

The ISO received comments on the topics discussed at the June 13, 2016 stakeholder meeting from the following:

1. California Public Utilities Commission (CPUC)
2. Calpine Corp. (Calpine)
3. Diamond Generating Corporation (Diamond)
4. Nextera Energy Transmission West, LLC (NEET West)
5. Pacific Gas & Electric (PG&E)
6. Wellhead Electric Company (Wellhead)

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	California Public Utilities Commission (CPUC) Submitted by: Keith White	
1a	<p>1. CPUC Staff Hope and Request That There Will be Additional Opportunity to Understand and Comment Further Regarding the Special Study of Required Performance Characteristics for Slow Response Local Capacity Resources – Once Study Results and Conclusions Have Been Posted.</p> <p>Stakeholders should be able to more clearly assess and comment on the “Method 1” (PTO analyses) and “Method 2” (CAISO analyses) parts of this study as well as how they are combined to produce conclusions, once concrete results and their interpretation have been posted.</p>	<p>There will be an opportunity for stakeholders to provide comments on the study results that will be presented in September.</p>
1b	<p>2. The CAISO Should Clarify What Updates From the 2015-16 Transmission Plan Analyses Will be Incorporated into the Updated Large Energy Storage Benefits Study Including What 50% RPS Portfolio Will be Used, and Should Study the Same Two Hourly Net Export Limits of 2000 MW and 8000 MW Used in the SB 350 Benefits Study.</p> <p>CPUC Staff look forward to the opportunity to view and comment on study assumptions and results when these are available, such as at a subsequent TPP stakeholder meeting.</p>	<p>The 2015-2016 Transmission Plan 40% Large Energy Storage Benefits Study is being updated to 50% using the CA FCDS portfolio prepared by the CPUC last year, and modeling a 2000 MW net export limit.</p> <p>The 2000 MW net export limit is expected to be used in the 2016-2017 transmission plan analysis as a reasonable middle ground. As the export limit is reasonably likely to be impacted more by issues outside of California than inside, we do not see unilaterally advancing that issue in this study cycle. However, we will be looking to engage with our interregional planning neighbors to better understand the issues that could help us assess a more reasonable export limit in future cycles.</p>
1c	<p>3. The CAISO Should Clarify Several Important Aspects of the Study on Economic Retirement of Gas-Fired Generation, and CPUC Staff Look Forward to That Information as Well as Opportunity to Comment Further, for the September TPP Meeting.</p> <p>The CAISO should clarify what loads and resources case(s) including what 50% renewable portfolio from “2015-16 production cost models” are used for the preliminary screening step in the “Economic Early Retirement” (of gas generation) study. The CAISO should also specify what services will be considered when assessing a generator’s modeled non-contribution to ancillary services (e.g., contingency reserves?)</p>	<p>As indicated in the presentation on the stakeholder conference call on June 13, the ISO used the same production cost models as used for the 2015~2016 50% renewable special study for screening the potential early retirement areas. The renewable portfolios in the production cost models were described in Chapter 3 of the 2015~2016 Transmission Plan, and the load assumptions in the production cost models can be found in Chapter 5 (Economic Planning Study) of the same document.</p> <p>All ancillary services modeled in the production cost models are considered, including Regulation Up/Down, Load Following Up/Down, and spinning reserve.</p>

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	<p>regulation up and down? what about flexiramp up and down?), as well as what year(s) will be modeled. We observe that gas generation capacity factors in general are likely to fall due to growing renewable generation, so that modeled “capacity factors below typical historical values” may not by themselves be sensitive indicators of early retirement, whereas ancillary services and capacity revenues may become more important. Lastly we understand that system RA needs (as well as flexible RA) will not initially be considered when assessing economic retirement potential, but will be brought into the analysis’s screening step if initial results so indicate.</p> <p>Finally, we look forward to upcoming information on study status including clarification of the above and other aspects of the study, as well as the opportunity to comment further based on that status.</p>	<p>The study year in the screening is the same as in the 2015~2016 50% renewable special study, which is 2025.</p> <p>It is recognized that the average capacity factor will change as the renewable penetration increases. Therefore, it is not the only criterion to be used in the screening. Ancillary services and the need for local capacity, which is an indication of the reliability need and a reflection of part of capacity revenue as well, are also used.</p> <p>System resource adequacy (RA) is not calculated in the screening since there is a separate process to assess System RA, in which the TPP results would be taken as input.</p> <p>The ISO will provide update at the September Stakeholder meeting.</p>
1d	<p>4. For the Gas-Electric Reliability Coordination Study, Treatment of Nonconventional Resources Should be Very Clearly Explained and Considered (See Below) and We Look Forward to Additional Information and Opportunity to Comment in the September TPP Meeting.</p> <p>As stated during the June 13 stakeholder webinar, CPUC Staff emphasize that it is important that the CAISO clearly identify what amounts, types and locations of nonconventional resources are included in the Gas-Electric Reliability Coordination studies, for the particular conditions (snapshots in time) that are studied, especially for mid- and long-term studies. In particular, these assumptions should be consistent with latest procurements and authorizations and with the latest CEC load forecast. The CAISO should also provide some assessment of what additional amount, characteristics (not necessarily technologies) and locations of additional nonconventional resources could mitigate identified reliability risks. Furthermore, the CAISO should clarify how the peak load shifting impact of behind-the-meter PV and a higher level of energy efficiency consistent with SB 350 are addressed. We look forward to such information as well as opportunity to comment further,</p>	<p>Future new resource assumptions, particularly in the LA Basin and San Diego subarea are consistent with the CPUC-authorized long-term procurement decisions. The CEC-adopted demand forecast (2016-2026 CED) is to be utilized in the studies. These assumptions were also included in the ISO 2016-2016 TPP Final Study Plan. To the extent that additional preferred resources are needed to mitigate potential reliability concerns, the ISO intends to provide this information as part of the results of the study. The ISO will consider performing a sensitivity assessment involving the peak load shifting impact of behind-the-meter PV, as suggested here for the gas-electric transmission reliability coordination study. In regards to the question on the SB 350 energy efficiency assumptions, the ISO refers to the CPUC’s Assigned Commissioner’s Ruling Adopting Assumptions and Scenarios for Use in the ISO’s 2016-2017 TPP and Future Commissioner Proceedings as work-in-progress as quoted below:</p> <p>“The CPUC staff will work with the CEC staff to develop, in a manner consistent with the CAISO-wide aggregate energy efficiency savings: (1) the specific hourly values appropriate to production simulation modeling, and (2) load bus modifiers appropriate to power flow modeling to be used as part of this revised SB 350</p>

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	for the September TPP meeting.	AAEE forecast.” To the extent that the information in (2) is not available for the ISO to incorporate into this study in the 2016-2017 TPP cycle, this information could be used as inputs for future reliability assessment in subsequent future transmission planning cycle.
1e	<p>5. The CAISO Should Clarify How Uncertainties and Modeling Refinements Regarding Reactive Capability in Inverter-Based Generation Qualitatively and Quantitatively Impact the System Frequency Response Assessment.</p> <p>This should include distinguishing reactive capability versus actual provision as well as how both of these relate to what reactive capability is specifically required under interconnection and other processes.</p>	<p>Uncertainty in modeling reactive capability in inverter-based generation indeed impacts the system assessment, but it does not impact frequency response. Reactive capability mainly impacts voltage and reactive support, but not response to frequency deviations.</p> <p>In inverter-based generation, reactive power and voltage control and frequency control are separate control loops independent from each other. Certain reactive capability from inverter-based generation is required under interconnection process, but it is required to support voltage and not frequency.</p>

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2	Calpine Corp. Submitted by: Matt Barmack and Mark Smith	
2a	<p>Calpine strongly supports the CAISO's proposal to examine the reliability implications of economic retirements. As the state relies on increasing amounts of renewable resources to achieve greenhouse gas and other environmental goals, it is critical to maintain the reliability of the transmission grid. Given the importance of reliability, Calpine encourages the CAISO to cast a broad net with respect to identifying resources that are potentially at risk of retirement and the retirement of which may jeopardize reliability. Consequently, for the purposes of the economic retirement special study, instead of the relatively narrow screens proposed by the CAISO to identify resources at risk of retirement, Calpine recommends that the CAISO to consider all conventional generation that is not supported by long-term contracts, i.e., merchant conventional generation, at risk of retirement. Given current market conditions, merchant conventional generation may not cover its going forward costs, in addition to the costs of major maintenance, from wholesale markets.</p> <p>Merchant conventional generation earns two primary revenue streams: one related to energy and ancillary services (AS) and another related to Resource Adequacy (RA) capacity.</p> <p>Historically, energy and AS gross margins have been high enough for merchant conventional generation to operate profitably, but they have recently trended lower, generally below \$40/kW-year over the last four years in NP15 (the northern part of the State). These margins are likely to trend down further as the State exits the recent drought and returns to normal hydro conditions and additional renewable resources enter the market.</p> <p>RA capacity compensation also has been low. The CPUC estimates a weighted average RA capacity price of \$3.23/kW-month (\$38.76/kW-year) for deliveries in 2013-2017. This value overstates the annual RA capacity compensation available to many resources because it includes transactions for both "system" and "local" capacity. Hence, it reflects a premium for RA capacity in certain local areas, such as the LA Basin, that is not available to resources that are not located in those local areas. In addition, system RA</p>	<p>The initial purpose of the economically-driven early retirement special study was to understand the implication of potential early retirement to transmission system reliability. Instead of looking at specific units or types of units, the study scope focused on identify the reliability impacts when potential economic early retirement may occur in certain areas, as a result of the increasing renewable penetration.</p> <p>The three criteria proposed for preliminary screen serve the purpose of the transmission system reliability study rather than identify specific units at risk of retirement. The historical capacity factors are used as references that reflect the possibility for generators to operate profitably under the historically normal condition. When renewable penetration increases, it is expected that the revenue stream for thermal units from the energy market would decrease. Their capacity factors would be lower than the historical numbers, which would reflect the decrease of the revenue stream. It is recognized that capacity factors are not equivalent to the revenue stream, but using capacity factor criterion provides a data point to look at the potential risk of early retirement of gas-fired generators. While different thresholds of capacity factors would result in different data points, the historical average is good to start with.</p> <p>Thermal units in different areas may behave differently in the unit commitment/economic dispatch in the simulation, due to the transmission constraints modeled in the database. Therefore, capacity factors can also reflect, to some extent, how the location may impact the risk of retirement for thermal units. In addition to the capacity factor criterion, the need for local capacity is also enforced to maintain sufficient capacity in local areas to mitigate reliability issues as identified in LCR studies.</p> <p>Ancillary service requirements will increase as renewable penetration increases. The updated ancillary service requirements based on the corresponding renewable portfolios and load assumptions have been modeled in the production cost models. The production cost simulation</p>

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	<p>requirements are lower outside of the peak summer months. Consequently, many resources are unable to sell their full capacity for all 12 months. Further, units in local areas outside of Southern California do not earn any appreciable premium for the fact they are local. For example, the weighted-average price for local RA capacity in NP 26 (\$2.44/kW-month), where many of Calpine's plants are located, is even lower than the overall weighted average price cited above.</p> <p>Even assuming that a resource can realize the NP26 weighted-average local RA price of \$2.44/kW-month in every month, this level of compensation (\$29.28/kW-year) in combination with energy and AS gross margins of approximately \$40/kW-year, may fall short of the "going forward" costs of operating a CCGT, i.e., the costs associated with operating an existing plant regardless of how much it generates. The CEC estimates CCGT going forward costs of approximately \$60/kW-year. Many merchant plants were built in the early 2000s. These plants are now facing significant additional major maintenance costs, which are not reflected in CEC estimates of going forward costs. Further, many actual CCGTs have slightly higher heat rates than the hypothetical resource modeled by DMM and hence run less and earn substantially less than DMM estimates.</p> <p>As the result of poor economics and the absence of long-term contracting opportunities, Calpine recently announced its intent to not operate Sutter, one of its California CCGTs, during 2016. Similarly, La Paloma Generating Company recently announced its intention to retire one of the four units at the La Paloma CCGT plant, another merchant CCGT in California. Further, La Paloma Generating Company recently requested an RMR contract to support the continued operation of the La Paloma plant.</p> <p>Calpine believes that it should be relatively easy to identify conventional generation that is merchant and hence may be at risk of retirement. Depending on the year, in addition to Sutter and La Paloma, based on public representations and knowledge of our own portfolio, Calpine believes that at least Metcalf, Delta, Pastoria, most of Calpine's peakers, Inland, High Desert Power Project, Diamond's Larkspur and Indigo peakers, and the bulk of the Cogentrix portfolio of peakers are also merchant. In addition, Sunrise</p>	<p>co-optimize energy and ancillary service in unit commitment/economic dispatch to meet both the load/supply balance constraint and the ancillary service requirement constraints. Adding ancillary service criterion will make sure sufficient units will be maintained in the models in power flow and stability studies.</p> <p>Responding to stakeholder feedback, the ISO is now considering expanding the risk study to consider the overall risk of early economic-driven retirement and the impact this may have on the system's overall resources and resource mix in light of renewable integration needs. The study scope will be amended and re-posted accordingly.</p> <p>We anticipate also looking at the available information about when existing capacity contracts may be coming to an end, as a means to highlight when retirement concerns may be the most severe.</p> <p>The extended scope is intended to help identify potential needs to inform other processes – the intent is not to assess the effectiveness of existing market compensation mechanisms to sustain that generation.</p>

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	<p>and Moss Landing also may be merchant depending on the time frame.</p> <p>Calpine believes that it would be particularly valuable for the CAISO to consider which combination of resources best preserve reliability in the Greater Bay Area. Assuming that the Pittsburg and Moss Landing steam units retire and other existing resources continue to operate, what combination of retirements of the Moss Landing CCGTs, Metcalf, and Delta could the system withstand?</p> <p>As indicated above, Calpine believes that, for the purpose of the economic retirement special study, CAISO should assume that all merchant conventional generation is at risk of retirement. Calpine has the following concerns about the CAISO's proposed approach for identifying resources at risk of retirement.</p> <p>The CAISO proposes three separate screens to identify units at risk of retirement: a capacity factor screen based on whether a resource operates at a low capacity factor in a production cost simulation reflecting higher than current penetrations of renewables, a screen reflecting whether a resource provides ancillary services in any hour of the same production cost simulation used to implement the capacity factor screen, and a screen that reflects whether a resource is "required" to meet an LCR requirement. There are problems with all three screens and the requirement that a resource pass all three screens to be deemed at risk of retirement is far too strict to identify resources that are genuinely at risk of retirement.</p> <p>First, capacity factor is a poor indication of whether or not a resource is economic. There are currently many resources that operate at relatively high capacity factors yet struggle to recover their costs. For example, the analysis of merchant economics that DMM includes in its annual report suggests that a generic CCGT would have operated at a capacity factor of 92-93% (!) in 2015, but, as indicated above, might not have recovered its going forward costs.</p> <p>In the event that the CAISO tries to model which specific resources are at risk of retirement rather than just assuming that all merchant conventional</p>	

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	<p>generation is at risk, then it should explicitly model the economics of resources rather than relying on flawed proxies such as capacity factor. For example, as recommended by Calpine during the June 13th call, it should be possible to use the results of the CAISO's proposed production cost simulations to derive estimates of the gross margins that resources would earn from the energy and AS markets reflected in the simulations. Alternatively, the CAISO might be able to leverage the dispatch model that DMM uses to simulate merchant economics.</p> <p>Second, the CAISO's proposed AS screen is completely flawed, i.e., it does not capture the viability of a resource. It is likely or possible that any resource included in a production cost simulation will provide AS or energy in some hour of the simulation. This provision does not prove that the resource is needed to maintain reliability and/or it's economically viable. For example, DMM's annual analysis of merchant economics suggest that generic CCGTs and CTs might not be economic despite earning AS revenues. The CAISO should drop this screen and focus on screens/a screen that better reflects the actual economic viability of resources.</p> <p>Third, the CAISO should clarify how or whether or not it will deem local resources at risk of retirement. On the June 13th call, the CAISO suggested that it will not consider resources that are strictly needed for local reliability at risk of retirement. How will the CAISO determine which of a set of resources are at risk of retirement if some but not all of them are needed? Even for resources that are deemed strictly needed, the CAISO should explain how it expects them to cover their costs through energy and AS, RA, CPM, RMR or other revenues.</p>	

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3	Diamond Generating Corporation Submitted by: Paul Shepard	
3a	<p>As discussed below, Diamond is concerned that the Special Study scope is too limited and will not accurately portray the premature retirement risks that firm capacity resources face today, nor the associated impacts on the transmission should those resource retire early. To address these limitations, the Special Study should look at both local and system capacity resources to better understand the cumulative effect of resource retirements within a relatively short time horizon. The CAISO should also revise the Special Study screens to reflect how limited long-term financial commitments and the pricing of capacity in CAISO's short-term markets impact the availability of capacity resources. As discussed below, the CAISO should not focus on resources' respective capacity factors or whether the resource provides ancillary services in a single hour during the year, but instead focus on whether a resource has a long-term financial commitment that assures availability over the TPP planning horizon. California is beginning to refine its procurement policies pursuant to the SB 350 Integrated Resource Planning ("IRP") requirement, which will integrate procurement with the CAISO's TPP, Resource Adequacy ("RA") procurement obligations and other market aspects which compensate resources for services provided to the grid. In the context of these changes, there is a need for a broader evaluation of local and system reliability and congestion impacts that are likely to occur with the early retirement of gas-fired generation. This is necessary so that the CAISO's efforts in this year's TPP will be informative beyond the immediate transmission planning process cycle.</p>	Please refer to the response to Calpine Corp., response 2(a).
3b	<p>DISCUSSION</p> <p>I. Conventional Generators Face Early Retirement Risks in the Absence of Longer-term Contracts and Fully Compensatory Short Term Market Prices.</p> <p>Diamond and a number of other merchant generators have explained that in the absence of longer-term financial commitments, the current CAISO market structures do not support the operation of conventional, firm-capacity resources (i.e., simple cycle and combined cycle</p>	

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	<p>projects).¹ In this proceeding and others (e.g., the Joint Reliability Plan and previous LTPP proceedings) the CAISO and CPUC have taken steps to proactively evaluate these risks.</p> <p>Unfortunately, both the CAISO and the CPUC have adopted very generalized assumptions that a resource will remain available to CAISO irrespective of market conditions as long as the resource's age is less than an assumed 40-year useful economic life. The early retirement risk study in the 2016-2017 TPP is a critical step towards fully understanding the system risks associated with the ongoing use of unrealistic assumptions about asset availability for system and local reliability needs. Diamond appreciates the CAISO's efforts to date, and recommends three specific actions to assure a robust evaluation of the premature retirement risk issue.</p>	
3c	<p>A. The 2016-2017 TPP Special Study Should Evaluate Both System and Local Resources.</p> <p>Under the current proposal, the 2016-2017 Special Study would only evaluate a subset of the firm capacity resources available to the CAISO.² The study would include a screen to only consider resources "required" to meet a local capacity requirement. By not considering both local and system resources, the CAISO cannot properly evaluate how combinations of resources are needed to maintain system reliability. In addition, the CAISO cannot properly evaluate the risk that multiple resources, all facing similar economic conditions, that may be forced into early retirement within a short timeframe of one another. The CAISO should assume that all merchant conventional generation is at risk of premature retirement absent a financial commitment or sufficiently compensatory market structures. By utilizing a more realistic assumption, the CAISO will be able to better evaluate the cumulative impact of resource retirement on transmission planning.</p>	
3d	<p>B. The Screens Should Be Revised to More Accurately Account for Actual Market Conditions.</p> <p>The Special Study proposes to use a capacity factor based screen to</p>	

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	<p>identify resources that are at risk of early retirement. The screen would limit the study to resources that have capacity factors below “typical historical values.” This capacity factor based screen will not provide meaningful results because a resource with a relatively high capacity factor may still face retirement risks in the absence of a longer-term financial commitment over the balance of the study period.</p> <p>The Special Study would also exclude resources that provide any ancillary services (“AS”) in any hour in the CAISO’s 2016-2017 production cost simulation based on the 50% RPS portfolios. This screen should be removed because it does not reflect market realities. In the absence of a longer-term financial commitment a resource could still provide some AS, but nevertheless be uneconomic (and therefore at risk for premature retirement) given the limitations of the CAISO short-term market structures. In addition, there is no requirement to achieve a 50% RPS within the 2016-2017 TPP ten-year planning horizon. SB 350 requires the utilities to meet a 50% RPS by 2030.</p> <p>The CAISO should remove the capacity factor and ancillary services based screens and instead use the presence of a longer-term financial commitment as the most important screen. If a resource rolls off of a contract for firm capacity within the TPP planning horizon, that resource is at risk of premature retirement and should be included in the Special Study.</p>	
3e	<p>C. The CAISO Should Use the TPP Special Study as a Jumping Off Point for Further Study of the Early Retirement Risk.</p> <p>The adoption of SB 350 and the CPUC’s plans for changes to the long-term procurement processes pose important questions as to how system reliability will be ensured over the longer planning horizon. The simple 40-year retirement assumption is flawed, and it risks understated potential reliability risks where procurement rules and short-term market conditions do not provide a path for resource re-contracting. The existing fleet of conventional, firm capacity resources will remain critical</p>	

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	<p>to maintain system reliability as the State pursues expanded RPS and GHG targets and seeks to design a flexible system that is responsive to dynamic market conditions. More must be done to address the full scope of the reliability risks that arise as conventional, firm capacity resources come off of their long-term contracts. The CAISO and the CPUC should revisit the simplified, 40-year retirement assumption and use this Special Study on early retirement risks to provide meaningful data rather than relying on the overly-simplistic 40- year retirement assumption.</p>	

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4	NextEra Energy Transmission West, LLC Submitted by: Edina Bajrektarcvic	
4a	<p>The followings are NEET West's clarification items concerning the stakeholder call and specific to the gas-electric reliability special study and the economically-driven early retirement of gas fired generation special study:</p> <ul style="list-style-type: none"> • Can CAISO provide the reliability study results for both "gas electric reliability" and "economic early retirement of gas generation assessment" special studies prior to the September 21-22 stakeholder meeting to allow stakeholders to comment/consider potential alternate solutions to solve the identified reliability issues? 	<p>The September stakeholder meeting provides reliability assessments and study results for the baseline as well as various sensitivity reliability assessments as outlined in the ISO Final Study Plan. Due to the amount of information to be reviewed and presented, the ISO cannot commit to provide the reliability results of the Special Studies prior to the September stakeholder meetings. In addition, the results of the Special Studies are not expected to trigger new transmission project needs, but rather serve as informational inputs to future decision making process at either the State regulatory and/or ISO forums. The scheduled timeline for stakeholder meetings in September and November would allow the ISO and the stakeholders adequate timeline to first focus on NERC compliance reliability issues for baseline assessment and subsequently economic and other special study assessments.</p>
4b	<ul style="list-style-type: none"> • Would CAISO welcome alternate transmission solutions for the identified local and system level reliability and congestion issues in the current cycle 2016-2017, and can stakeholders submit those solutions during open request window for reliability submissions in this current cycle (on or before October 14, 2016)? 	<p>The ISO appreciates stakeholder input, including suggestions of potential transmission solutions. This information is most helpful if provided in the appropriate comment period or request window, as set out in the schedule provided in the ISO's study plan.</p>

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5	Pacific Gas & Electric Submitted by: Matt Lecar	
5a	<p>Gas-Electric Reliability</p> <p>PG&E encourages the CAISO to leverage previous assessments of the impact of the Aliso Canyon constraint to further investigate: (1) the vulnerability of relying on Path-26 and Northern California dispatchable resources to help balance the Southern California gas system; and (2) the impacts of the LADWP operationally constrained system in the LA Basin (e.g. NG Plant and/or transmission contingencies).</p> <p>PG&E would also encourage CAISO to clarify the scope for the winter assessment based upon the information from the operational studies for the 2016-17 winter and address any uncertainty in gas generation requirement in future due to other system changes (e.g. increased renewable generation, etc.)</p>	<p>The comments have been noted regarding resource assumptions via flow through Path 26, and comments regarding the impacts of the LADWP's constraints in the LA Basin. Regarding assumptions of flow via Path 26 and whether or not this path will enable flow up to a maximum of 4,000 MW would be investigated in the economically driven early retirement of gas-fired generation. The flow on Path 26 was at its maximum 4,000 MW at various time in the recent heat wave in June 2016 to provide support to Southern California. In regards to the assumptions of LADWP operationally constrained system in the LA Basin, the ISO will check with LADWP for its assumptions for the recent summer assessment for potential inputs to the ISO long term studies.</p> <p>Regarding PG&E's questions on the scope for the winter assessment, the ISO will provide this information upon completion of the Joint Agency Task Force operational report for the coming winter. This joint agency report is anticipated to be available in early autumn.</p>
5b	<p>Economically-Driven Early Retirement of Gas-Fired Generation</p> <p>PG&E appreciates CAISO's effort to identify potential economic early retirement of gas-fired generation and any local and system level operational reliability and congestion issues that may arise due to the potential early retirement of gas-fired generators. Given the scope of this effort described during the June 13th stakeholder call, PG&E believes that this special study is a good screening level analysis and will identify resources required to meet local reliability or to provide ancillary services. However, the simplistic criteria used may not provide enough information to determine whether a generator will be uneconomic to continue to operate.</p> <p>A gas fired generation retirement study of decision making quality should consider many factors that affect retirement decisions including:</p>	<p>Please refer to the response to Calpine Corp., response 2(a).</p>

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	<ul style="list-style-type: none"> • Power purchase agreements, maintenance and operations costs, CAPEX investments and portfolio needs across a range of plausible futures and system conditions (e.g. hydro conditions) • A unit's ability to recover on-going costs including fixed O&M, insurance taxes, and CAPEX <p>PG&E recognizes that unit specific information may not be available to perform a unit specific economic retirement study and therefore in order to avoid misinterpretation of the study findings, PG&E recommends that the CAISO clearly state what is within scope of the study, caveats of study limitations, and use of results.</p> <p>The study should also clearly state that although this study takes into account existing and future known resources, alternative solutions to meet LCR requirements (e.g., potential siting of future resources) and ancillary service requirements is not included in the analysis.</p>	
5c	<p>Frequency Response Assessment/Generation Modeling</p> <p>In addition to the TPP special study, Frequency Response is also the subject of a current CAISO initiative (and corresponding activity at FERC), including the recent tariff filing to allow procurement of primary frequency response resources from adjacent balancing areas. PG&E notes that the droop setting changes that were proposed in the new tariff need to be addressed in future frequency response studies.</p>	<p>In the Frequency Response study the droop settings will be verified and they will be adjusted and modeled according to the CAISO Frequency Response Initiative.</p>

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6	Wellhead Electric Company Submitted by: Doug Davie	
6a	<p>Special Study – Early Retirement of Gas-fired Generation: Wellhead understands and appreciates that this special study will be an initial step (simplified screening analysis) in what will be a much larger effort to address any reliability concerns that may be identified. A couple of questions and concerns that Wellhead hopes will be addressed and considered in this initial study include the importance of: 1) performing intra-hourly modelling; and 2) clearly identifying the performance requirements and resource attributes that will be needed in the event of early retirement. We also appreciate that this study will not address possible solutions to the problems which will facilitate the analysis being completed much sooner (i.e. appropriate for a screening study).</p> <p>Sufficiently Detailed Analysis</p> <p>To ensure the reliability of an electric system that will have more than 50% of its energy supply from non-dispatchable GHG-free energy sources, significant operational flexibility will be required from the balance of the fleet. Most importantly, this will require intra-hourly analysis to take proper account of energy supply volatility that will increase very significantly. Wellhead performed analysis in the CPUC’s long term planning proceedings which shows intra-hour volatility can be several times what is observed in hourly modelling. This is also consistent with the real time data the CAISO has provided in the CPUC’s flexible RA proceeding. A big problem for one or two intervals during an hour has very different performance/attribute requirements than a lesser problem for the duration of the hour. Looking only at hourly data and analysis obfuscates critical details of the problem which must be addressed.</p> <p>This study also needs to take account of what we know today regarding the resources of the future. If not properly managed, over-generation can turn into a significant electric system reliability issue. The CAISO’s prior analysis in several CPUC proceeding has identified the serious implications over-generation has on electric system reliability. It’s relatively easy to understand how replacing Diablo Canyon with several thousand MWs of energy efficiency, solar and wind resources will increase the previously identified over-generation problem by 6,000 to 8,000 MW. That is not trivial. Neither</p>	<p>The comments have been noted.</p>

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	<p>are the implications to the costs of curtailing or exporting that amount of additional generation.</p> <p>Intra-hourly analysis is also necessary to understand locational reliability issues. Although this study will not be addressing potential solutions, it will provide important information to be considered in the design of the necessary future studies including location-specific analysis.</p>	
6b	<p>Focus on Performance Requirements and Solutions that Support the Future</p> <p>Wellhead believes it is fairly well understood and agreed that an analysis of this type needs to be focused on the performance requirements that are essential to reliable operation of the electric grid now as well as in the future when the percentage of non-dispatchable generating sources will be that much larger. This information, which will be subject to further analysis and refinement in future studies, will be particularly helpful in allowing developers to ideate potential solutions and decision makers to authorize “no regrets” decisions. Actions that are effective in meeting near term requirements as well as ensuring a reliable electric system that can support an increased renewables future are likely part of the least-cost-best-fit set of solutions that need to be acted on in the near future to ensure there are no problems come 2025 when Diablo Canyon will retire.</p>	