The ISO received comments on the topics discussed at the November 26, 2018 stakeholder call from the following:

1. Bonneville Power Administration (BPA)
2. Center for Energy Efficiency and Renewable Technologies (CEERT), Renewable Northwest (RNW), National Resources Defense Council (NRDC), Northwest Energy Coalition (NWEC)
3. LS Power
4. National Grid Ventures, Rye Development LLC
5. Powerex Corp.
6. Public Advocates Office
7. Public Generating Pool (PGP)

Copies of the comments submitted are saved here:

http://www.caiso.com/planning/Pages/TransmissionPlanning/2018-2019TransmissionPlanningProcess.aspx

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

1. Bonneville Power Administration (BPA) Submitted by: Young S. Linn		
No	Comment Submitted	CAISO Response
1a	COI N-S Capacity Increase from 4,800 NW The Northwest AC Intertie (NW AC Intertie) is owned by BPA, PacifiCorp, and Portland General Electric, with BPA as the operating agent. In addition to the asset owners, other Northwest utilities have capacity ownership rights on BPA's portion of the NW AC Intertie. To the extent that TPP identifies changes to any operations on the Northwest AC Intertie, such changes must be led by the operating agent and the other facility owners. Since this new capacity can be achievable under favorable system conditions (i.e., all lines in service and certain generation pattern), it can only be made available for scheduling on a non-firm basis. It cannot be sold as firm transmission service by the transmission providers. In addition, a new line rating would be necessary when and if all of the intertie facility owners agree to undertake the next steps. Further, the allocation process for addressing the additional non-firm capacity as well as an implementation procedure will require coordination among the NW AC Intertie owners and CAISO.	The comment has been noted.
1b	Dynamic Transfer Capability on COI This past summer, BPA increased the Dynamic Transfer Capability (DTC) on the NW AC Intertie from 400 MW to 600 MW. As of December 1, 2018, BPA also removed the DTC Voltage Stability Limit (freezing/crimping) on the NW AC Intertie. It is important to note that a DTC study above the 600 MW was not part of the scope for the current 2018-2019 TPP informational study. Thus, a separate DTC study would be needed in the future to see what it takes to increase the DTC beyond the current 600 MW limit.	The comment has been noted.
1c	Intra-hour scheduling on PDCI Changes to any operations on the PDCI must be led by operating agents of the PDCI and the other owners of the facilities. Currently all energy schedules on the PDCI are done manually. BPA and LADWP make hourly phone calls for scheduling and balancing authority reconciliation functions. Because of the manual process, energy schedules on the PDCI must be in hourly increments. The intra-hour scheduling on the PDCI is one of BPA's grid modernization projects, and BPA plans to begin working on the project starting in early 2019.	The comment has been noted.

No	Comment Submitted	CAISO Response
	BPA estimates that the project schedule from the scoping phase to the implementation could take up to two years. Close coordination between BPA and LADWP, as well as the other asset owners, would be needed in order to scope system requirements and develop an implementation plan including a timeline for the final project.	
1d	Assigning Resource Adequacy Value to Firm Zero-Carbon Imports The November 26, 2018 presentation does not appear to fully address the questions asked by the CEC and CPUC about California and Northwest diversity opportunities. The limits on operational practices identified in the November 26 presentation may be more resolvable than described. The February 15, 2018 letter from Chair Weisenmiller and President Picker describes their broader interest in changing the dynamics of surplus renewable sales during certain hours and periods of the year. With respect to such broader policy implications the assumptions and restrictions in the November 26 presentation may be too narrow and dispositive. BPA remains committed to work with the CAISO to continue to explore the potential for long-term, firm deliveries of carbon-free resources to California customers. BPA and other owners of Pacific Northwest hydro currently are incented to sell carbon-free energy into California because of the favorable short-term energy price dynamic, rather than the long-term planning value collectively conferred by the owners or the favorable value proposition of an accommodative policy framework for selling long-term, carbon-free resource adequacy products deliverable to California entities. This and other processes should contemplate the implications of changes to the short-term incentive for selling carbon-free energy to California wrought by possible public policy changes in the Pacific Northwest and by possible enhancements to the CAISO's Maximum Import Capability (MIC) allocation framework rather than assuming that the status quo will continue in perpetuity. Solidifying our collective long-term planning and commercial foundation is paramount to further improvements on intertie facilities and infrastructure investments.	The study assessed the existing resource adequacy utilization and technical requirements of resource adequacy on the interties. Market enhancements were outside of the scope of the study. The ISO has initiated the resource adequacy enhancement stakeholder initiative that will consider these market issues. The link to the initiative on the ISO website is: http://www.caiso.com/informed//Pages/StakeholderProcesses/ResourceAdequacyEnhancements.aspx In addition please refer to the following CPUC's proceedings: - CPUC's RA Proceedings (http://www.cpuc.ca.gov/ra/) - CPUC's Integrated Resource Planning Proceeding (IRP) (http://www.cpuc.ca.gov/irp/

2. Center for Energy Efficiency and Renewable Technologies (CEERT) Renewable Northwest (RNW) National Resources Defense Council (NRDC) NW Energy Coalition (NWEC)	Submitted by: Liz Anthony and Jim Caldwell : Cameron Yourkowski : Julia Prochnik : Fred Heutte

No	Comment Submitted	CAISO Response
2a	In the initial letter asking CAISO to perform the Informational Study, the primary purpose indicated was to investigate the role of increased transfer capacities in the phase out of Aliso Canyon natural gas storage facility and reducing gas burn in the LA Basin. While CEERT, RNW, NRDC and NWEC see the analysis completed thus far as an important first step, an analysis on impacts to local capacity requirements in the LA Basin and on natural gas needs in California and in the LA Basin is needed to fulfill the purpose of the study. The LA Basin is essentially a single load pocket, even though it is operated by two balancing authorities and thus should be evaluated as a single physical system.	This informational study was the first step to identify potential opportunities to increase transfers between the Pacific Northwest and California. The main focus of this study, as stated in the letter received from the CEC and CPUC, is transmission and how it can facilitate transfer of energy between Pacific Northwest and California. The results of this study can inform other existing or future studies/initiatives, and in particular the ongoing CPUC Aliso Canyon Investigation (http://www.cpuc.ca.gov/AlisoOII/). The ISO is participating in that investigation.
2b	CEERT, RNW, NRDC, and NWEC seek clarification on whether Most Severe Single Contingency (MSSC) was studied. In the Study Scope, "potential change in [MSSC] and its impact on system planning and operation" was listed as an analysis for increasing capacities on the PDCI. The PDCI is not normally the current MSSC for CAISO, LADWP, or BPA, but in the future it will likely be with events like retirement of Diablo Canyon Power Plant, closure of the IPP coal plant, and changes in dispatch in the Pacific Northwest.	The assessment considered the contingency of PDCI with the existing ratings.
2c	We urge that the methodology development in this Informational Study is continued into the 2019-20 TPP with both physical infrastructure and upgrades. The Swan Lake pumped hydro project could provide extensive flexibility between the two regions. A physical upgrade to the PDCI to improve transfer capabilities should be studied, given that the modest increases in transfers studied in this round appear to have benefits.	The comment has been noted. The ISO has also conducted extensive study of the benefits of bulk storage over the last several transmission plans, including the recently released draft 2018-2019 Transmission Plan. LADWP is commencing a third party consultant study to conduct an engineering and planning study to identify the system upgrades, modifications, outage constraints required to increase the PDCI transfer capability from 3220 MW to 3800 MW. The studies are expected to be completed by the end of Q3, 2019.
2d	Finally, a continuation of this study should tie together with the follow on work for the Malin Study (CAISO economic study). Particularly, the impact of loop flow and the potential advantages of projects like the SWIP N transmission line on capacity on the PDCI and AC intertie.	The comment has been noted. SWIP - North was submitted as a potential reliability project, an economic study request, and as an interregional transmission project into the ISO's 2018-2019 transmission planning cycle, and, as per the draft plan released on February 4, 2019,

No	Comment Submitted	CAISO Response
		the ISO has not identified a need for the project as this time and with the planning assumptions currently in place. The ISO's neighboring planning regions also did not find a need for the project in this biennial interregional planning cycle.
2e	Given the interregional nature of the Informational Study, we hope promising projects can then be submitted into the interregional process. Projects that enable increased coordination between CA and the PNW are prime examples of the types of projects intended for study in the interregional process, which can insure a full view of benefits and implications for each region.	The comment has been noted. The ISO notes that the next opportunity to submit interregional transmission projects into the planning regions in the western interconnect is in 2020. (The interregional coordination process is a biennial process, as only the ISO has an annual process, and the other planning regions have biennial processes that align with the interregional coordination process.)

3. LS Power Submitted by: Sandeep Arora		
No	Comment Submitted	CAISO Response
3a	Increased Capabilities for Transfers of Low Carbon Electricity between the Pacific Northwest and California: Near Term Assessment It is unclear at this time whether CAISO and other Path Operators will seek the higher ratings through the WECC Path rating process or not. LS Power requests CAISO to clarify the following questions: (1) It appears that the decision to use the higher path limits will be made in Real Time Operations. If that is the case, will the CAISO Day Ahead Market use the existing ratings? (2) LS Power understands CAISO, BPA, and LADWP will be conducting additional studies before CAISO finalizes its recommendations on Near Term Assessment. If transmission upgrades are recommended to enable higher path limits, will CAISO be comparing these upgrades with other solutions, such as new transmission projects that may help achieve even higher PAC-NW to CA transfers but via different transmission paths?	The ISO's recommendation is that a process be initiated to increase the WECC path rating when the ongoing review of the WECC path rating process itself is completed and if the updated path rating process no longer requires the outage of adjacent circuits that are not on the same tower to always be considered an N-2 contingency. The focus of this study was to determine the maximum capacity under favorable conditions. Details of how the higher ratings will be utilized will be determined at a later stage, if the WECC path rating process is modified as discussed above and a revised path rating is obtained. This study is not recommending transmission upgrades, and it was conducted for informational purposes only.
3b	Increased Capabilities for Transfers of Low Carbon Electricity between the Pacific Northwest and California: Long Term Assessment The long-term analysis shows the number of hours in a year this path can get congested but did not quantify the cost impact of this congestion. As CAISO finalizes its analysis, it should also report this congestion cost.	The updated results with congestion cost were included in the draft transmission plan.

No	Comment Submitted	CAISO Response
	Further, it appears CAISO's congestion analysis was performed using the full 4800 MW N-S limit for the COI path, not the 3200 MW N-S scheduling limit for PACI interface. Using the full 4800 MW COI rating will undoubtedly mask congestion that is routinely witnessed on this path, as noted in CAISO Annual DMM reports. Including the 1600 MW capacity of the California-Oregon Transmission Path COTP path, which isn't owned by CAISO LSEs, for energy transfers into CAISO is an improper assumption for this analysis. In addition, as noted in CAISO's presentation, 1200 MW out of the 3200 MW PACI scheduling limit comprises of ETCs and TORs that are owned by entities outside CAISO. This leaves only about 2000 MW out of the total 4800 MW on COI that CAISO should use for its economic analysis. The other 2800 MW should be modeled with a large hurdle rate for flow to enter the CAISO system. Unless CAISO correctly captures these scheduling realties, its economic analysis will lead to inaccurate findings. Consistent with LS Power's comments recently submitted it is extremely important to capture COI/PACI congestion accurately in CAISO's Planning Analysis. Once this congestion is correctly captured, Economic Projects submitted into this year's Planning process should be studied to understand if any of these projects help address congestion and thereby lead to ratepayer savings. This additional work will make great strides in providing useful conclusions for this Special Study and will help guide policy makers in decision making with respect to whether transmission investments should be made to increase PAC-NW to CAISO transfers. This analysis can also guide the 2019-20 IRP process with respect to portfolios that should be used for CAISO's 2019/20 TPP.	In the production cost model, the COI path not only terminates within the ISO territory (two of three lines), but also terminates within the BANC territory (the remaining line). The COI path rating of 4800 MW with outage derates was enforced. This is consistent with current system operation. ETCs may limit the ISO market's access to the additional physical capacity in the Day-ahead market. The ISO is accordingly investigating with its neighbors the possibility of accessing this capacity. The analysis in the ISO's transmission planning study continues to focus on incremental gains in physical capacity – either by rating increases on the existing facilities or by system reinforcements.

4. National Grid Ventures Rye Development, LLC	Submitted by: Nathan Sandvig : Erik Steimle	
No	Comment Submitted	CAISO Response
4a	National Grid and Rye Development continue to believe that the PNW Import Study paints an incomplete picture of the possibilities for expanding transfer capability between the PNW and California, particularly because it fails to consider resources like pumped storage that have the potential to significantly expand the transfer capability between these two regions.	Please see response to comment 2a. As noted, the focus was on transmission capacity, and the consideration of new resources takes place through the CPUC's IRP process.
4b	A. The PNW Import Study Inappropriately Excludes Consideration of Pumped Storage Resources. As a threshold matter, National Grid and Rye Development recognize that prudent transmission planning focuses on scenarios that represent the highest stress on the transmission grid, and that as part of the PNW Import Study, Pacific Northwest ("PNW") hydro conditions must be taken into account when considering pressures on the regional transmission system. Closed-loop pumped storage can provide significant benefits to the CAISO and PNW transmission systems, many of which will further increase the transfer capability between California and the PNW. National Grid and Rye Development continue to request additional studies to quantify the benefits of pumped storage for policy makers and regulators. National Grid and Rye Development would be happy to provide technical data or otherwise cooperate with the CAISO study team in order to ensure a robust and complete study of the benefits associated with the increased transfer of low-carbon energy between California and the PNW.	Please see response to comment 2a and 4a. Economic study requests can be proposed in the ISO's annual transmission planning studies.
4c	B. The PNW Import Study Assumptions Are Conservative The final study report resulting from the PNW Import Study needs to underscore its assumptions are highly conservative, and therefore, any results, even if benefits are shown, are likely incomplete due to those very conservative assumptions. Pumped storage resources have the unique capability of providing greater reliability and flexibility to both the PNW and California transmission systems at a time when flexibility is most needed in order to integrate increasing amounts of variable generation.	The comment has been noted.
4d	C. Next Steps/Future Studies National Grid and Rye Development encourage CAISO to conduct subsequent studies with generation assumptions that reflect the likely future mix of generation resources for the PNW, while also taking into account the carbon policy goals of Oregon and Washington. In particular, any future study should	The comment has been noted. Please refer to the response to 4a.

No	Comment Submitted	CAISO Response
	consider pumped storage resources, as these resources are likely to play a pivotal role in meeting future demand for flexible capacity and storage of intermittent sources of energy.	
4e	D. Evaluation of Policy and Regulatory Barriers to Increased Transfers. National Grid and Rye Development suggest that any future study should include an analysis of market seams issues and other policy or regulatory barriers such as the impact of California's Export Fees, as well as the transmission rates on the Southern Intertie charged by the BPA and others. Such an examination of export fees and transmission rates seems especially timely since CAISO work to date suggests that roughly 3,700MW to 6,300MW of available South-to-North transmission capacity currently exists on the Pacific Intertie (i.e. PDCI and COI combined). The principal reason that this South-to-North Intertie capacity goes unused is the CAISO's $11-12/MWh Export Fee. Eliminating or discounting this fee (e.g. waiving it when CAISO's Day Ahead Market projects negative prices at either NP-15 or SP-15) would help CAISO and other scheduling coordinators in California avoid significant midday curtailment of solar resources after 2020.	The comment has been noted. While the issue of export charges was examined a few years ago, the ISO does not consider the export fee to be a major impediment in light of the -150/MWh bid floor. There were also complexities in differentiating between exports scheduled to serve load, and those providing balancing services. However, this issue can be suggested for consideration in the ISO's annual policy initiatives process.
4f	**III. Conclusion** National Grid and Rye Development assert that final report will be incomplete because it will inadequately portray to its readers that existing PNW hydro generation is the only method for increasing transfer capability between California and the PNW, even though other generation options exist that would significantly increase such transfer capability. For this reason, National Grid and Rye Development continue to call on CAISO to conduct additional planning studies that consider the benefits of pumped storage, and thereby, properly evaluate the additional potential transfer capabilities these resources could provide between California and the PNW.	The comment has been noted.

5. Powerex Corp. Submitted by: Mike Benn		
No	Comment Submitted	CAISO Response
5a	Powerex believes that products and services such as capacity, flexibility, and battery-like arrangements that better utilize solar energy production can likely be provided by northwest hydro resources at substantially lower total cost, and with no GHG emissions, than obtaining these same services from new facilities. Powerex believes while transmission capacity is a limitation but the key obstacle is the lack of an adequate forward market framework for the procurement of the products or services required by California to integrate additional renewable resources. Such forward arrangements both "lock in" the services needed by California and also enable northwest entities to plan their systems well in advance of delivery, potentially unlocking far more flexibility than the limited residual capability that can be made available without advance planning. Historical data are likely to be highly inaccurate predictors of future availability. This is quite simply because the entire western interconnection, and not just California, is experiencing substantial changes in its resource mix, its load patterns, and its related grid challenges. Thus in those areas where the Study makes assumptions about the continued future availability and capabilities of northwest hydro, the Study's conclusions may erroneously assume higher levels of northwest hydro participation in California's markets than may be realized in the future. Absent the development of robust forward procurement programs for capacity, flexibility, and battery-like services, the CAISO grid will remain on a path that appears inconsistent with California's environmental policy goals and is not least-cost for California's ratepayers. In contrast, forward procurement of capacity, flexibility and battery-like services from northwest storage hydro entities can provide California with large scale renewable integration services that are low-risk, cost-effective, and can be implemented quickly. Such arrangements would support California's continuing transition to clean, renewable resources, including enabling the continued expansion of in-state solar generation and the gradual adoption of in-state storage solutions.	The comment has been noted. Please see response to comment 1d. The comment has been noted. Please see response to comment 1d.

No	Comment Submitted	CAISO Response
5b	I. Powerex Strongly Supports Enabling Sub-Hourly Scheduling On The PDCI The ability of the PDCI to be used to help manage solar oversupply and/or to help meet morning and evening net load ramps is severely limited, since flows on the line may only be scheduled on an hourly basis. This makes the line wholly ineffective in accessing flexible resources on an intra-hour basis, including through either intertie bidding in the CAISO's Fifteen Minute Market or through 15-minute (and 5-minute) EIM transfers. Moreover, the lack of price certainty for block hourly schedules in real-time, under the CAISO's current real-time market rules, discourages even hourly-level participation in the CAISO real-time market. In other words, despite its seemingly "perfect fit" as a conduit for real-time transactions that support renewable integration, the PDCI is currently used almost exclusively for hourly schedules arranged on a forward and/or day-ahead basis. Powerex believes there are significant operational and economic benefits associated with overcoming the existing scheduling limitation. Moreover, unlike other aspects of the Study, realizing these benefits depends only on completing the facility upgrades, and does not depend on other market enhancements. For these reasons, Powerex believes that the upgrades necessary to enable sub-hourly scheduling on the PDCI should be pursued with high priority.	BPA and LADWP have initiated a joint study to assess the system impact and system enhancement requirements in both BPA and LADWP systems for implementing sub-hourly scheduling on PDCI.
5c	II. Powerex Supports Increasing Dynamic Scheduling Capability Across COI And Bonneville's Primary Network Powerex is generally supportive of exploring measures that enable a higher level of dynamic scheduling between the northwest and California. However, Powerex understands that the DTC limit on the COI is not solely the result of conditions on the COI facilities alone. In that regard, eliminating the COI DTC limit could potentially require Bonneville to implement other forms of limitations on its transmission system, such as limiting dynamic transfers within its primary network, imposing new or more expansive rate-of-change limits, and/or "crimping" dynamic transfers in real-time. Powerex believes that the current DTC limits—which are known in advance and allocated to COI rights holders on a day-ahead basis—may be preferable to the introduction of more complex or uncertain restrictions that are known only in real-time. Powerex therefore supports exploring ways to increase dynamic scheduling on the COI, but only if achieved in a manner that does not introduce new or expanded limits on dynamic scheduling on the Bonneville primary network, and only if such	BPA's "DTC Roadmap" document details the studies BPA is planning to perform to identify real time or study tools as well as system enhancements required to increase the DTC beyond 600 MW. The roadmap has been included in Appendix H of the 2018-2019 Transmission Plan

No	Comment Submitted	CAISO Response
	increases do not lead to increased risk of schedules being further limited or "crimped" in real-time.	
5d	III. The Analysis Of Increased Transfer Capacity Contains Significant Gaps The Study's near term assessment does not appear to address the chronic inability of the COI to achieve its current capacity rating. For instance, despite having a full rating of 4,800 MW, the COI has been de-rated by at least 100 MW in over 50% of hours during 2018 to date, and in more than 70% of hours in 2017. In fact, de-rates on the COI were so common and so large that the average rating in 2018 was approximately 4,200 MW, while in 2017 it was approximately 3,800 MW. The Study's near-term assessment appears to focus only on increasing the COI rating above 4,800 MW under specific, favorable conditions, but it does not appear to address the factors that frequently limit flows on the COI to less than this quantity during the majority of hours. In other words, it appears that the near-term opportunities to achieve an increased transfer capacity may be extremely limited unless the root causes of chronic de-rates are addressed. Indeed, increasing the rating of the path without addressing chronic de-rates could result in additional firm rights being issued, requiring higher levels of pro-rata curtailments to all firm transmission rights-holders during the frequent circumstances when the full rated capacity is not available. The near-term assessment also examines south-to-north flows. However, given that flows on the COI and PDCI have been consistently (and almost exclusively) in the north-to-south direction, it is unclear that the northbound capacity rating presents a binding limitation in the near future. The Study's long-term assessment is predicated on production cost modeling. While recognizing that hydro modeling is critical to the study, it appears that the analysis consists of highly simplistic assumptions of available energy based on historical information, with more detailed modeling of only those northwest hydro resources whose output is marketed by Bonneville. Although Powerex recognizes Bonneville's importance to the examination of inter-regional trade benefits on the COI and PDCI—as both the key transmission provider as well as a key hydro participant in the region—the Study fails to include	In the ISO's planning PCM, scheduled outages that result in repeatable congestion cost to the ratepayers were modeled, which were the annual maintenance outages provided by the facility owners. The corresponding derates were also modeled. North to South congestions on Path 26 and PDCI were observed in the production cost simulation results. Hydro generator models of regions in this study are consistent with the WECC ADS PCM, with adding sensitivities of different hydro conditions provided by Northwest regions. The PCM did not impose any hurdle on the interties, and the export hurdle is only imposed on flows from one BAA to other BAAs. With this transmission right on the interties are not modeled.

No	Comment Submitted	CAISO Response
	consideration of numerous other hydro entities and numerous other firm transmission rights holders on the interties. Powerex supports further dialog and analysis of the potential benefits that may be achieved through increased inter-regional trade in products and services, including the benefit of any proposed expansion of the COI and/or PDCI. However, for any such analysis to provide meaningful insights, it must be based on a sound and realistic representation of the capabilities of all hydro entities in the northwest and of all entities with reserved long-term transmission rights on the interties.	
5e	IV. Unlocking RA And Other Value Of Northwest Resources Requires A Robust Forward Procurement Market Framework, Not Transmission Upgrades The process for allocating the maximum import capacity ("MIC") of each intertie to California LSEs has been a barrier to procuring RA capacity from external resources. The observation that RA showings have been less than the MIC reflects this barrier, whereas the Study appears to interpret this outcome as indicating that external resources are simply not valuable for meeting RA requirements.	Please see response to comment 1d.
5f	V. Transmission Infrastructure Is Not The Primary Barrier To The Northwest Providing Renewable Integration And Capacity Services To California Powerex believes that the Study errs in focusing on transmission infrastructure as the primary barrier to unlocking these benefits. With the exception of enabling sub-hourly scheduling the PDCI, Powerex does not believe that expansion of transmission facilities should be the primary focus of efforts to increase inter-regional transactions and coordination in the coming years. A large storage hydro system may be able to enter into forward arrangements whereby it commits to offer to absorb up to a defined quantity of California solar oversupply during the midday hours throughout the winter and spring periods. Knowing of this commitment well in advance, the operator of the hydro system may manage its reservoir levels very differently earlier in the season, so that both native inflows and California surplus solar energy can be absorbed throughout the winter and spring seasons without approaching maximum reservoir elevations or running up against other binding constraints.	Please see response to comment 1d.

No	Comment Submitted	CAISO Response
	Powerex believes that current CAISO stakeholder processes, particularly the RA enhancements initiative, provides an important opportunity to consider improvements to the procurement of forward capacity. The forward procurement of flexibility and of battery-like services, however, may need to be addressed through new initiatives, and in coordination with other agencies including the California Public Utilities Commission and the California Energy Commission.	

6. Public Advocates Office Submitted by: Fidel A. Leon Diaz		
No	Comment Submitted	CAISO Response
6a	1. Provide the economic impact of increasing the transfer capability in the north to south direction between the Pacific Northwest and California. The CAISO proposed load shedding, additional voltage support in California, increased generation tripping in the Pacific Northwest, and the use of Flexible Alternating Current Reactive Insertion (FACRI) as mitigation measures to increase COI rating. The CAISO did not provide the quantity and costs for these proposed mitigation measures. The Public Advocates Office requests that the CAISO provide cost estimates for its proposed mitigation measures to increase transfer capability between the Pacific Northwest and California in its final special study report. The CAISO should also further explain the potential gain from the proposed load shedding and increased generation tripping mitigation measures in its final special study report. If mitigation measures in the north to south direction are pursued, the Public Advocates Office requests that the CAISO determine the economic impact of these mitigation measures to the Pacific Northwest region for cost allocation purposes.	The informational study didn't recommend any transmission upgrades to increase COI rating at this point. However the benefits of higher COI rating in the long term is estimated through production cost simulation. More details are provided in Section 4.3.2 of Appendix H in the draft 2018-2019 Transmission.
6b	2. Provide the economic impact to California of increasing the transfer capability in the south to north direction between California and the Pacific Northwest. The results from the CAISO's sensitivity studies reveal that increasing the path rating on the Pacific Direct Current Intertie (PDCI) above 1,000 megawatts (MW) would result in congestion in the south to north direction. Congestion would also occur on Path 26 in the south to north direction under the 1,000 MW path rating PDCI sensitivity that would have a monetary impact. The proposed mitigation measures to address congestion on the PDCI include: Remedial Action Schemes (RAS), generation curtailment, and phase shifter transformer upgrades. To better understand the economic value of these proposed mitigation measures, the CAISO should determine the demand for California's excess energy in the Pacific Northwest, and the potential revenue California could receive from the transfer of its excess energy to the Pacific Northwest. These monetary benefits could then be compared to the costs of the proposed mitigation measures. The Public Advocates Office requested that the CAISO determine the Pacific Northwest's demand for California's excess energy in its	The comment has been noted. In the ISO Draft 2018-2019 Transmission Plan, the PDCI modelled at its WECC path rating didn't show any congestion but a simulation with a 1,050 MW S-N PDCI limit indicated 76 to 385 hours of congestion with an estimated congestion cost of $0.5 million to about $3 million (see Table 4.3-5 and 4.3-6 of Appendix H of the ISO Draft 2018-2019 Transmission Plan). The study is exploratory at this time and the ISO would certainly evaluate cost effective alternatives before recommending approval.

No	Comment Submitted	CAISO Response
	October 5, 2018 comments on the preliminary results from the 2018-2019 TPP. The Pacific Northwest's level of demand for California's excess energy has still not been provided. Additionally, the economic value of increasing the transfer capability in the south to north direction should be compared to the cost of new storage in California as an alternative means to utilize California's excess energy. As part of the 2018-2019 TPP, the CAISO is considering storage to address existing congestion and renewable curtailment in southern California's renewable procurement locations. If transfer capability mitigation measures in the south to north direction are pursued, the Public Advocates Office requests that the CAISO determine the economic impact of these mitigation measures to the Pacific Northwest region for cost allocation purposes.	
6c	3. Increased Coordination between the CAISO, the Bonneville Power Administration, and the Los Angeles Department of Water and Power The CAISO indicated that joint studies with the BPA and LADWP will be performed to fully assess and determine the necessary modifications needed to allow for sub-hourly scheduling on the PDCI. The Public Advocates Office recommends that the CAISO, LADWP, and BPA should collaborate and study the PDCI and the California-Oregon Intertie (COI). As part of this collaboration, the CAISO should determine BPA's and LADWP's scheduled usage of the COI and the PDCI to determine the feasibility of increasing dynamic transfers or implement sub-hourly scheduling on these paths.	A joint study group between BPA, LADWP, and CAISO has been formed to evaluate the system impact and potential reinforcements required to facilitate sub-hourly scheduling on PDCI.
6d	4. Conduct Additional Hydroelectric Sensitivity Studies The final report should address how state and federal policies could affect the hydroelectric production calculations in this study. While such policies cannot impact factors such as weather, policies such as dam upgrade spending and new hydro development will affect hydroelectric production. If investments for hydro infrastructure improvements are adopted as federal or state policies, it would be possible to see how the subsequent increase in hydroelectric production could impact transfer capacity between the Pacific Northwest and California. The final study should provide a high-level analysis of the hydroelectric policy landscape and how it could impact the study's conclusions.	Please see response to comment 1d. In addition, it is expected that the owners of hydro facilities will take the impact of policy changes into account in their submission to WECC Anchor Data Set (ADS).

7. Public Generating Pool (PGP) Submitted by: Laura Trolese		
No	Comment Submitted	CAISO Response
7a	I. General Comments Assigning an RA value to firm zero-carbon imports or transfers into California, PGP has from the beginning struggled with the purpose and intent of this portion of the study within the context of transmission planning. PGP understands that this element of the study was requested in the CEC/CPUC Letter. However, given that Resource Adequacy covers such a broad spectrum of reliability and commercial issues, PGP believes a more appropriate forum to study this issue is within the CAISO's and CPUC's RA program. PGP believes evaluation and incentives for avoided GHG emissions from transfers of Northwest hydro to and from California is rightly placed within the context of Resource Adequacy rules and CAISO Market Design. Historical flows on the COI and PDCI are not a good indicator of future flows and the benefits of avoided GHG reductions from Northwest hydro imports cannot be guaranteed without forward commitment through RA contracts.	Please see response to comment 1d.
7b	II. Carbon Free Energy From Northwest Hydro Cannot Be Assured Without Long-term Commitments The traditional flows of low-carbon hydro energy on the Pacific AC and DC Interties is not necessarily a valid predictor of future energy transfers between the two regions. The Northwest is seeing significant planned retirements of gas- and coal-fired resources in the near to mid-term, which will increase the demand for Northwest hydro capacity and energy. Continued avoided GHG emissions from transfers of low-carbon energy to and from the Pacific Northwest cannot be assumed without forward procurement of Northwest hydro resources on a long-term basis.	Please see response to comment 1d.
7c	III. The Characteristics of All Northwest Hydro Resources Should be Considered in The Analysis There is approximately 46,000 MW of existing carbon-free hydroelectric generating capability in the Pacific Northwest and Canada.	Multiple hydro conditions were considered in the study, based on the data provided by the Northwest Power and Conservation Council and BPA. These hydro conditions were described in the draft transmission plan. Generators in northwest under contract with California entities were modeled accordingly the PCM, all based on public available information.

No	Comment Submitted	CAISO Response
	<table><tr><th>Utility</th><th>Hydro Capacity (MW)</th></tr><tr><td>Bonneville Power Administration</td><td>~22,450</td></tr><tr><td>BC Hydro</td><td>~11,850</td></tr><tr><td>Consumer-Owned Utilities</td><td>~6,200</td></tr><tr><td>Investor-Owned Utilities</td><td>~5,500</td></tr><tr><td>TOTAL</td><td>46,000</td></tr></table> *Source: PNUCC Northwest Regional Load Forecast and BC Hydro Fact Sheet*[3] The Northwest region has surplus even in low water years with Northwest utilities applying conservative planning rules. The Northwest region has between 4,000 – 11,000 aMW of surplus depending on the water year. CAISO lists the potential priority of Pacific Northwest entities to serve local loads as a potential barrier for higher RA contributions from Northwest hydro. Certainly, there are federal statutes, such as the Northwest Power Act, that obligate BPA to use its federal hydropower to serve Northwest entities prior to BPA selling power out of the region. However, given that BPA only accounts for about half of the hydro in the Northwest, PGP believes it is important that the characteristics of all Northwest hydro resources be considered for RA when evaluating the range of potential transfers of energy from Northwest hydro resources to and from California. PGP requests CAISO provide more information regarding the planning assumptions used to model hydro resources when scoping the potential priority of Pacific Northwest entities to serve local loads as a barrier to higher RA contributions, specifically from Northwest hydro.	The PCM database will be posted on the ISO Market Participation Portal when it is finalized.
7d	IV. Barriers to Higher RA Showings from NW Hydro Should Be Fully Examined PGP also believes it is important for purposes of this analysis to examine the full range of barriers to higher RA showings of Northwest hydro resources and also to identify potential solutions that reduce or eliminate those barriers. Listed below as reference are three barriers that could be considered in CAISO's and/or the CPUC's RA program: 1) Maximum Import Capability (MIC) allocation process leaves import capability unusable. 2) RA import allocation is one year at a time. 3) Northwest hydro is precluded from participating in flexible RA.	Please see response to comment 1d.
7e	V. NW Hydro Can Be Forecasted Months and Even Years in Advance Northwest hydro resources can be forecasted far in advance of actual operations. Northwest hydro operators take uncertainties into account when	The comment has been noted.

No	Comment Submitted	CAISO Response
	defining their firm surplus capacity on a forward basis. And while Northwest hydro resources may have less firm surplus available the further out into the future, they can have high confidence of specific amounts of capacity 45 days out and 14 months out, the timelines necessary for California load-serving entities to procure their allocated share of the RA obligation. In fact, Northwest hydro resources regularly sell firm monthly, yearly and even multi-year firm capacity contracts on a forward basis.	
7f	VI. NW Hydro RA Capacity Has Not Been Shown to Be More Costly The study concluded that firming up capacity and energy going through a number of balancing authority areas may result in additional cost compared to internal California resources. PGP requests the assumptions or basis for this conclusion, or any analysis that substantiates that the cost of NW hydro capacity is expected to be a barrier to higher RA contributions from Northwest hydro.	The likelihood of higher cost of firming up capacity and energy as it goes through number of BAs was presented as a potential barrier for higher RA showings, rather than a conclusion based on historical data. This and other potential barriers could be considered in RA Enhancement and other initiatives.
7g	VII. Conclusion PGP believes this analysis is just the beginning of a broader conversation of how participation of Northwest hydro resources in California's RA program can be expanded. The inability to secure forward commitments and appropriate compensation through long-term RA contracts may alter the conclusion that California would continue to avoid GHG emissions from the transfer of low-carbon energy to and from the Pacific Northwest. There are opportunities to increase RA showings of Northwest hydro resources. As the CEC and CPUC develop a strategy that would allow for the shutdown of the Aliso Canyon Natural Gas Storage facility, it is important that forward procurement of long-term Northwest hydro resources remain part of the solution and that attention be devoted to identifying and removing barriers to participation in California's RA program. PGP urges that collaboration and dialogue be continued with a renewed awareness of the importance and inherent flexibility the Northwest hydro's resources can offer to the CAISO grid. PGP advocates for the CAISO to continue exploring the RA value Northwest hydro can offer in support of California's overarching policy objectives in the RA Enhancements initiative.	Please see response to comment 1d.