

The ISO received comments on the topics discussed at the June 20, 2016 stakeholder meeting from the following:

1. Bay Area Municipal Transmission group (BAMx)
2. California Energy Storage Alliance (CESA)
3. California Wind Energy Association (CalWEA)
4. TransWest Express LLC (TransWest)

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

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

No	Comment Submitted	CAISO Response
1	Bay Area Municipal Transmission group (BAMx) Submitted by: Joyce Kinnear	
1a	<p><u>Special Studies – 50% Renewable Energy Goal for 2030</u></p> <p>BAMx supports the effort in this planning cycle to better understand the potential impacts that a California 50% renewable energy requirement may have on the electric transmission infrastructure needs. The effort can provide valuable information as to where infrastructure improvements may be required, but it also provides guidance to the procurement process as to how some potentially costly upgrades may be avoided.</p> <p>It is very important to understand that this Special Study should develop information to improve the assumptions made by the RPS Calculator to be used in selecting proper renewable resource portfolios for detailed studies of the need for transmission infrastructure in the next planning cycle. BAMx believes that the RPS calculator is the best available tool to decide whether to build additional transmission infrastructure in order to accommodate more renewables in a particular location and to decide whether such resources should be energy-only or fully deliverable. It is a sophisticated tool, but it relies upon the transmission capability estimates developed by the CAISO as an input. The upcoming Special Study is a valuable opportunity to use power system and production cost (congestion) analysis tools to provide this important information to the RPS Calculator, which has the ultimate job of deciding appropriate renewable portfolios for additional detailed study.</p> <p>Communication of the study results will be highly important. There are many aspects associated with the safe and reliable operation of the California electric system. While electric infrastructure is a critical component necessary to integrate higher levels of renewable generation, other aspects, such as resource integration, disturbance performance (including governor response, inertia, short circuit current, etc) and cost are similarly important. Therefore, results and recommendations from the transmission study in this cycle must be carefully crafted so that all audiences are aware that this analysis addresses only a fraction of the considerations necessary for an electric system to be sufficiently flexible to accommodate a higher level of renewable generation.</p>	<p>Your comments have been noted.</p>

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	<p>In the remaining portion of these comments, BAMx suggests some changes to the Special Study plan proposed during the June 20th public webinar.</p>	
<p>1b</p>	<p><u>Special Study Portfolios Recommendations</u></p> <p>During the June 20th public Webinar, the CPUC Energy Division (ED) and the CAISO proposed the following four portfolios.</p> <ol style="list-style-type: none"> 1. Portfolio #1: In-State Full Capacity Deliverability Status (FCDS) that includes only “fully deliverable” In-State resources; and 2. Portfolio #2: In-State EO that includes a possible mix of “fully deliverable and energy only” In-State resources. 3. Portfolio #3: Out-of-State (OOS) FCDS that includes only “fully deliverable” In-State resources and a “set aside” of “fully deliverable” 2,000 MW of Wyoming wind and 2,000 MW of New Mexico wind; and 4. Portfolio #4: OOS EO that includes a possible mix of “fully deliverable and energy only” In-State resources and a “set aside” of “energy-only” 2,000 MW of Wyoming wind and 2,000 MW of New Mexico wind. <p>Ultimately, BAMx would favor studying a WECC-wide portfolio that includes a possible mix of “fully deliverable and energy only” resources, as determined from a least-cost best-fit perspective using the RPS Calculator version 6.2. To identify the most economical portfolios, BAMx does not see any rationale for applying any artificial restriction to procure only In-State renewable resources or assuming that all the 50% RPS resources need to be FCDS. However, as stated above, given that the primary objective of the Special Study is to identify the constraints that would form the basis for the transmission inputs to the RPS calculator for future use, we appreciate the design of the proposed four portfolios. For example, it is important to know what the additional transmission upgrades that would be needed, if any, at the Gateway CREZs, such as</p>	<p>BAMx’s characterization of CAISO’s approach towards testing out-of-state resources is reasonable. As noted, the primary objective of assuming certain MW being delivered into ‘gateway’ zones within California is to test the available in-state transmission capability and any upgrades which might be needed to deliver out-of-state resources from these ‘gateway’ points to the load centers in California.</p> <p>The existing transmission capability that can be expected to be available for importing out of state renewables into California will be considered as part of the interregional transmission planning process, and available results will be incorporated into the 50% RPS special study.</p> <p>The special study will attempt to capture the impact of export assumptions on the transmission system by looking at a range of exports in production cost modeling, but determining an export limit is beyond the scope of this year’s study. This will be considered as a possible study in future cycles.</p>

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	<p>Mountain Pass to accommodate the incremental FCDS (or EO) OOS resources delivered at Eldorado. BAMx believes that this was exactly the CAISO's logic in setting aside 4,000 MW of OOS wind resources in portfolios #3 and #4. Please confirm and provide clarification, if any.</p> <p>BAMx requests the CAISO and the CPUC ED to revise the Special Study portfolios to take into account the full capability of existing transmission in accessing OOS resources and to export energy. Currently, the RPS Calculator assumes that no existing transmission is available (e.g., new transmission must always be built) to access OOS renewable projects. BAMx believes that studying this particular assumption should be a high priority for the Special Study. There needs to be a better understanding among the policymakers and stakeholders regarding the level of OOS renewable resources that can be imported into and exported out of California on the existing transmission infrastructure. Moreover, this information is a very important input to the RPS Calculator. There is clearly some amount of energy that can be imported over the existing transmission system. The SB 350 study assumes that nearly 3,000 MW of external medium- quality wind and solar resources would be available over the existing transmission system at the proximity to the existing delivery points into California.² BAMx is not aware of the detailed reasons for the zero or for the 3,000 MW assumption or why the study should include any <i>particular</i> number.</p> <p>However, there is strong evidence that the number should be at least 2,000 MW. BAMx strongly encourages the study plan to include an analysis of what level of import should be assumed as an input in the RPS Calculator version 6.2. The currently proposed portfolios assume that the CAISO's net export capability is limited to only 2,000 MW. The CAISO's 2015-16 TPP Special Study has clearly demonstrated that net exports are highly effective in addressing over- generation and in reducing the potential renewable curtailments.³ The SB 350 studies have assumed two different levels of net exports, 2,000 MW and 8,000 MW.⁴ It is reasonable to expect that even with the existing market structure, neighboring balancing authorities would enter into transactions</p>	

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	<p>to purchase negatively priced energy in excess of the historically observed 2,000 MW upon which the net export limit assumed in the Study Plan and SB 350 studies is based. BAMx hopes the CAISO will develop the proper assumptions and good analysis as backup for the capability to export from the existing CAISO grid to be included in the Special Study.</p>	

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2	California Energy Storage Alliance (CESA) Submitted by: Jin Noh	
2a	<p>CESA appreciates the opportunity to comment on the CAISO's 50% RPS Special Study (50% RPS Study) to be included in the CAISO's 2016 – 2017 Transmission Planning Process (TPP). CESA's concern regarding the 50% Study is an overarching one that relates to all of the special studies underway and planned in the CAISO's Final Study Plan. Unsurprisingly, none of the special studies are currently scoped to consider the impact of major energy market changes taking place in real time, such as the response to the Aliso Canyon gas leak and PG&E's recent announcement that it intends to shut down Diablo Canyon and replace it with renewables and other preferred resources, including energy storage. CESA submits that the CAISO should consider revisiting <i>all</i> of the special studies included in the Final Study Plan to account for events of this magnitude, and that the scopes of the CAISO's special studies should be modified if need be, to conform to a Revised Final Study Plan.</p> <p>On June 22, 2016, CESA submitted comments supporting the SB 350 Special Study currently investigating potential transmission needs to meet the state's goal of 50% renewables by 2030 (SB 350 Study). CESA recommended in those comments that the CAISO study how non-wire alternatives can cost-effectively meet transmission needs. Apparently, the plan for the SB 350 Study is that it will be 'informational only', and will be used to improve transmission inputs into the RPS calculator 6.3, which will be used to develop RPS portfolios that will be used in future TPP cycles beginning with the 2017 – 2018 TPP. Draft resource data updates to the 50% Study are planned to be available at the TPP meeting to be held in November 2016, and the final 50% RPS Study is expected to be finalized early in 2017.</p> <p>CESA is also on record in March 2016 as commending the CAISO for conducting a Bulk Energy Storage Resource Case Study (Bulk Storage Study) in the 2015-2016 TPP planning process that explored the ability of a bulk storage resource to reduce production costs, emissions, renewable curtailments, and renewable overbuilds. The Bulk Storage Study represented a major step toward demonstrating the value of bulk storage resources in a</p>	<p>As shown on Page 20 of the 2016-2017 Transmission Planning Process Study Plan, Diablo Canyon is being modeled off-line based on the OTC Compliance dates. In other words Diablo Canyon is off-line in the 2026 base cases that will be used for all studies in the current planning cycle.</p> <p>In addition, there is already a special study dedicated to the potential loss of gas storage such as Aliso Canyon, and the energy market changes related to the Aliso Canyon outage that are taking place in real time will be considered in that study.</p> <p>The comment has been noted.</p>

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	<p>high renewables future. However, CESA has also recommended that continued special studies be conducted on bulk storage systems. For example, the CAISO can build on the Bulk Storage Study by quantifying the transmission benefits and impact of bulk storage systems -which was not within the scope of the Bulk Storage Study. With the passage of Senate Bill 350 that instituted a 50% RPS by 2030, CESA believes the Bulk Storage Study should be re-run with the new 50% RPS goal as a basic assumption.</p> <p>To be very clear, CESA does not recommend slowing progress on any of the special studies underway. The adjustments in assumptions used for the 2015-2016 TPP recommended in these comments should not be disruptive if they are addressed now, rather than many months into the future. CESA appreciates the CAISO's consideration of these comments and looks forward to continued participation in the CAISO's 2015-2016 TPP.</p>	

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3	California Wind Energy Association (CalWEA) Submitted by: Nancy Rader and Dariush Shirmohammadi	
3a	<p style="text-align: center;">1. The Special Study Should Model Out-of-State Optimum Resources Delivering Through New Transmission Upgrades</p> <p>The methodology for the Special Study currently assumes that out-of-state (OOS) resources must be delivered through new transmission facilities that directly interconnect these resources to the CAISO. The study arbitrarily selects a portfolio of 4,000 MW of OOS wind to be imported into California. CAISO and CPUC have the ability to optimize the level of OOS RPS resources that could be imported into California by balancing the cost of the new transmission required to bring the resources' energy into California and the value that such resources bring to the state. In performing this analysis, CAISO should consider the added capacity of OOS resources that could be imported into California via existing and available transmission capacity between these resources' locations and the CAISO-controlled transmission grid.</p>	<p>The existing transmission capability that can be expected to be available for importing out of state renewables into California will be considered as part of the interregional transmission planning process and the available results will be included in the TPP.</p>
3b	<p style="text-align: center;">2. The Special Study Should Model the Available Transmission Capacity Resulting from Retiring Coal Units or CAISO Footprint Expansion</p> <p>A WECC case study – “PC-21: Coal Retirement” -- shows that little or no congestion occurs with coal-plant retirements and significant renewable energy additions across the WECC footprint mainly for import into California. (See PC-21 slide reproduced below.) [see CalWEA's comments for slide] Specifically, the following can be gleaned from PC-21:</p> <ul style="list-style-type: none"> • The retirement of over 6,000 MW of coal units that are already scheduled to occur by 2024 will enable approximately 3,500 MW of wind energy and 1,800 MW of solar to be accessed through dynamic transfer (DT) arrangements with the CAISO (or via an expanded CAISO) without any transmission upgrades. 	<p>The quantity of existing transmission that can be expected to be available for importing out of state renewables into California needs to be analyzed as part of the interregional transmission planning process. Currently there is only a negligible amount of coal generation that is imported from out of state for use by load serving entities that are part of the CAISO, so the retirement of coal does not directly create transmission capability for use within the CAISO.</p>

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	<ul style="list-style-type: none"> • The retirement of 16,000 MW of coal capacity (about half that now operating) would enable 9,600 MW of wind and 4,800 MW of solar to be dynamically scheduled with <u>very modest</u> transmission upgrades. <p>This WECC case was not necessarily an optimal one; it was constructed in a certain way for whatever reasons that are not explained on the slides. As part of the Special Study, CAISO and CPUC should develop an <u>optimal</u> level of WECC renewables that considers WECC coal plant retirements and the ability to dynamically schedule renewables into the CAISO, or directly interconnect these renewables in an expanded CAISO.</p> <p>The RPS statute provides for RPS “product content category 1” status for projects delivering through a dynamic transfer (DT) agreement with the CAISO and the project’s host transmission provider. As the CAISO is aware, such arrangements put the project under direct CAISO control as if it were physically located within the CAISO’s balancing area. Within the last year, four contracts totaling over 700 MW of OOS wind energy have been signed with two California utilities that will utilize dynamic scheduling and out-of-state transmission service using existing transmission lines.</p> <p>The Special Study should recognize this resource potential, which depends only upon the availability of firm transmission service. Such service will become increasingly available as coal plants retire across the West. Presently, at least 6,157 MW of U.S. coal plant retirements within the WECC are scheduled to occur by 2024. The Special Study should determine where firm transmission service may be available to access high-quality wind resources across the WECC.</p> <p>Such a study would also roughly approximate a scenario under which the CAISO footprint is expanded and more efficient transmission capacity utilization protocols would allow the import of wind generation resources without the need for transmission upgrades.</p>	

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4	TransWest Express LLC (TransWest) Submitted by: David Smith	
4a	<p>The study, although for information purposes only, is very important because it will help inform various agencies and market participants about the potential solutions to the integration challenges associated with supplying over half of California's electric energy needs with renewable resources. The study is also important due to the compressed timeframe to reach the incremental 40% target in 2024, 45% in 2027 and the 50% RPS in 2030. The 40% target is well within the 10-year 2016-2017 TPP planning horizon. Transmission solutions, especially long- distance lines, take many years to develop and place in service, hence the 10-Year planning horizon. The adoption of Senate Bill 350 (SB350) with its 50% RPS mandate in late 2015 has required the CPUC and the ISO to conduct a three annual TPP cycle prior to approval of any transmission solutions to meet the SB350 Policy Transmission needs. In the 2015-2016 TPP the 50% RPS special study provided useful information to improve the information the CPUC needs to inform their policy decisions. The 2016-2017 study needs to take this analysis further and tee up the required information for the CPUC and ISO to consider in their respective 2017-2018 Needs Assessments for the 2018 to 2028 planning horizon. In addition, Market Participants, particularly load serving entities with RPS obligations, will need to have the information from this study to inform their procurement and integrated resource planning activities.</p> <p>Regional Expansion TransWest notes that SB350 also included provisions for the regional expansion of the ISO. Since passage in late 2015 an enormous amount of work and effort has gone into this initiative. TransWest supports the regional expansion and suggest that the provisions of an expanded ISO in to the PacifiCorp regions be incorporated into the 2016-2017 TPP 50% RPS Special Study. The Special Study should look at both solutions that provide direct access between OOS resource areas and California load as well as solutions that only require access between the OOS resource areas and non-Californian load centers within the expanded market regions. Given the amount of resources dedicated to regional expansion initiative since the passage of SB350, the TPP Special Study should consider an expanded</p>	<p>The comments have been noted.</p>

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	<p>region as a possibility. The ability to approve any Policy Transmission following the 2017-2018 TPP Needs Assessment will need to be informed on how that transmission investment may be impacted by the regional expansion. Once again, agencies and load serving entities could use this information to better plan and implement investment and transaction activities to reach their respective policy obligations.</p>	
<p>4b</p>	<p>SB 350 Implementation Timeline</p> <p>TransWest appreciates the timelines provided by the CPUC and the ISO to outline the sub-tasks within the Special Study. We agree the key objective of the study is to update the RPS Calculator with information on transmission to help inform the 2017 Assumptions and Scenarios for the TPP and Long Term Procurement Planning (LTPP). TransWest has developed the attached timeline based on our understanding of the ongoing processes in California and regionally that are looking at transmission solutions to meet the increasing RPS needs of California and the region. The arrows between the processes show the key data flows between the processes. The duration from the completion of the Special Studies in February 2017 to the start of the 2017-2018 TPP provides the CPUC and ISO very little time to use the information and for the public to review and comment on the data before it is used. TransWest would like to suggest that the ISO reconsider its methodology for the Special Study so that critical and less analytically demanding information be provided prior to February 2017. We outline these suggestions on methodology below.</p> <p>The Integrated Resource Plan (IRP) process required by SB350 will not be in place to inform the 2017-2018 TPP, although output from the 50% special study and from subsequent TPPs will likely be required to inform the development of IRPs. RETI 2.0 will be completed in time to help inform the 50% RPS TPP and LTPP in 2017.</p>	<p>The process of portfolio creation for the 2017-2018 TPP is still under development. Considering the other RPS related initiatives that are underway, we think that proceeding with the defined scope of the 50% special study is the reasonable action at this point. The objective is to provide useful input into the future proceeding or initiative that will be responsible for providing future portfolios.</p>
<p>4c</p>	<p>Special Study Portfolios</p> <p>TransWest is not certain why the ISO felt the need to request alternative portfolios from the CPUC to conduct the 50% RPS. We see some improvements over the portfolios provided in the 2016 Assumptions and Scenarios and we have some questions to better understand the reason</p>	<p>The four portfolios have been selected to cover a reasonable spectrum of scenarios that would allow us to evaluate transmission constraints. This information would form a useful input into the future portfolio development. Without these alternative portfolios, we would not have the additional constraint information.</p>

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	<p>for the alternative set of portfolios. As long as these portfolios will serve to improve the RPS Calculator with the transmission information that needs to be reviewed and revised for the most likely resource areas to be viewed as high potential areas to meet the 50% RPS requirements. We assume this confirmation has already taken place between the CPUC and ISO.</p> <p>The Special Study portfolios include CA-only and WECC-wide portfolios. This differs from the product content category requirements in SB350 and the 2016 Assumptions, Scenarios and portfolios that were all based on WECC-wide renewable resources with sufficient transmission to schedule delivery to the ISO system. It is not clear why CA-only portfolios were requested by the ISO. Transmission considerations for any areas that show up only in the CA-only portfolios should have a lower priority than the other areas.</p> <p>The Out-of-State (OOS) portfolios make reference to a “set aside” amount of resources in Wyoming and New Mexico. The term “set aside” implies that these resources had to be specially treated, set aside, to appear within the portfolio outcome. We understand this is most likely the case with the RPS Calculator. However, we point out that the metrics for these OOS portfolios with these “set asides” are all better than the CA-only portfolios. These resources may not be selected by the RPS Calculator without setting them aside. However, this should be more an indication of the limitation on the RPS Calculator and not the resources.</p> <p>It isn't clear how the 2,000 MW figure was selected for these two resource areas. The typical rating of new 500 kV AC line solutions are approximately 1,500 MW and for new DC line solutions can range from 1,500 MW to 3,000 MW or more. Since 4,000 MW of OOS resources provided better economics it may make sense to extrapolate that even more OOS resources would improve the metrics more. The ISO's SB350 study assumes 6,000 MW of OOS resources and the 2016 Assumptions and Scenarios document includes a scenario with 3,000 MW of</p>	<p>There is no priority for these portfolios. These are “information only” studies which will look at a range of scenarios in order to gain a more comprehensive understanding of the impact on the transmission system under different mix of resources and locations.</p> <p>The comment has been noted.</p> <p>The OOS resource ranges were chosen so as to allow us to reasonably examine the impact on the in-state transmission system. There is also a possibility that some part of this 2,000 MW could be delivered to California over the existing transmission.</p>

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	<p>Wyoming wind. The 2015-2016 TPP 50% Special Study found over 2,000 MW of capacity at the assumed entry points for these OOS resources. TransWest believes different ranges of OOS resources from Wyoming and New Mexico will make sense to analyze in the 50% special study.</p> <p>TransWest appreciates that the ISO and CPUC have provided portfolios for all cases that produce the same level of non-curtailed renewable energy. This was a deficiency in the 2016 Assumptions and Scenarios that was not accounted for in the metrics.</p>	
4d	<p>Study Scope and Methodologies</p> <p>The Study scope should include a review and revision if required of the existing and potential new transmission capacity values to the highly likely resource areas. This seems to be the main focus of the scope. In addition, the capital cost estimates to realize the new transmission capacity levels should be reviewed and revised along with other basic information required in the RPS calculator for miles, voltage level, etc.</p> <p>With respect to the potential transmission solutions to meet the needs of the potential wind resources in Wyoming and New Mexico, RETI 2.0 has already catalogued a wide range of potential solutions. Some of these solutions and a couple of new ones since the RETI 2.0 review in late 2015 have submitted Interregional Transmission Project submittals to the ISO and other regions. In addition, many of these projects (e.g. Gateway, SunZia, Southline have completed Phase 2 and TransWest and SWIP-N are in Phase 2) have already undergone intensive reliability review within the Path Rating Process with involvement by the ISO. A secondary review of these study plans and reports should help provide a general overview of the reliability assessment for these projects without the need to conduct production cost modeling and reliability studies.</p> <p>The ISO should develop a comprehensive list of these potential solutions along with key project details. WECC and West Connect have similar databases that can be used to inform this listing. There may be data the ISO needs to review to confirm or revise, however this work could be</p>	<p>The special study will help inform transmission related information that gets fed into a future portfolio creation process.</p> <p>The existing transmission capability that can be expected to be available for importing out of state renewables into California needs to be considered as part of the interregional transmission planning process. The timeline for this analysis may not completely align with that of the 50% special study.</p>

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	<p>completed faster than PCM and reliability studies themselves. Once this information is compiled, the scope of the PCM and reliability studies to fill in the gaps will be less than starting from scratch. In addition the PCM and reliability assessments can be performed on a more refined level in the 2017-2018 Needs Assessment.</p> <p>The information from this listing will be helpful as well to inform the generic project information updated in the RPS Calculator as well as needed market information for LSEs. Out-of-state resources, especially ones located in remote areas in Wyoming and New Mexico that require transmission additions cannot file Generator Interconnection Requests with the ISO. Therefore market participants do not have a way to request or to understand the impacts of such a request on the evaluated cost for the resources without the ISO reviewing these within the Special Study. It is quite possible that the RETI 2.0 TTIG and/or the Western Interstate Electric Board will develop such a listing. However the constraints on that process and resources at hand will require the ISO's review and confirmation on the key data.</p>	