Regional Resource Adequacy

Revised Straw Proposal

April 13, 2016

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1. Executive Summary

On October 7, 2015, California Governor Jerry Brown approved Senate Bill No. 350 ("SB 350"), the Clean Energy and Pollution Reduction Act of 2015. The bill provides for the potential transformation of the California Independent System Operator Corporation ("ISO"), which already operates regional markets and provides interstate transmission service, into a more regional organization, with the approval of the Legislature pursuant to a specified process. As entities located outside of the ISO's current balancing authority area ("BAA") express interest in potentially joining the ISO, it will be necessary that the ISO's rules for resource adequacy ("RA") work effectively in a multi-state environment because RA is integral to reliably operating the electric power system. This straw proposal describes a framework to ensure there are adequate resource capabilities to reliably operate the system under a larger regional structure. The ISO will continue to engage with stakeholders to develop the details of this RA framework, with this initiative culminating in a proposal that ISO management will present to the ISO Board of Governors and the FERC for approval. The ISO has extended the schedule of this initiative and plans to present a proposal to the ISO's Board of Governors at the Board's August 31-September 1, 2016 meeting.

RA is a critical feature that ensures that the ISO can effectively serve load and reliably operate the electric system. RA serves to ensure that the ISO has sufficient resources offered into its markets to meet reliability needs and acts as an important market power mitigation measure to protect against physical withholding. The must-offer obligations of the RA program ensure that a sufficient pool of resources with the necessary attributes are available in the right locations and offered into the ISO market. Reliability is ensured through the RA forward planning and resource "showings" processes, which provide adequate resources to meet system, local and flexible operational needs. A multi-state ISO should provide lower procurement costs over time due to the synergies and geographic diversity obtained through a larger balancing authority footprint.

The primary objective of this initiative is to implement a multi-state process that ensures that sufficient capacity is offered into the ISO's market to serve load and reliably operate the electric system. The ISO proposes to build on existing, proven mechanisms to create a multi-state ISO RA framework. The proposed framework provides the flexibility for Local Regulatory Authorities ("LRAs") and Load Serving Entities ("LSEs") to maintain their current capacity procurement programs. The ISO will help to facilitate these programs by clearly communicating to state regulatory commissions, LRA, and LSEs the ISO's forecasted reliability needs to inform capacity procurement decisions.

The ISO intends to only change those tariff provisions that require modification to make RA work in the context of an expanded BAA that spans multiple states. This stakeholder initiative is focused on "need to have" items for an expanded BAA. The ISO does not intend for this initiative to explore broader changes to the general RA construct as the ISO regularly conducts stakeholder initiatives to consider improvements to the RA provisions of the ISO tariff and any such changes are more appropriately addressed in those initiatives. It is important that the provisions for a multi-state ISO be put in place through a filing to the Federal Energy Regulatory Commission ("FERC") by the end of 2016, so that the regulatory approval process can begin by early 2017 for entities that may be interested in joining an expanded BAA.

In this Revised Straw Proposal the ISO presents additional details on the elements of the Regional RA framework that was initially proposed in the February 24, 2016 Straw Proposal. The ISO seeks to provide

stakeholders with these details and options in order to facilitate discussion and feedback. The proposal includes additional details on the ISOs proposed changes to the following elements: (1) Load forecasting, (2) Maximum Import Capability ("MIC"), (3) Internal RA transfer capability constraints, (4) Allocating RA Requirements to LRAs/LSEs, (5) Updating ISO tariff language to be more generic, (6) Reliability assessment; including the Planning Reserve Margin ("PRM") methodology, uniform counting methodologies, and incorporating the reliability assessment into the ISO's Backstop Procurement Authority provisions.

The ISO seeks feedback from stakeholders on the details and changes to the following elements of the Regional RA Revised Straw Proposal:

1. *Load Forecasting* – The ISO proposes that the coincident system load forecast for an expanded BAA would be created each year by the ISO based on load forecast data created by and submitted by LSEs. The ISO is not proposing to change the manner in which load forecasts are developed for LSEs, and envisions that existing methods and arrangements would continue to be used. For example, the California Energy Commission ("CEC") would continue to determine the load forecast for LSEs in the existing ISO BAA and entities outside of the current BAA would create their own load forecasts and submit those forecasts to the ISO. The ISO would calculate the coincidence factor and determine the allocation of the coincident load to each LSE in the BAA.

2. *Maximum Import Capability* – The ISO proposes to revise the existing methodology used to calculate the MIC MW values to reflect the different peak time periods in which non-coincident peaking areas without commonly known constraints experience their own maximum simultaneous imports.

3. *Internal RA transfer capability constraints* – To ensure reliable operation of the grid, any potential internal transfer constraints need to be respected by limiting the transfers of RA resources between internal areas to the extent necessary to maintain reliability. The ISO previously proposed to build on the methodology that is currently being used to address the "Path 26 transfer capability constraint" in the current BAA. In this Revised Straw Proposal the ISO has identified potential problems that would be associated with the previous direction on this topic. The ISO has determined it is more appropriate to develop a zonal RA concept to ensure that any internal constraints limiting RA transfers are respected. This zonal RA concept is described at a high level in the proposal and will be discussed with stakeholders and further details will be provided in subsequent proposals.

4. *Allocating RA Requirements to LRAs/LSEs* – This aspect of the Regional RA proposal addresses two potential issues related to allocating RA requirements to potential new ISO participants. The first is the scenario of the need for allocating RA requirements to LSEs that may have a state or local regulatory agency that does not wish to assume the role of receiving RA requirements from the ISO and then allocating such requirements to its respective LSEs. The second scenario is where there is more than one LRA, state commission, or other jurisdictional entity overseeing and/or approving a multi-jurisdictional LSEs procurement decisions. To address these two potential scenarios, the ISO proposes to create a new mechanism where LRAs and state agencies could elect to defer allocation of RA requirements to the ISO so the ISO can directly allocate RA requirements LSEs rather than to the LRA.

5. *Updating ISO tariff language to be more generic* – This element of the ISO's Regional RA proposal addresses the need for the tariff provisions related to RA and the performance of RA resources to be more generic. The current tariff utilizes California-centric language that may not be applicable to entities in an expanded BAA. The ISO believes this is necessary to avoid any unintended barriers or consequences associated with the current tariff language as the ISO expands to more of a regional entity.

6. *Reliability Assessment* – To ensure reliable operation of the BAA, each month the ISO will conduct a reliability assessment for the upcoming month using the information submitted by LSEs in RA showings and generators in supply plans. The assessment will consider system, local, zonal, and flexible RA requirements and the RA capacity that has been provided to the ISO by LSEs for each RA requirement. To perform its proposed reliability assessment, the ISO will develop system-wide and zonal PRMs that would be established through a study conducted in parallel with an associated stakeholder process. The ISO would also develop consistent counting methodologies for the amount of MWs that each type of resource could qualify for, which would be used in the reliability assessment to assess how well the resources that are provided to the ISO meet reliability needs. The reliability assessment will look at the total amount of RA resources provided and assess whether the RA capacity collectively provided is sufficient to meet reliability needs. The reliability assessment will mitigate the potential for inappropriate "leaning" on the RA requirements by individual LSEs. If the ISO identifies any shortfalls after considering all of the RA capacity provided, the ISO will provide LSEs an opportunity to cure the shortfall. If a shortfall still remains after the opportunity to cure has passed, the ISO would have the ability to procure backstop capacity if needed and allocate costs to LSEs that are short.

The ISO believes that a PRM and consistent counting methodologies, together with the RA and IRP frameworks already in place within each state, are the minimum provisions needed for the ISO to conduct a reliability assessment in order to ensure that adequate resources are available throughout the multi-state ISO for reliable operation of the system.

2. Stakeholder Comments and Changes to Proposal

The ISO posted its Regional RA Straw Proposal on February 24, 2016 and held a stakeholder meeting to discuss the Straw Proposal on March 2. Stakeholder comments were due on March 16. The ISO received 28 sets of stakeholder comments on the Straw Proposal. The Stakeholder Comments and ISO Responses Matrix has been posted separately and includes all stakeholder comments that were received and the ISO's detailed responses. The Stakeholder Comments and ISO Responses Matrix can be accessed at the following link: Regional Resource Adequacy.

The ISO received comments on all aspects of the Straw Proposal and the ISO has provided additional details, analysis, and changes to the proposal as discussed below.

- Schedule – Stakeholders expressed concern with the pace of this initiative that targeted taking a proposal to the ISO Board of Governors at their meeting on June 28-29, 2016 and feel that the schedule is too aggressive to allow adequate time to develop the proposal. Stakeholders requested that the ISO extend the schedule to provide additional time for the ISO to work with stakeholders on development of the proposal. As described in this proposal, the ISO has

extended the timeline of the initiative and is now planning to present its proposal to the ISO Board of Governors at their August 31-September 1, 2016 meeting. The extension to the schedule will allow the ISO to present this proposal to stakeholders, as well as two additional iterations of proposals prior to the ISO presenting its proposal to the ISO Board of Governors on August 31-September 1, 2016.

- Working Groups and Training – Stakeholders have said that RA is a complicated subject with many interrelated elements that require a broad understanding of the various key components of an RA program and requested that the ISO provide working group, workshops and/or other forums to provide opportunities to drill down into elements of RA and fully understand the ISO's proposals. The ISO has considered providing working group or other forums, but decided to use the additional time through extending the schedule to provide two additional iterations of proposals subsequent to this revised straw proposal. Three iterations of proposals from now until the Board meeting provides limited time between each proposal iteration that does not support also having out-of-town or out-of-state forums for education/training. What the ISO has decided to do as an alternative to workshop type of events is to offer that, at any time during the Regional RA stakeholder initiative, the ISO will hold an informational call with a stakeholder on topics that the stakeholder would like additional information on such as (1) how RA works in general, or (2) specific topics related to the ISO's proposal for Regional RA. If a stakeholder would like an informational call, the stakeholder should submit a request at regionalintegration@caiso.com. The ISO believes that this targeted approach will be more efficient for both stakeholders and the ISO. Stakeholders will be able to obtain information that they are specifically seeking, whether it be basic or general information on how RA works, or a more detailed drill-down into details of some aspect of RA or the ISO's proposal.

- Timelines and RA Milestones – Stakeholders expressed concern that there is not enough information currently available on the timeline of events that occur, or would occur under the ISO's proposals, over the course of a year for the proposed RA program/tariff provisions. Stakeholders also asked for more information on the timing of the elements of the ISO's proposed RA elements for the expanded BAA. The ISO provides in this proposal additional detail regarding the timelines/milestones proposed for the RA program, showing information on both tariff provisions that are not proposed to be changed as well as proposed revised or new tariff provisions, as well as the stakeholder processes associated with each item.

- Analysis of Applying RA Provisions to Expanded BAA – Stakeholders requested that the ISO provide "results" or data that show the effect of an expanded BAA. For example, stakeholders have requested what the flexible capacity requirements or MIC numbers would be for an expanded BAA to help better inform them of the implications of an expanded BAA. The ISO is working on several analyses to provide this kind of information to stakeholders. In this proposal the ISO provides its analysis of three RA provisions for an expanded BAA: (1) load forecasting and determination of system RA requirements; (2) local capacity requirements; and (3) flexible capacity requirements. The ISO is working on other analyses, but those efforts are not yet completed. The ISO will provide additional "results" in subsequent proposal. The ISO is aware that stakeholders are keenly interested in seeing results for an analysis of the MIC provisions for

an expanded BAA. This analysis is not yet concluded, but the ISO hopes to have this analysis completed in time to provide it in the next proposal.

- Governance – Stakeholders requested additional information on the ISO's plans and schedule for development of the governance proposal. Stakeholders also suggested that the governance proposal should be developed and adopted before proceeding further on the Regional RA initiative. Stakeholder comments on this topic are provided in detail in the stakeholder comments and ISO responses matrix that has been posted separately. In its responses, the ISO discusses its plans and schedule, including the topic of timing of events. In summary, the ISO does not believe that the governance of an expanded ISO must be fully resolved before policy changes can be designed to support a regional market. It is essential to proceed with the various ISO regional stakeholder initiatives, including the Regional RA initiative, because these issues are pertinent for any potential entity seeking to join the ISO.

- Effective Date – Stakeholders expressed concern that the new Regional RA tariff provisions might be made effective, in their view, unnecessarily early in anticipation of a new Participating Transmission Owner ("PTO") joining the ISO to create an expanded BAA. Several stakeholders requested that the ISO not make the new tariff provisions effective unless and until a new PTO actually joins the ISO. In essence, stakeholders requested information on when and how the ISO plans to implement any new RA tariff provisions, as well as what the trigger would be for making the new tariff effective. In Section 4 of this proposal and in the stakeholder comments and ISO responses matrix, the ISO addresses these stakeholder concerns and describes the ISO's current thinking on the timing of and trigger for having the tariff provisions become effective.

- Load Forecasting – Stakeholders were generally supportive of the ISO's general framework for load forecasting, but requested additional details on specifically how the ISO would do the load forecast, what the steps in the process would be, the timing of the steps within the process, how much flexibility LSEs would have in submitting data to the ISO, how weather normalization would be addressed, and how coincidence would be determined. In section 5.1 of this proposal, the ISO provides more details on aspects of the load forecasting proposal.

- Maximum Import Capability – Stakeholders requested additional detail on the ISO's MIC proposal as well as analysis of the potential MIC calculation for an expanded BAA. Stakeholders expressed a need for these additional details in order to better understand the potential impact of how the ISO's MIC provisions would be applied to interties into the PacifiCorp footprint. The ISO has provided additional detail on the MIC proposal and is currently conducting the requested analysis to apply the current MIC methodology to the ISO and PacifiCorp combined BAA footprint. The ISO is still developing these results with the assistance of PacifiCorp. The ISO will share additional details and provide answers to related questions once the results of the analysis are available.

- Internal RA Transfer Constraints – Stakeholders posed many helpful questions and commented on the ISO's previous proposal to establish the concept of additional intra-BAA transfer capability constraints to ensure that any constraints that may potentially limit the transfers of RA resources between major internal areas in an expanded BAA are properly respected in the ISOs related

processes. The previously proposed concept was to apply a process akin to the Path 26 methodology currently utilized by CPUC jurisdictional LSEs within the ISO BAA. In response to stakeholder comments and the ISO's review of merely extending the current Path 26 methodology, the ISO determined that it would be problematic to utilize a similar path counting constraint methodology for additional internal path constraints. The ISO has determined it is more appropriate to develop a zonal RA concept to ensure that any internal constraints limiting RA transfers are respected. This zonal RA concept is described at a high level in the proposal and will be discussed with stakeholders and further details will be provided in subsequent proposals.

- Reliability Assessment – Stakeholder requested the ISO provide details on the proposed reliability assessment, including the methodology to be used for the PRM and resource counting, as well as how the ISO would incorporate the reliability assessment into the ISOs backstop procurement provisions and details on how the current backstop provisions work. The ISO has provided background on all these aspects of the reliability assessment proposal. The ISO also presents options for methods to use in PRM determinations, and the ISO's proposed counting rules for certain resource types. The ISO seeks feedback on these proposed options for further development in subsequent proposals.

- Allocating to LRAs/LSEs – Stakeholders requested additional detail on the purpose of this item of the ISO proposal. This aspect of the Regional RA proposal addresses potential issues related to allocating RA requirements to potential new ISO participants. In the proposal the ISO provides detail on the changes necessary to accomplish this need. The ISO stresses that this section of the proposal is not intended to change how LSEs and LRAs in the current ISO BAA receive and/or allocate RA requirements, but instead is only intended to address any potential barriers or issues related to allowing the ISO to directly allocate RA requirements to LSEs to accommodate those entities whose state commissions/LRAs prefer to leave the running of the day-to-day business of the entity to that entity. The proposal would also help the ISO accommodate multistate entities that do not have a single regulatory authority overseeing their activities.

- Making the ISO Tariff more generic – Stakeholders generally supported the ISOs proposal to clean up the California-centric language used in the ISO RA tariff provisions. Stakeholders also requested clarity about this aspect of the proposal. The ISO does not mean for these changes to impact the current tariff provisions applicability or intent. The purpose of this proposal is to avoid any unintended barriers or consequences associated with the current tariff language as the ISO expands to more of a regional entity.

3. Plan for Stakeholder Engagement

In response to the February 24, 2016 Straw Proposal and during the March 2, 2016 stakeholder meeting the ISO has received numerous stakeholder comments requesting that the ISO provide additional workshops and further background and education on numerous RA topics.

Some of the topics that were raised by stakeholders requesting additional information and education included; the RA Must Offer Obligations (MOO), MIC, Local Capacity Requirements (LCR), Flexible RA Capacity, ISO Backstop Authority, RA Availability Incentive Mechanism (RAAIM), Deliverability, and RA

Substitution rules. The ISO has provided additional background in this revised straw proposal on some of these topics, including LCR, Flexible RA Capacity, MIC, and ISO Backstop Authority.

Numerous other RA topics that stakeholders requested workshops and background information on pertain to RA topics that the ISO believes will work "as is" for an expanded BAA without tariff revisions (for example; MOO, RAAIM, Deliverability, and RA Substitution). The ISO considers the RA tariff provisions/topics that do not need to be revised for an expanded BAA to be out of scope for the Regional RA stakeholder initiative. The ISO does not plan to present detailed discussion of RA provisions that are out of scope. However, the ISO has provided briefings on the entire RA construct during previous stakeholder meetings for this initiative and all of the current RA provisions are described in the ISO tariff[1] and Reliability Requirements Business Practices Manual ("BPM")[2].

Although the ISO has not included details in this proposal on every aspect of the current RA tariff provisions, the ISO understands that all RA topics that make up the overall RA construct are important to stakeholders and it is important for stakeholders to understand the entire RA construct in order to effectively participate in this initiative. Rather than providing workshops on RA provisions that the CAISO does not propose change, the ISO offers that, at any time during the Regional RA stakeholder process, the ISO will hold an informational call with a stakeholder on topics that the stakeholder would like additional information such as (1) how RA works in general, or (2) specific topics related to the ISO's proposal for Regional RA. If a stakeholder would like an informational call, the stakeholders should submit a request at regionalintegration@caiso.com.

The table below shows the key elements of an RA program, and indicates which elements are within the scope of the Regional RA initiative as tariff provisions the ISO proposes change, and the other elements that are not within the scope of the Regional RA initiative and which the ISO is not proposing to change because they will work "as is" for an expanded BAA.[3]

Table 1: Summary of Elements within Scope of this Initiative

RA Key Element	In Scope of Regional RA Initiative?
Planning Reserve Margin	Yes (Reliability Assessment)
Established and standardized load forecast	Yes (Load Forecasting)
Capacity procured in advance and comprised of system, local and flexible capacity	No
Rules for "counting" the MW value of resources	Yes (Reliability Assessment)
Requirements to offer RA capacity into ISO market	No
Procured resources must be "deliverable" to load	Yes (MIC and Zonal Requirements)
Formal process to review procurement reports	No

[1] ISO Tariff Section 40 - Resource Adequacy Demonstration For All Scheduling Coordinators as of Jun 3, 2015

[2] Business Practice Manual for Reliability Requirements

[3] These elements were discussed in the RA briefing in this initiative that was presented to stakeholders on December 16, 2015. See slide 17 at http://www.caiso.com/Documents/BriefingPresentation_RegionalResourceAdequacy.pdf.

RA Key Element	In Scope of Regional RA Initiative?
Clear ex ante consequences for noncompliance and poor performance	No
Other	Yes (Allocating to LRA or LSE, Updating Tariff to be More Generic)

Stakeholders also expressed numerous concerns regarding the schedule and timeframe for this initiative, with many comments indicating that stakeholders believe the schedule for this initiative is too aggressive and indicating the need for additional time in order to allow adequate time to fully consider the Regional RA proposals and provide additional opportunity for stakeholder engagement in the development of the ISO's proposal. The ISO has heard stakeholder's requests for additional time and has responded to these comments by extending the timeline of the initiative to target bringing a Draft Final Proposal to the August 31 – September 1, 2016 Board of Governors meeting.

A full schedule detailing these updates to the major milestones remaining for this initiative is provided below.

Table 2: Regional RA schedule

Milestone	Date
Post revised straw proposal	Apr 12
Hold stakeholder meeting on revised straw proposal (in Salt Lake City)	Apr 21
Stakeholder comments due on revised straw proposal	May 4
Post second revised straw proposal	May 26
Hold stakeholder meeting to discuss second revised straw proposal (outside California)	Jun 2
Stakeholder comments due on second revised straw proposal	Jun 15
Post draft final proposal	Jun 30
Hold stakeholder meeting to discuss draft final proposal (in Folsom, CA)	Jul 12
Stakeholder comments due on draft final proposal	Jul 26
Present proposal to Board	Aug 31-Sep 1

The ISO understands that there are a number of concurrent and sequential initiatives concerning regional integration. Through stakeholder meetings, comments, and ISO management review, the ISO's intent is to be informed by all of the work in this area and build upon decisions as they are made by the Board of Governors. The ISO supports continued dialogue and welcomes the opportunity at any time to discuss with stakeholders how the various efforts work together. Please contact your ISO representative or submit a request for such as discussion at regionalintegration@caiso.com.

The ISO will provide updates to the schedule or other changes as they occur and stakeholders can view the updated timeline diagram on the regional integration website for further details at: http://www.caiso.com/informed/Pages/RegionalEnergyMarket/BenefitsofaRegionalEnergyMarket.aspx

4. Introduction

In this Revised Straw Proposal the ISO presents additional details on the elements of the Regional RA framework that was initially proposed in the February 24, 2016 Straw Proposal. The ISO seeks to provide stakeholders with these details and options in order to facilitate discussion and feedback. This Revised Straw Proposal includes additional details on the ISOs proposed changes to the following elements: (1) Load Forecasting, (2) MIC, (3) Internal RA transfer capability constraints, (4) Allocating RA Requirements to LRAs/LSEs, (5) Updating ISO tariff language to be more generic, (6) Reliability Assessment; including the PRM methodology, uniform counting methodologies, and incorporating the Reliability Assessment into the ISO's Backstop Procurement Authority provisions.

In addition to the further detail on these elements, the ISO provides background on the provisions related to the ISO's proposed changes. The ISO also describes how current processes will accommodate new entrants, for instance; the import capability allocation process ensuring that parties' current contractual obligations are accounted for.

On particular aspects of the proposal, the ISO has provided options for stakeholder consideration; such as the PRM methodology and the ISO uniform counting methods for certain resource types. These options are described in the proposal with explanations that are helpful in exploring the appropriateness of each option.

As noted above, some stakeholders expressed concern that the new Regional RA tariff provisions might be made effective, in their view, unnecessarily early of the regional expansion of the ISO and requested clarity on this issue. The ISO provides its views on this issue below.

Effective Date for Regional RA

The ISO received numerous stakeholder comments expressing concern about whether the tariff changes necessary to carry out this proposal would go into effect, and thus potentially impact the current jurisdiction of regulatory entities, before any changes to the ISO membership and BAA footprint were made. The ISO has heard such concerns and will ensure that they are adequately addressed.

The timeline that the ISO has shared with stakeholders assumes a January 2019 integration date. This high level timeline highlights several key dependencies, including PacifiCorp obtaining the necessary state regulatory authorizations to participate in a regional ISO. PacifiCorp has made it clear that this process requires a high degree of regulatory certainty to be successful and would take approximately one year to complete. This in turn suggests that the ISO stakeholder processes necessary to support a regional ISO should be undertaken in 2016. That said, the ISO understands the concerns of stakeholders with respect to the effective date of any changes that may result from these initiatives and offers the following assurances.

The ISO will ensure that any tariff provisions associated with a regional ISO would become effective only as necessary to support the integration of a new Participating TO. This means that provisions with substantive impact would only become effective once the regional ISO includes PacifiCorp (or any new

Participating TO outside of the ISO's current BAA), while only procedural provisions would become effective prior to that date as necessary to support the integration. For example, submitting RA plans is an activity undertaken by LSEs in the ISO BAA in advance of the operational period but PacifiCorp would not be an LSE until the integration date. Accordingly, the ISO may request earlier effective dates of procedural provisions that support the integration.

There are a number of approaches that would address the effective date concerns raised by stakeholders. For example, the ISO could request waiver of the notice provisions such that the tariff provisions were only effective to support integration. Alternatively, the ISO could include provisions in the tariff specifying that they would only become effective as necessary to support integration. Alternatively, the ISO might consider making conceptual-type filings prior to submitting tariff filings, similar to what the ISO did in connection with the new market design it implemented in 2009. At this time the ISO is evaluating its procedural options and has not opted for a particular course of action at this point. Nonetheless, the ISO assures stakeholders that the regional ISO initiatives will not have a substantive impact on current ISO market participants unless and until a new regional entity is integrated in accordance with the amended tariff rules.

5. Revised Straw Proposal

5.1 Load Forecasting

Part of the ISO's proposed Regional RA framework includes revising the process for developing load forecasts utilized for RA. The ISO will need to develop a process to consolidate sources of load forecasting data to be able to discern system coincidence peak throughout an expanded footprint and allocate each LSE's portion of the coincident system peak forecast.

5.1.1 Load Forecasting Proposal

The ISO proposes to revise the process for developing load forecasts for the ISO system that are used for RA. The ISO will develop a process to consolidate sources of load forecasting data so it can receive the necessary load forecasting information to develop a system-wide load forecast, discern the system coincidence peak throughout an expanded footprint, and determine each LSE's contribution to the system-wide coincident peak forecast. As noted in the ISO straw proposal, the ISO must strive to balance the current California load forecasting process with the needs of a broader organization in which many potential new entities effectively conduct their own load forecasting. The ISO continues to believe that an approach that blends the ability of LSEs to provide their own load forecasts, with aspects of the current load forecasting methodology in the ISO's existing BAA, will allow the ISO to develop accurate and transparent load forecasts for use in an expanded ISO BAA.

The ISO proposes that the system load forecast for an expanded BAA would be created each year by the ISO based on load forecast data created by and submitted to the ISO by the CEC (for LSEs within the current ISO BAA) and LSEs themselves (for LSEs outside the current ISO BAA). The ISO is not proposing to change the manner in which load forecasts are developed for current LSEs, and envisions that existing methods and arrangements could continue to be used by potential new LSEs. For example, the CEC would continue to determine the load forecasts for LSEs in the existing ISO BAA, and entities outside of the current BAA would continue to develop their own load forecasts as they have done

previously and submit the required data to the ISO. The ISO would then use the provided hourly load forecasting data to determine the overall system-wide peak, as well as each LSE-specific coincidence factor, which the ISO will use to allocate the respective share of the system need to each LSE.

To determine the system coincidence peak and identify each LSE-specific contribution, the ISO will need to calculate each LSE-specific coincidence factor for each LSE in the BAA. The ISO has initially identified two coincident factor formulas, described below as options for determining LSE-specific coincidence factors.

The ISO also proposes to establish criteria that will trigger a review of individual LSE forecasts. The proposed criteria are described below. The ISO would have the ability to consider adjusting load forecasts or requesting LSEs submit revised load forecasts, if an LSE forecast diverges unreasonably from the LSE's weather normalized peak loads, but only in cases where the LSE cannot demonstrate that its forecast is reasonable.

The ISO also proposes to publish the results of load forecast accuracy after the fact; specifically identifying the load forecast error percentages (%) for all of the submitted load forecasts comparing to their weather normalized peaks for transparency. This will allow the ISO to benchmark the accuracy of submitted forecasts.

Load Forecasting Requirements

The ISO proposes to require all LSEs to provide the ISO with mid-term (one year forward) hourly load forecasts. These hourly forecasts will allow the ISO to determine the system peak and each LSE's contribution at the system peak for each LSE. Load forecasts should include impacts from behind-the-meter or "load modifying" Demand Response ("DR"), Energy Efficiency ("EE"), and Distributed Generation ("DG"). The ISO believes that entities conducting load forecast in an expanded BAA should retain the flexibility to treat adjustments to their load forecasts how they choose and accept what methods best represents the needs of their situation. In other words, LSEs conducting load forecasts may determine the assumptions utilized for their own load forecasts and decide how to incorporate impacts from DR, EE, DG, and other load forecast modifiers.

Although it is appropriate to allow for flexibility, the ISO proposes that LSEs submit their load forecasting modifiers and adjustments to the ISO to promote transparency and facilitate the ISO's review of submitted load forecasts. Additionally, the ISO load forecasting review proposal, detailed below, would safeguard against the potential for unreasonable forecasts to be accepted and deter manipulation of load forecasts. The ISO will also need to coordinate the load forecasting data requirements with the needs required by whatever direction is ultimately determined for the Planning Reserve Margin (PRM) methodology under the reliability assessment proposal. Thus, the exact details regarding what load forecasting data the ISO needs are somewhat dependent on the methodologies utilized for other parts of the proposal, including the PRM methodology. If the ISO determines that the deterministic building block approach is appropriate for setting PRM targets then the ISO will need less detailed load forecasting information. Specifically, the ISO would only need to receive LSEs' hourly load forecasts to determine the system, zonal, and flexibility requirements. The ISO would use LSE specific hourly demand and energy forecasts to determine the LSE's load shape/profile and develop load forecast uncertainty adjustments, all of which the ISO would use as inputs to a LOLE study for determining the PRM targets. The ISO

would also use these LSE submitted load forecasts to allocate system, zonal, flexible RA requirements to LSEs.

Weather Normalized Peak and Load Forecast:

The weather normalized peak is an estimate of what the peak would have been under normal weather conditions. It is calculated under the normal, or average weather conditions which are the average of the weather characteristics over a certain period of time. The previous forecasted peak can be compared to the weather normalized peak to understand how accurate the forecast is and the weather normalized peak can also be used as a starting point to perform load forecast for the future.

The load forecast process is usually involved with developing a load forecast model and collecting model input data. The input data include historical loads, historical weather data, historical and future economic and demographic data, and calendar information.

The CEC currently produces a load forecast that is utilized for RA in the current ISO BAA. The CEC and CPUC have published the weather normalized peak and 1-in-2 load forecast methodology in their Resource Adequacy 2016 Load Forecast Adjustment Methodology document:

> *"The CEC's peak-load forecast for each investor owned utility (IOU) service area is derived from short-term weather normalized peak-load forecasts for each transmission access charge (TAC) area. Weather normalization factors out the variations in weather allowing for comparison of peak loads over time under different weather conditions. Weather normalization consists of regressing daily peak loads on weather and calendar effects and using the regression estimates with historical weather patterns in a Monte Carlo simulation to produce a distribution of peak loads of which the median, the one-in-two, represents the weather normalized peak loads. To better capture peak load's weather sensitivity and adequately represent the latest weather patterns, weather normalization requires four years (2011 – 2014) of CAISO's Energy Management System (EMS) data to estimate correlation between peak load and recent weather patterns and 30 years (1985 – 2014) of weather data to define normal weather conditions.*
>
> *The two-step time-series regressive analysis based on peak-producing days and Monte Carlo simulation produces one-in-two weather normalized peak loads for summer and for each month, which are compared and adjusted with historic peak loads and load shapes of each service area. Weather normalized peak loads are projected two years ahead (2016), i.e. locked two years out, using the latest economic and demographic information. The one-in-two weather normalized peak loads for summer form the base to develop Integrated Energy Policy Report (IEPR) peak loads at the IOUs service areas after they have been adjusted downward by critical peak pricing, peak time rebate and non-event based demand program impacts (real time or time of use pricing and permanent load shifting). The one-in-two weather normalized monthly peak loads for each month are used by the CEC to reconcile the aggregate LSEs year-ahead forecasts in each IOU area for RA compliance[4]."*

[4] CEC Resource Adequacy 2016 Load Forecast Adjustment Methodology

The ISO believes that a 1-in-2 load forecast is appropriate and proposes that all submitted load forecasts use a 1-in-2 load forecast.

The ISO seeks feedback regarding the level of load forecast flexibility that should be required:

- Would it be appropriate for the ISO to specify the type of criteria and processes that load forecasting entities should use to conduct their load forecasts?
- Alternatively, would it be appropriate for the ISO to allow flexibility for LSEs to conduct load forecasts in a manner that they determine and fits their individual needs?

The ISO could simply accept an LSE method for its load forecasts so long as the submitted forecasts utilized are reasonable. Alternatively, the ISO could require utilization of more specific methods for its load forecast submissions. The ISO would need to develop additional details on how load forecasts should be treated if it is preferable to require specific criteria and methods.

Monthly Load Forecast Adjustments:

It is also important to note that the ISO currently allows entities to adjust submitted load forecasts prior to the start of the Month Ahead RA processes. The ISO proposes to continue allowing load forecasting entities to submit month ahead load forecasting adjustments when there are forecast changes that deviate from the previously submitted annual load forecasting data. The ISO needs to determine how this process may impact any of the other aspects of the RA process plans to better define and develop the process in subsequent proposals.

Coincidence Factor Methodology Options

The ISO proposes to calculate the coincidence factor and determine the allocation of the system peak to each LSE in an expanded ISO BAA. It is necessary to determine the coincidence factor for each specific LSE for each month in order to properly allocate RA requirements to LSEs. In order to determine a monthly LSE coincidence factor, the ISO will need to use a defined coincidence factor methodology using a specified coincidence factor formula. The ISO proposes two potential options for coincidence factor formulas, described below, for stakeholder consideration and feedback.

Median of Five Monthly Peaks (California Energy Commission) Coincidence Factor Method:

The methodology utilized by the CEC for LSEs in the existing ISO BAA is the Median of Five Monthly Peaks methodology. The ISO could propose to continue using this methodology for an expanded BAA system-wide load forecasting process as well. This method is described below.

In the February 9, 2015 CEC R.14-10-010 Workshop, the CEC presented the CEC's monthly coincidence factor definition as:

> "A LSE-specific monthly coincidence factor is calculated as the ratio of the LSE's peak load at the time and hour of the five highest monthly ISO's system peak loads to the specific LSE's actual non-coincident peak load in any given month."

Under the CEC coincidence factor method, the CEC computes LSE-specific coincidence factors for each month and transmission access charge ("TAC") area based on historical hourly loads for the latest 1-3

years. The CEC coincidence factor methodology is currently used for determining system RA requirements for CPUC jurisdictional LSEs.

The median monthly coincidence factor is selected from the five available as the LSE-specific monthly coincidence factor. The monthly coincidence factors are applied to each LSE's year-ahead monthly peak forecasts, to adjust the LSE's non-coincident peak to a forecast of the LSE's peak coincident with the ISO system peak. In month-ahead forecasts, the coincidence factor is also applied to the non-coincident peak of migrating load. Therefore both the year-ahead and month-ahead forecasts are being adjusted by coincidence factors in determining RA obligations."[5] The CEC coincidence factor can be expressed as the following formula:

$$Coincidence\ Factor_{CEC}\ (CF_{CEC}) = \frac{Median\ of\ LSE\ Load\ at\ five\ highest\ monthly\ System\ Peak}{LSE\ Non-coincidence\ peak}$$

Power Systems Coincidence Factor Method:

An alternative approach that the ISO could utilize is a Power Systems coincidence factor methodology. The Power Systems coincidence factor can be defined as the ratio of the simultaneous maximum demand of a group of electrical consumers within a specified period to the sum of their individual maximum demands within the same period. The Power Systems coincidence factor methodology can be expressed as the following formula:

$$Coincidence\ Factor_{PS}\ (CF_{PS}) = \frac{System\ Coincidence\ Peak}{LSE\ Non-coincidence\ peak + ISO\ Non-coincidence\ peak}$$

The ISO seeks stakeholder feedback on the proposed options for coincidence factor methodologies.

Reasonableness Review and ISO Adjustment Authority:

The ISO proposes to conduct a reasonableness review of LSE's submitted forecasts if certain criteria trigger such a review. The proposed criteria detailed below would trigger the ISO to review a LSE's forecast and potentially enable the ISO to adjust the LSE forecast.

Importantly, the ISO would adjust submitted forecasts only in cases where a LSE's non-coincident peak forecast diverges unreasonably from average year-over-year weather normalized peak trends when comparing the LSE's non-coincident peak forecast with the LSE's weather normalized peak trend, and the LSE cannot demonstrate that its forecast is reasonable.

The ISO proposes to utilize the following criteria based on historic data as prompts to trigger ISO review and potential modification of submitted forecasts:

Load Forecasting Review Criteria

The ISO proposes to use a 4% divergence threshold in a LSE's average year-over-year change in the previous 3 years of normalized peak load data. The ISO believes this is appropriate criteria to trigger an

[5] *Resource Adequacy Forecast Adjustment(s) Allocation Methodology* R.14-10-010 Workshop - California Public Utility Commission. San Francisco, February 9, 2015

ISO performance review of the submitted load forecast. The ISO reviewed the Itron 2014 Forecasting Benchmark Survey which examines utility forecast accuracy and growth projections.[6] The survey found that a majority of utility forecasting errors is within 3% for system forecast and 4% for peak forecast, the ISO feels this is a reasonable criteria for the proposed review ability. The figures below show the results of the Itron survey.

Figure 1: Electric System Error Distribution

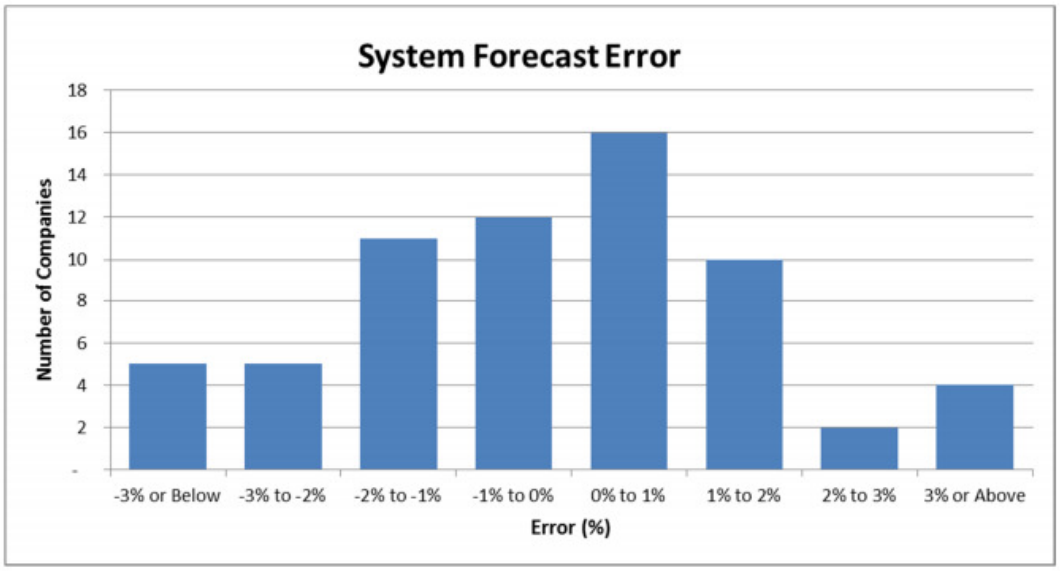
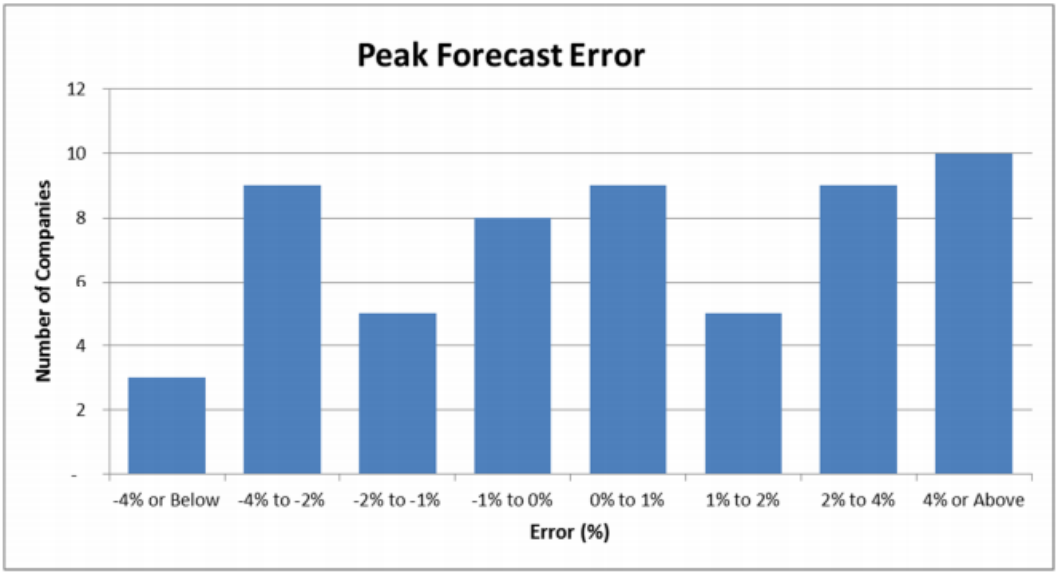


Figure 2: Peak Error Distribution



[6] 2014 Forecasting Benchmark Survey - Itron

The ISO proposes to use historic normalized peak trends as a reference and seeks stakeholder input to further develop the specified criteria values for use in the ISO review criteria.

The ISO will have the ability to evaluate forecasts using historical normalized data. This review will help determine what a reasonable variation for individual LSE forecasts might be. The ISO would not adjust LSEs' forecasts if they can adequately demonstrate the review criteria variances are reasonable. However, the ISO would retain the right to review and adjust any load forecast following triggered by the LSE forecast's unreasonable divergence from historical data, and a subsequent discussion between the ISO and LSE, if the LSE cannot demonstrate that its forecast variances are reasonable.

The CEC has a similar ability in its process to review divergent forecasts submitted by LSEs and may conduct a plausibility adjustment to LSE submitted load forecasts. This ability is described in the Resource Adequacy 2016 Load Forecast Adjustment Methodology document:

> ***"Plausibility Adjustment:***
>
> *As provided by CPUC Decision (D.) 04-10-035, CEC staff determines whether an LSE's forecast is plausible by comparing preliminary LSE coincidence adjusted submitted forecasts with CEC's adopted IOU service area forecasts. CEC staff performs a plausibility comparison for individual LSE forecasts to the most recent month-ahead load forecasts, August, and adjusts them if the difference is greater than a tolerance threshold. An estimate of current monthly peak demand is calculated from monthly load profiles and recent LSE-specific month-ahead peak demand forecasts. If an LSE's monthly forecast exceeds the tolerance threshold, then CEC staff evaluates the reasonableness of the forecast and will adjust the forecast to make it more plausible. CEC staff allows LSE forecasts to be up to five percent divergent from CEC estimates before the forecast is considered implausible[7]."*

Load Forecasting Coordination with Congestion Revenue Rights process and the Transmission Planning Process

The ISO must coordinate the proposed load forecasting approach with the development of load forecasts used for the ISO's Transmission Planning Process ("TPP") and Congestion Revenue Rights ("CRR") processes.

The ISO notes the need to coordinate load forecasts because similar forecasts should be used to the greatest extent possible. For instance, the CRR process is an annual process for allocating financial hedging mechanisms based upon expected congestion patterns on the ISO system that are driven by demand and supply balance; so, the mid-term, year-out load forecast is also an important input into the CRR process. The ISO raises this issue to identify the relationship between the use of these mid-term load forecasts for both RA and CRRs.

[7] CEC Resource Adequacy 2016 Load Forecast Adjustment Methodology

5.2 Maximum Import Capability

5.2.1 Maximum Import Capability Background

The ISO received numerous stakeholder questions regarding the MIC calculation and assignment for individual LSEs and market participant's in written comments and during the stakeholder meeting on the ISO's Straw Proposal. For background purposes, the ISO describes the current MIC calculation and Available Import Capability Assignment Process steps below.

MIC Calculation

The ISO assesses the deliverability of imports using the MIC methodology. For most interties, the ISO calculates MIC megawatt amounts based on historical usage, looking at the maximum amount of simultaneous energy schedules into ISO BAA, at the ISO coincident peak system load hours over last two years. This historically-based MIC methodology establishes a baseline set of values for each intertie. Furthermore, the ISO performs a power flow study in the ISO's TPP to test that these values ensure each intertie's MIC can accommodate all state and federal policy goals; if any intertie is found deficient, the ISO establishes a forward looking MIC and plans the system to accommodate this level of MIC in the TPP and RA.

To establish the MIC values for each intertie, the ISO examines the prior two years of maximum historical import schedule data during high load periods. The ISO selects the sample hours by choosing two hours in each year, and on different days within the same year, with the highest total import level when peak load was at least 90% of the annual system peak load. The ISO calculates the historically-based MIC values based on the scheduled net import values for each intertie, plus the unused Existing Transmission Contract ("ETC") rights and Transmission Ownership Rights ("TOR"), averaged over the four selected historical hours.

RA showings that designate import MWs to meet RA obligations across interties using either Non-Resource-Specific System Resources, Pseudo-ties or Dynamically Scheduled System Resources are to be used in conjunction with a MIC allocation and are considered to be a firm monthly commitment to deliver those MWs to the ISO at the specified interconnection point with the ISO system.

Allocation of Import Capability:

The ISO calculates MIC values for each intertie annually for a one-year term, and the ISO's 13-step Available Import Capability Assignment Process is used to allocate import capability to LSEs. MIC allocations are made available to LSEs on each intertie for their use in procuring RA capacity from external resources. MIC allocations are not assigned directly to external resources; rather, LSEs choose the portfolio of imported resources they wish to elect for utilizing their MIC allocations. The following table lists the 13-step Available Import Capability Assignment Process. This process is also described under Section 40.4.6.2.1 of the ISO Tariff.

Table 3: Available Import Capability Assignment Process[8]

MIC Allocation Step		Description of Step
Step 1	Determination of Maximum Import Capability on Interties into the ISO BAA	The ISO will establish the Maximum Import Capability (MIC) for each Intertie into the BAA, and will post those values on the ISO Website in accordance with the schedule and process set forth in the BPM.
Step 2	Determination of Available Import Capability by Accounting for Existing Contracts and Transmission Ownership Rights Held by Out-of-Balancing Authority Area LSEs	For each Intertie, the Available Import Capability is determined by subtracting the import capability on each Intertie associated with Existing Transmission Contracts (ETCs) and Transmission Ownership Rights (TORs) held by LSEs that do not serve Load within the ISO BAA from the MIC established in Step 1. The remaining sum of all Intertie Available Import Capability is the Total Import Capability. Total Import Capability is used to determine the Load Share Quantity for each LSE that serves Load within the ISO BAA.
Step 3	Determination of Existing Contract Import Capability by Accounting for ETCs and TORs Held by ISO Balancing Authority Area LSEs	The Existing Contracts and Transmission Ownership Rights held by LSEs that serve Load within the ISO BAA will be reserved on the Available Import Capability remaining on each Intertie after Step 2 above, and will not be subject to reduction under any subsequent steps. The import capability reserved pursuant to this Step 3 is the Existing Contract Import Capability.
Step 4	Assignment of Pre-RA Import Commitments	The ISO assigns LSEs serving Load within the ISO BAA Pre-RA Import Commitment Capability on a particular Intertie based on Pre-RA Import Commitments in effect (where a supplier has an obligation to deliver the Energy or make the capacity available) at any time during the Resource Adequacy Compliance Year for which the Available Import Capability assignment is being performed. The Pre-RA Import Commitment will be assigned to the Intertie selected by the LSE during the Resource Adequacy Compliance Year 2007 import capability assignment process, which was required to be based on the Intertie upon which the Energy or capacity from the Pre-RA Import Commitment had been primarily schedule. For a Pre-RA Import Commitment without a scheduling history at the time of the Resource Adequacy Compliance Year 2007 import capability assignment process,

[8] Tariff Section 40.4.6.2.1

MIC Allocation Step		Description of Step
		the primary Intertie upon which the Energy or capacity was anticipated to be scheduled will be used. (2007 is the date used for Pre-RA Import Commitments for participants in the current ISO BAA; the ISO will need to establish a new "cut-off" date for new ISO participants.) To the extent a particular Intertie is over requested with Pre-RA Import Commitments under Step 4, due to either Pre-RA Import Commitments not included in the Resource Adequacy Compliance Year 2007 import capability assignment process or changes in system conditions that decrease the MIC of the Intertie, such that the MW represented in all Pre-RA Import Commitments utilizing the Intertie exceed the Intertie's Available Import Capability in excess of that reserved for ETCs and TORs under Steps 2 and 3, the ISO will assign Pre-RA Import Commitments Pre-RA Import Commitment Capability based on the Import Capability Load Share Ratio of each LSE submitting Pre-RA Import Commitments on the particular Intertie. To the extent this initial assignment of Pre-RA Import Commitment Capability does not fully assign the Available Import Capability of the particular over requested Intertie, the remaining Available Import Capability on the over requested Intertie will be assigned until fully exhausted based on the Import Capability Load Share Ratio of each LSE whose submitted Pre-RA Import Commitment has not been fully satisfied by the previous Import Capability Load Share Ratio assignment iteration. The Available Import Capability assigned pursuant to this Step 4 is the Pre-RA Import Commitment Capability.
Step 5	Assignment of Remaining Import Capability Limited by Load Share Quantity	The Total Import Capability remaining after Step 4 will be assigned only to LSEs serving Load within the ISO BAA that have not received Existing Contract Import Capability and Pre-RA Import Commitment Capability under Steps 3 and 4, that exceed the Load Serving Entity's Load Share Quantity. Only the MW quantity of any Pre-RA Import Commitment Capability assigned to Existing Contract Import Capability under Step 4 that exceeds the Existing Contract Import Capability on the particular Intertie will be counted for purposes of this Step 5. This Total Import Capability will be assigned until fully exhausted to those LSEs eligible to receive an assignment under this Step based on each LSE's Import Capability Load Share Ratio up to, but not in excess of, its Load Share Quantity. The quantity of Total Import Capability assigned to the LSE under this Step is the LSE's Remaining Import Capability. This Step 5 does not assign Remaining Import Capability on a specific Intertie.
Step 6	ISO Posting of Assigned and Unassigned Capability	Following the completion of Step 5, the ISO will post the following information to the ISO website: (a) The Total Import Capability;

MIC Allocation Step		Description of Step
		(b) The quantity in MW of Existing Contracts and Transmission Ownership Rights assigned to each Intertie, distinguishing between Existing Contracts and Transmission Ownership Rights held by LSEs within the ISO BAA and those held by load serving entities outside the ISO BAA; (c) The aggregate quantity in MW, and identity of the holders, of Pre-RA Import Commitments assigned to each Intertie; and (d) The aggregate quantity in MW of Available Import Capability after Step 4, the identity of the Interties with Available Import Capability, and the MW quantity of Available Import Capability on each such Intertie.
Step 7	ISO Notification of LSE Assignment Information	Following the completion of Step 5, the CAISO will notify the Scheduling Coordinator for each LSE of: (a) The LSE's Import Capability Load Share; (b) The LSE's Load Share Quantity; and (c) The amount of, and Intertie on which, the LSE's Existing Contract Import Capability and Pre-RA Import Commitment Capability, as applicable, has been assigned; and (d) The LSE's Remaining Import Capability.
Step 8	Transfer of Import Capability	LSEs are then allowed to transfer some or all of their Remaining Import Capability to any other LSE or Market Participant. The ISO will accept transfers among LSEs and Market Participants only to the extent such transfers are reported to the ISO through the ISO's Import Capability Transfer Registration Process, by the entity receiving the Remaining Import Capability who must set forth (1) the name of the counter-parties, (2) the MW quantity, (3) term of transfer, and (4) price on a per MW basis. The ISO will post the information on transfers of Remaining Import Capability received under this Step 8 to the ISO website.
Step 9	Initial Scheduling Coordinator Request to Assign Remaining Import Capability by Intertie	The Scheduling Coordinator (SC) for each LSE or Market Participant then notifies the ISO of its request to assign its post-trading Remaining Import Capability on a MW basis per available Intertie. Total requests for assignment of Remaining Import Capability by a SC cannot exceed the sum of the post-traded Remaining Import Capability of its LSEs. The ISO will honor the requests to the extent an Intertie has not been over requested. If an Intertie is over requested, the requests for Remaining Import Capability on that Intertie will be assigned based on each LSE's Import Capability Load Share Ratio in the same manner as set forth in Step 4. A Market Participant without an Import Capability Load Share will be assigned the Import Capability Load Share equal to the average Import Capability Load Share of those LSE from which it received transfers of Remaining Import Capability.
Step 10	ISO Notification of Initial	The ISO will notify the SC for each LSE or Market Participant of the accepted request(s) for assigning Remaining Import Capability under

MIC Allocation Step		Description of Step
	Remaining Import Capability Assignments and Unassigned Capability	Step 9. The ISO publishes the aggregate unassigned Available Import Capability, if any, and identifies the Interties with unassigned Available Import Capability, and the MW quantity of Available Import Capability, on each such Intertie on the ISO Website. The ISO will issue a Market Notice to advise the SC for each LSE or Market Participant that Step 10 is complete and to specify the time at which the ISO will begin accepting requests for the Remaining Import Capability for Step 11.
Step 11	Secondary Scheduling Coordinator Request to Assign Remaining Import Capability by Intertie	To the extent Remaining Import Capability remains unassigned as disclosed by Step 10, SCs for LSEs or Market Participants will notify the ISO of their requests to assign any Remaining Import Capability on a MW per available Intertie basis. Step 10 must be completed before a SC may submit a request under this step for any Remaining Import Capability. Any requests received prior to the time stated in the Market Notice issued at the completion of Step 10 will not be honored by the ISO. The ISO will honor the timely requests received to the extent an Intertie has not been over requested. If an Intertie is over requested, the requests on that Intertie will be assigned based on each LSE or Market Participant's Import Capability Load Share Ratio, as used in Steps 4 and 9.
Step 12	Notification of Secondary Remaining Import Capability Assignments and Unassigned Capability	The ISO will then notify the SC for each LSE or Market Participant of the accepted request(s) for assigning Remaining Import Capability under Step 11. The ISO will publish any unassigned aggregate Available Import Capability on the ISO website and identify the Interties with Available Remaining Import Capability, and the MW quantity of Availability Import Capability on each such Intertie. The ISO will issue a Market Notice to advise the SC for each LSE or Market Participant that Step 12 is complete and to specify the time at which the ISO will begin accepting requests for the Balance of Year Unassigned Available Import Capability for Step 13.
Step 13	Requests for Balance of Year Unassigned Available Import Capability	To the extent total Available Import Capability remains unassigned as disclosed by Step 12, SCs for LSEs or Market Participants may notify the ISO of a request for unassigned Available Import Capability on a specific Intertie on a per MW basis. Step 12 must be completed before a SC may submit a request under this step for any remaining unassigned Import Capability. Any requests received prior to the time stated in the Market Notice issued at the completion of Step 12 will not be honored by the ISO. Each request must include the identity of the LSE or Market Participant on whose behalf the request is made. The ISO will honor timely requests in priority of the time that requests from SC were received until the Intertie is fully assigned and without regard to any LSE's Load Share Quantity. Any honored request shall be for the remainder of the Resource Adequacy Compliance Year; however, any notification by the ISO of acceptance of the request in accordance with this Section after the 20th calendar day of any month

MIC Allocation Step		Description of Step
		shall not be permitted to be included in the LSE's Resource Adequacy Plan submitted in the same month as the acceptance. The ISO notifies the SC of the time the request was deemed received by the ISO and whether the request was honored within seven days of receipt of the request. If the request is not honored because the Intertie requested was fully assigned, the request will be deemed rejected and the SC will be required to submit a new request for unassigned Available Import Capability on a different Intertie if it still seeks to obtain unassigned Available Import Capability. The ISO will update the list of unassigned Available Import Capability by Intertie on its website.
Please note: This multi-step process for assigning Total Import Capability determines the import capability that can be credited towards satisfying the Reserve Margin of a LSE under this Section 40. Upon the request of the ISO, SC's must provide the ISO with information on Pre-RA Import Commitments and any transfers or sales of assigned Total Import Capability. A table that details the schedule for this process is included in Appendix A.		

5.2.2 MIC Proposal

In its Straw Proposal, the ISO indicated that it might need to slightly revise the methodology for calculating the MIC values in an expanded BAA to properly reflect the maximum amount of imports that can be reliably depended on for RA. The slight methodology adjustment is needed to reflect situations where a PTO that joins the ISO has a need to serve its peak load that occurs non-simultaneous with the rest of the system and when there are no simultaneous constraints between certain areas of an expanded ISO BAA. Using the current MIC methodology without change would needlessly restrict downward the MW amount that can actually be reliably achieved for certain branch groups that are mainly used to serve the peak load in this new area that peaks at non-simultaneous times with the rest of the system. This proposal is described in greater detail below.

The ISO has received many stakeholder comments requesting data and specific results about what the MIC values would look like for Interties/branch groups in the PacifiCorp footprint if PacifiCorp becomes a PTO and the ISO BAA is expanded to encompass the PacifiCorp footprint. Stakeholders have indicated the need for this type of information on MIC values for potential Interties/branch groups in order to conduct net-benefit tests and risk assessments. The ISO understands these requests and wishes to be responsive to stakeholder needs.

The ISO is currently conducting the requested analysis to apply the current MIC methodology to the ISO and PacifiCorp combined BAA footprint. The ISO is still developing these results with the assistance of PacifiCorp. The ISO will share additional details and provide answers to related questions once the results of the analysis are available.

Preserving existing rights and practices

As noted above, the ISO received numerous questions regarding the MIC calculation and assignment for individual LSEs and Market Participant's in written comments and during the stakeholder meeting on the ISO Straw Proposal. Numerous stakeholders have expressed concerns regarding the need to respect current arrangements and maintain viability of current practices and existing contractual obligations. Stakeholders are concerned that these existing practices and obligations may be negatively impacted if they joined the ISO BAA due to the ISO's current MIC calculation and assignment provisions.

The ISO understands there may be apprehension and a need to better understand how MIC provisions would affect potential new entrants, and the ISO wishes to ease these concerns. The ISO stresses that the current MIC allocation process is designed to protect pre-existing arrangements and contractual obligations by entities on particular interties.

The ISO will consider existing contractual rights (ETCs and TORs) and pre-existing commitments (Pre-RA Commitments) under the current MIC process to allow existing arrangements and practices to continue without negatively impacting potential new entrants. The ISO will account for those arrangements and practices that are established under firm transmission rights and contractual obligations in the current MIC process. The MIC process currently considers and protects for these ETCs, TORs, and Pre-RA commitments as described in Table 3 above.

It is also important to understand that the 13-step allocation process allows LSEs to select the interties on which they seek an allocation of import capability; it does not simply allocate import capability to all entities on all interties. The current process is more flexible than what some stakeholders have imagined and allows LSEs to tailor their portfolio and select the interties they desire an allocation of import capability to meet their particular needs.

Establishing a Pre-RA Commitments Date

Currently, the ISO utilizes the March 10, 2006 date as the cut-off for considering what arrangements count as Pre-RA Commitments in the Available Import Capability Assignment Process described above. The ISO recognizes that discussion must occur regarding a "cut-off date" for considering what existing contractual obligations constitute Pre-RA Commitments under the Available Import Capability Assignment Process for potential new entrants in an expanded BAA. The ISO will provide further details on this issue in upcoming proposals.

MIC Calculation Proposal

The ISO believes that the current MIC calculation and allocation methodology are still appropriate in most respects. However, the ISO proposes one minor change to the MIC methodology that is necessary to perform MIC calculations using non-simultaneous base case studies. This slight methodological change is needed in order to capture the benefits of regional diversity and allows calculation of truly maximum reliable MIC values when there are no simultaneous constraints between certain areas of an expanded ISO BAA and the areas peak at non-simultaneous times. The ISOs proposal is intended to capture the truly maximum reliable MIC values where certain areas have different seasonal peaking characteristics, and there are no associated simultaneous constraints between those different areas of the system. This proposed change also allows for the ISO to capture the benefits of load diversity across a larger geographic footprint by measuring the MIC capability during the peaks of particular sub-regions.

At this time, the ISO believes that the only change required is an edit to a note in the ISO Reliability Requirements BPM on page 80 where it states:

> "The sample hours are selected by choosing two hours in each year, and on different days within the same year, with the highest total import level when peak load was at least 90% of the annual system peak load."

The ISO proposes to change the above text so that it reads:

> "The sample hours are selected by choosing two hours in each year, and on different days within the same year, with the highest total import level when peak load was at least 90% of the annual peak load for each relevant simultaneously constrained part of the grid."

5.3 Internal RA Transfer Capability Constraints: Zonal Resource Adequacy Proposal

5.3.1 Internal RA Transfer Capability Constraints Background

To maintain reliability it is necessary that any constraints that may potentially limit the transfers of RA resources between major internal areas in the ISO BAA be identified and respected in the capacity planning and procurement processes of LSEs and LRAs, as well as in the annual and monthly RA processes that the ISO conducts. To accomplish this, the ISO previously utilized the Path 26 Counting Constraint methodology, which is a multi-step, iterative process to allocate Path 26 capability and prevent the over reliance by LSEs on the limited transfer capability across the Path 26 transmission path when meeting RA requirements.

The ISO previously proposed to establish the concept of additional internal RA transfer capability constraints to ensure that any constraints that may potentially limit the transfers of RA resources between major internal areas in an expanded BAA are properly respected in the ISO's related processes. The proposed concept was to apply a process akin to the Path 26 methodology currently utilized by CPUC jurisdictional LSEs within the ISO BAA. In developing this concept the ISO reviewed merely extending the current methodology, but has determined that it would be problematic to utilize a similar Path counting constraint methodology for accounting and allocation of limiting internal constraint paths to an expanded footprint for additional internal path constraints.

The following problems would result from a simple expansion of the Path 26 methodology:

- Current allocations on Path 26 would be impacted by new entrants that would also receive shares of path constraint allocation, potentially negatively impacting current participant's ability to utilize transfer capability across Path 26 for RA purposes.
- Any newly identified constraints would need to be allocated fairly to all LSEs and may already be limited in transfer capability.
- Adding additional internal constraints and allocation similar to the Path 26 method will necessitate excessively complex accounting of allocation and netting over multiple internal path constraints.

5.3.2 Zonal Resource Adequacy Proposal

Instead of pursuing the previous proposal to simply extend the Path 26 method concepts to additional constraints in an expanded BAA, the ISO believes it is more appropriate to develop a zonal RA concept under which the ISO would establish RA zones, zonal import limits, and zonal RA requirements for each RA zone and all LSEs serving load in each of the defined RA zones.

The ISO believes that this zonal RA approach better ensures that any internal RA transfer constraints are properly accounted for and respected in the most efficient and equitable manner possible. Additionally, the following zonal RA proposal will acknowledge and continue to realize the benefits of the current netting of RA transfers across the existing internal Path 26 constraint and other potential internal constraints in an expanded BAA.

The ISO proposes to develop a zonal RA concept that will require the ISO to establish RA zones, zonal Planning Reserve Margin (PRM) targets, zonal import limits, and zonal RA requirements for each RA zone as well as each of the LSEs serving load in each of the established zones. The proposed zonal RA concept can be described through the following iterative steps:

Table 4: Proposed Zonal Resource Adequacy process steps

Proposed Zonal Resource Adequacy process steps
1) Establish defined RA zones
2) Establish zonal PRM targets for each defined RA zone = **Zonal PRM Target (ZPRM)**
3) Maximum Import Capability (total MIC for all interties into specified zone) + internal transfer limits (total of any internal transfer limits into specified zone) = **Zonal Import Limit (ZIL)**
4) (Zonal load forecast x ZPRM) - ZIL = **Zonal RA Requirement (ZRA)**
5) Allocate ZRA to LSEs on a load share ratio basis: (ZRA / LSE Load Share Ratio) = **LSE specific Baseline Zonal Capacity Requirement (BZCR)**
6) Establish LSE specific “netting” credit: [(Each LSEs total MW netting participation in all zones other than the credit zone)/(Total MW netting participation in all zones other than the credit zone from all LSE in the credit zone)] x Total MWs made available in the credit zone = **LSE specific NZC (Netting Zonal Credit)**
7) Establish final zonal capacity requirement after netting: BZCR – (NZC) = **LSE specific Final Zonal Capacity Requirement (FZCR)**

Step 1: Establishes defined RA zones. The criteria and guidelines for creating RA zones is under development, and the ISO’s initial thinking is that there would initially be four RA zones established: South of Path 26, North of Path 26, PAC West, and PAC East zones. The ISO seeks stakeholder feedback on these proposed RA zones and any guidelines, criteria, or other considerations that should be utilized in establishing the proposed RA zones. Once zones have been established, they will not need to be revisited or redefined frequently; however, as additional entities join the ISO, expanding the BAA

footprint may require adding defined RA zones for those areas. The ISO would conduct Steps 2-7, described in more detail below, on a regular basis as a standard part of the ISO's RA processes.

Step 2: Establishes the Zonal PRM Target (ZPRM) for each zone. In order to establish this ZPRM for each zone, the ISO proposes to utilize one of the methods proposed for determining PRMs as discussed in Section 5.6.2, *i.e.*, through either a probabilistic or deterministic PRM study.

Step 3: Establishes Zonal Import Limit (ZIL) for each zone, *i.e.*, the total MIC and internal transfer limits. This will produce a ZIL for each zone in order to properly respect all import and internal transfer limits into each specified zone. To determine the ZIL for each zone, the ISO will add the total MIC for all interties into the specified zone and the total of any internal transfer limits into the specified zone.

Step 4: Establishes the Zonal RA Requirement (ZRA) for each zone. To determine the ZRA for each zone, the ISO will multiply the specified zonal load forecast by the ZPRM (determined in Step 2) and subtract the ZIL (determined in Step 3).

Step 5: Allocates the ZRA to LSEs on a *pro rata* load share ratio basis. (ZRA / LSE Load Share Ratio) = LSE specific Base Zonal Capacity Requirement (BZCR).

Step 6: Establish LSE specific Netting Zonal Credit (NZC). This step allows for the potential reduction of LSE specific BZCR by voluntary participation in the zonal "netting" process. The ISO will measure resources already procured by LSEs not serving load in a specified zone, or in excess of the served load in a specified zone. The ISO will then credit a reduction for each zonal "netting" participating LSEs, commensurate with its MW quantity participation ratio into the entire "netting" process. "Netting" credit to be received in each zone is relative to the total MW quantity made available by other LSEs participating in the "netting" process:

> [(Each LSEs total MW netting participation in all zones other than the credit zone)/(Total MW netting participation in all zones other than the credit zone from all LSE in the credit zone)] x Total MWs made available in the credit zone = LSE specific NZC (Netting Zonal Credit)

Please note: The ISO has identified that it may be necessary to develop sequential "sub-steps" under this NZC process in order to establish some iterative communication of the system RA procurement in each zone by LSEs not serving loads in those zones. For instance; similar to the current Path 26 netting process; the ISO will explore sub-steps such as a preliminary submittal of netting contracts. The ISO intends to further develop this in zonal RA section of subsequent proposals in order to ensure the proposal best captures the full netting benefit of system procurement in each zone in order to fully capture the benefits of the proposed NZC step.

Step 7: Establishes the final zonal capacity requirement after netting. This is accomplished by reducing the LSE specific BZCR by the NZC to give the LSE specific Final Zonal Capacity Requirement (FZCR).

The ISO will conduct these steps as part of a recurring zonal RA process that will establish zonal RA requirements for every LSE serving load in each RA zone. This zonal RA proposal accounts for all internal transfer constraints and import capability through the ZIL determination. The zonal RA proposal

will provide for recognition of all "netting benefits" provided by the overall system RA procurement that has been conducted in specified zones by LSEs not serving loads in the specified zone as well.

There are numerous considerations to discuss related to this zonal RA proposal and the ISO welcomes stakeholder feedback in the further development of the concept. The ISO will continue to build upon this aspect of the initiative in subsequent proposals.

5.4 Allocating RA Requirements to LRAs/LSEs

This aspect of the proposal addresses two potential issues related to allocating RA requirements to potential new ISO participants. The first is the scenarios of the need for allocating RA requirements to LSEs that may have a state or local regulatory agency that does not wish to assume the role of receiving RA requirements from the ISO and then allocating such requirements to its respective LSEs. The second scenario is where there is more than one LRA, State Commission, or other jurisdictional entity overseeing and/or approving a multi-jurisdictional LSEs procurement decisions. To address these two potential scenarios, the ISO proposes to create a new mechanism for LRAs and state agencies to defer allocation of RA requirements to the ISO so the ISO can directly allocate RA requirements LSEs.

The ISO stresses that this section of the proposal is not intended to change how LSEs and LRAs in the current ISO BAA receive and/or allocate RA requirements, but instead is only intended to address any potential barriers or issues related to allowing the ISO to directly allocate RA requirements to LSEs to accommodate those utilities whose state commissions/LRAs prefer to leave the running of the day-to-day business of the utility to the utility. Also, it can accommodate multistate utilities that do not have a single regulatory authority overseeing its activities.

Under this proposal, the ISO will allow LRAs/State Commissions/jurisdictional entities to elect to have the ISO allocate all RA requirements directly to their jurisdictional LSEs if they desire. Note that the ISO is intending to add the option for LRAs, State Commissions, and other jurisdictional entities to decide to defer to the ISO for allocating the system requirement to their jurisdictional LSEs.

The ISO also intends to create a new mechanism in order to allocate all system, zonal, local, and flexibility RA requirements directly to multi-jurisdictional LSEs to avoid any related issues. PacifiCorp has identified this issue in its stakeholder comments on the straw proposal, and the ISO agrees this approach simplifies the approach and eases jurisdictional concerns for any potential ISO participants that are multi-jurisdictional LSEs. This approach will require the ISO to define "multi-jurisdictional LSE" as part of the ISO tariff.

5.5 Updating ISO Tariff Language to be More Generic

This element of the ISO's Regional RA proposal addresses the need for the tariff provisions related to RA and the performance of RA resources to be more generic. The current tariff utilizes California-centric language that may not be applicable to entities in an expanded BAA. The ISO believes this is necessary to avoid any unintended barriers or consequences associated with the current tariff language as the ISO expands to more of a regional entity.

As a general principle, the ISO believes that the RA tariff provisions should not make general references to any particular state or regulatory agency. Instead, such references would only be necessary where a

specific state or agency is distinguished from another. As an example, the load forecasting section of this proposal (Section 5.1.2) contemplates a specific function for the California Energy Commission that would not be carried out the by agencies of other states that may lie within an expanded ISO footprint that carry out similar energy policy and planning functions for those respective states. Accordingly, in the context of load forecasting, there would be reason for the revised tariff to mention the California Energy Commission specifically. As a counterexample, the tariff contains the term Local Regulatory Authority ("LRA"), which is defined as: "The state or local governmental authority, or the board of directors of an electric cooperative, responsible for the regulation or oversight of a utility." Yet in the context of RA tariff provisions, the current ISO tariff frequently contains references to the California Public Utilities Commission ("CPUC") or the LRA. This current diction is redundant, as the CPUC already meets the definition of a LRA. If the ISO expands to a regional entity this redundancy poses the risk of confusion.

Section 40.2 of the ISO tariff currently contains certain requirements for LSEs subject to the jurisdiction of the CPUC and other requirements for LSEs not subject to CPUC jurisdiction. Going forward, the ISO does not believe that drawing such a distinction is necessary and believes that any separate requirements should be defined in terms of whether a relevant LRA has or has not established the relevant RA requirements.

5.6 Reliability Assessment

The ISO's Straw Proposal for a Regional RA framework identified the ISO's initial proposal to conduct a reliability assessment once the ISO communicates its operational and reliability needs to the responsible entities, and they have provided the ISO with RA plans and supply plans. The ISO believes that a reliability assessment is necessary to ensure that LSE and LRA procurement programs have accounted for adequate resources to be committed to the ISO markets to allow the ISO to reliably operate the system. The assessment will mitigate the potential for undue "leaning" on the system by individual entities. To perform this assessment, the ISO requires three elements.

1. PRM targets to evaluate total system-wide and zonal procurement levels;
2. Uniform counting methodologies for assessing the capacity value that each resource type can provide towards meeting the ISOs reliability needs; and
3. Revisions to the current backstop procurement authority and cost allocation tariff language that incorporate the reliability assessment.

The ISO's proposal for each of these components of the proposed reliability assessment is discussed in greater detail below.

5.6.1 Planning Reserve Margin Background

Generation reliability criteria generally fall into two types of measures: deterministic and probabilistic. Deterministic criteria are calculated with known system parameters and provide a static look at the system. They offer the advantage of being relatively easy to calculate and understand. However, they only provide a limited representation of the adequacy of the bulk electric system. Probabilistic criteria recognize and model the dynamic nature of the bulk electric system. Statistical methods are used to model the future uncertainties in the various parts of the bulk electric system.

Planning Reserve Margins (PRMs) are a widely used deterministic criterion for generation reliability. PRMs are utilized by bulk electric systems including the ISO and other RTOs/ISOs in order to plan for or target procurement levels for the required margin of generation resources that will be sufficient to maintain reliability to the specified generation reliability target that has been chosen. PRMs must be sufficient to cover a number of risks that may impact the reliability of the bulk electric system including the following items: planned maintenance; unplanned or forced outages; generation and demand response resource deratings; and expected variations in weather, customer demands, and load forecast error.

Probabilistic (stochastic) analyses model the likelihood of an event through the expected relative frequency of occurrence of a specified event in a very large collection of possible outcomes through various approaches, such as Monte Carlo simulation. Probabilistic approaches are a quantitative measure of the likelihood of an event and the uncertainty associated with the event occurring. Probability concepts provide the ability to quantitatively incorporate uncertainty in the planning of power systems, which cannot be done using deterministic methods and criteria.

There are a number of probabilistic metrics (criterion) used to measure resource adequacy and can be translated to determine PRM targets. Some common metrics are described below:

- *Loss of Load Probability* (**LOLP**, in %): LOLP is the probability that at least one shortfall event will occur over the time period being evaluated. Common industry standards include: 1-in-10, or 10% and 1-in-20, or 5%. This approach uses an annual measure. This metric does not reflect the frequency of events like LOLE.
- *Loss of Load Expectation* (**LOLE**, in days per year): LOLE is the expected number of days in a year when the aggregate resource is insufficient to meet load. A very common LOLE criterion is “1 day in 10 years”, or equivalently, 0.1 days per year, if annual analysis is required. Hourly LOLE utilizes hourly load and generation profiles rather than the daily peak and capacity profiles. Using hourly profiles in the analysis provides information on the potential duration of the outages in addition to the frequency. It is more useful to use hourly LOLE when there are intermittent/variable resources like wind and solar on the system.
- *Expected Unserved Energy* (**EUE**, in MWh): EUE is the expected amount of energy not served per year. This metric gives some information of the aggregated magnitude of shortfalls.

Although PRMs are a deterministic criterion, it is possible to use a probabilistic metric such as LOLE to translate the criteria into a deterministic measure used to set a PRM target. Many other regions of the country conduct this probabilistic criterion translation into a PRM target utilizing LOLE criterion. In fact many NERC Regional Entities use a LOLE generation reliability criterion (however WECC does not have any standards for generation reliability criterion), as well as most of the other ISO/RTOs, including PJM, ISO-NE, NYISO, MISO, and IESO. This probabilistic approach to deriving PRM targets is more commonly used than a simple deterministic PRM approach because unless the PRM is derived from an LOLE, or other probabilistic study, there is uncertainty about the likely level of system reliability risk because certain generators have higher forced outage rates than others. In other words, two different systems using the same deterministic PRM target will yield varying levels of reliability because of the differing levels of generator availability across systems.

5.6.2 Planning Reserve Margin Proposal

To conduct the ISO's proposed reliability assessment, the ISO has identified the need to establish PRM targets to evaluate reliability levels and ensure adequate capacity has been made available. It will be important to determine a PRM target through a method that accurately measures the expected level of reliability of the system in order avoid risks to reliability. The ISO has previously explained the need to determine a system level PRM to mitigate the potential for certain entities to lean on the rest of the system. In addition to addressing this leaning issue through the system PRM, the ISO has also proposed a zonal RA concept as explained in Section 5.3 above. In order to establish the zonal RA concept, the ISO will need to define the specific RA zones and determine zonal PRM requirements for each RA zone.

For the purposes of creating system and zonal PRM targets for use under the reliability assessment the ISO offers the two following options for stakeholder's consideration:

(1) Probabilistic PRM translation (LOLE study)
(2) Simplified deterministic PRM calculation

The ISO presents the following discussion on the two potential PRM options, including the necessary inputs for both methods to be developed, as well as descriptions of the merits and shortcomings associated with both approaches. The ISO seeks additional stakeholder feedback on the two proposed options for determining system and zonal PRMs.

Probabilistic PRM – LOLE study approach:

As noted above, numerous other regions use a probabilistic PRM approach. These are usually based on rigorous statistical analysis, such as Monte Carlo simulation. In this method, multiple uncertainties in the system are considered simultaneously, and the output is obtained after a high number of sampling iterations. The main advantage of this method is to allow utilities to better approximate real operation of the system, which makes results much more useful.

The benefits of a probabilistic LOLE PRM approach include:

- More accurate risk assessment; LOLE is a complex probabilistic criterion that can accurately account for the dynamic nature of a power system.
- Probability concepts such as LOLE provide the ability to quantitatively incorporate uncertainty in the assessment of power systems, which cannot be done using deterministic methods and criteria.
- LOLE uses statistical methods to address future uncertainties in various system components and accounts for individual unit level variability of characteristics such as outage rates.
- As noted in the PRM background, LOLE is a widely accepted generation reliability criterion in other regions.

Some potential shortfalls of a LOLE study PRM approach include:

- Complexity and resource burdens; and LOLE requires complex power flow modeling including detailed data and assumption inputs so it may be difficult to set up and perform. This would add

significant development time as well as requiring additional work to gather required data inputs from entities.

- LOLE studies may have the potential for inconsistencies (*i.e.*, many more random variables).
- The target level of LOLE reliability criterion would need to be determined as part of the study inputs, *i.e.*, 1-day-in-10 years, 1-in-5, 1-in-20, etc., that may create disagreement amongst parties with different interests.
- Choosing a specified level of LOLE reliability criterion to use for determining PRMs is not straightforward because WECC has not developed any applicable standards for generation reliability criterion unlike many of the other North American regional reliability organizations (1-in-10 LOLE is generally accepted as an appropriate target in most other NERC regions).

Required Inputs to LOLE Studies:

Calculating LOLE reliability levels expressed in days/year requires the use of daily load peaks, generator capacities, and forced outage rates. The ISO expects that performing an LOLE study will require a number of the following inputs, described in Table 5 below.

Table 5: LOLE Study Inputs

LOLE Model Inputs
Load Inputs
(1) Hourly demand and energy forecasts
(2) Monthly load shapes/profiles
(3) Load forecast uncertainty (load forecast error projection - expected/probabilistic)
Generation Resource Data
(1) Operating parameters
(2) Unit forced outage rates
(3) Planned maintenance schedules and maintenance cycles
(4) Energy limits for DR / Interruptible Load
System and External Information
(1) Zone definitions
(2) Internal transfer limits / zonal import limits
(3) External system model with load and generation characteristics
(4) Historical import levels
Detailed Transmission Model Inputs
(1) Typical load and Power Flow model used in transmission studies
(2) Transmission system details including specific buses and branches
(3) Loads modeled at bus level

Additional details on the needed inputs and treatment of certain system criteria in the LOLE model include: detailed unit specific data including unit's forced outage rates, maintenance intervals, and operating parameters. External systems would also need to be included in the model. Representative external areas with interties into the ISO system would need to be modeled with generation and load

characteristics. Intertie limits for these modeled external areas could be set using previous years hourly net transfer observations or other reliable method, and the maximum simultaneous imports limited to total MIC. Non-firm imports/exports would not be included, i.e., no economy exports would be scheduled for the modeling purposes to keep all non-firm exports at zero, only firm imports/exports would need to be included and should be based on known and demonstrated contractual obligations.

Deterministic PRM approach ("Building Block" PRM approach):

The second method the ISO could consider using a simple deterministic formula with specified inputs to determine the needed PRM targets. These basic analytical methods are simple, but their major disadvantage is that they do not directly address any generation reliability metrics such as LOLE; so, it is not possible to know the system risk level and whether the resource adequacy measure is appropriate for each situation. This approach can be described as somewhat of a judgement call, where professional experience and system knowledge is used, replacing the more rigorous modeling of probabilistic approaches. The ISO could use this approach to determine both system-wide and zonal PRM targets as well.

The benefits of a deterministic PRM criterion include:

- Relatively easy to incorporate because it is simple and straightforward, easy to understand, and easy to compute.
- Using a simplified deterministic approach can be calculated easily, and the ISO could set PRM targets simply through a basic analytical approach which can remain relatively static but can be refreshed with updated inputs periodically.

Some of the shortfalls of the simple deterministic PRM approach include:

- Resulting PRM target is developed through a less analytically rigorous method compared to a LOLE Study based PRM.
- The use of a deterministic reserve margin has the disadvantage of not recognizing that different types of plants with the same capacity may have different effects on supply adequacy.
- The approach only provides a limited representation of the system's actual level of reliability and would not be able to capture any of the future uncertainty of the various system components that a probabilistic approach captured because that cannot be done using deterministic methods and criteria alone.

If the ISO were to utilize a deterministic PRM, it would need to determine the basic elements that would make up the inputs to the calculation. These deterministic components and inputs are readily available and can also be called PRM "Building Blocks".

Deterministic PRM Inputs / Building Blocks:

- Average forced outage rates;
- Assumed levels of available external support;
- Average load forecast error;
- Operating reserve requirements;
- Reserve for unusual weather events

For example; a further expanded deterministic PRM including average forced outage rate for the entire resource fleet, expected availability of external support, and historic load forecasting error rates could be expressed as:

Example Deterministic PRM Calculation Formula:

$$\begin{aligned} &\textbf{\textit{Load Supply Balance}}\ (100\%) + \textbf{\textit{Avg Forced Outage Rate}}\ \% + \textbf{\textit{Avg LF Error}}\ \% \\ &\quad + \textbf{\textit{Operating Reserves Requirement}}\ \% \\ &\quad + \textbf{\textit{Unusual Weather Events Reserves}}\ \% = \ \textbf{\textit{PRM Target}}\ \% \end{aligned}$$

Table 6: Deterministic Building Block PRM Example:

Deterministic Building Block PRM Example		
Load/Supply Balance	100%	+
Average Forced Outage Rate	5%	+
Average Load Forecasting Error	2.5%	+
Operating Reserves Requirements	6%	+
Unusual Weather Event Reserves	1.5%	=
Total PRM Target	115%	
Note: example PRM building blocks and percentages are for illustrative purposes only.		

These building blocks could be used to determine PRM targets based on some judgment of appropriate levels of assumed reliability. PRM targets could be calculated for a system-wide PRM and zonal specific PRM targets using zonal specific deterministic inputs such as the specified zone's average forced outage rates and zonal average load forecast error.

The ISO believes that these PRM inputs/building blocks are reasonable starting points to discuss with stakeholders and welcome any feedback about the inputs should be used in a deterministic building block PRM approach and how the ISO would ultimately determine the values applied for each of the building blocks/inputs.

5.6.3 Uniform Counting Methodologies Background

To conduct the ISO's proposed reliability assessment, the ISO has identified the need to establish uniform counting methodologies for assessing the capacity value that each resource type can provide towards meeting the ISOs reliability needs. Counting methodologies for all resources will allow the ISO to consistently determine the maximum capacity value that a resource can realistically deliver. The various resource type specific methodology below are what is currently used by the ISO.

- Pmax: The maximum power output a resource can reach as established by a Pmax test. The resource's scheduling coordinator requests the ISO to conduct this test.
- Exceedance Methodology: The minimum amount of generation produced by a resource in at least 70% of the studied hours at the time of system peak demand.

- Historical Data: The monthly historic performance during that same month during the Availability Assessment Hours[9], using a three-year rolling average. Resources with missing data due to outages occurring during the availability assessment hours will use average values for the same hours on the same calendar day but from other years.
- Technology Factors: For new resources that do not have historical data, the technology factors are used to calculate the QC. For each fuel type technology factors are currently calculated as follows:
    - Wind and solar – exceedance methodology evaluation of similar fuel type.
    - All other fuel types – historical data methodology evaluation of similar fuel type.

5.6.4 Uniform Counting Methodologies Proposal

The ISO proposes to develop uniform counting methodologies that would be applied for resource adequacy showings and the proposed reliability assessment. The counting methodology proposal would provide consistent and transparent methodologies for evaluating the amount that each resource type is able to effectively contribute towards meeting the ISO's reliability needs. The methodologies would be determined through a transparent and open stakeholder process, and the maximum qualifying capacity quantity that a resource owner could offer as RA capacity would be posted a year-ahead to allow LSEs sufficient time to procure RA capacity from resource owners for the following resource adequacy compliance year. Updates to the methodology, which may be needed over time to reflect best practices, would be effectuated through an open and transparent stakeholder process. An example of a methodology that might be used in the future is the effective load carrying capability methodology that is currently under discussion in several forums. The ISO is not proposing to eliminate the ability of LRAs to develop their own resource counting methodologies for developing their RA and procurement programs. However, establishing consistent counting rules that the ISO would use for ISO resource adequacy showings and the reliability assessment will mitigate concerns about over-counting resources by an entity, which can result in leaning on other entities. The following proposal for counting methodologies incorporates existing methodologies identified above or includes additional options that the ISO would like to request feedback from stakeholders.

Counting methodologies

The ISO's proposed Reliability Assessment and RA showings will require the use of consistent methods for assessing the capacity value that each resource type can provide towards meeting the ISO's reliability needs. The following sections describe the ISO's proposed uniform counting methodologies and various options for each resource/fuel type.

A) Thermal

The capacity of thermal resources will be assessed based on the tested and validated Pmax value of the resource.

[9] CAISO tariff section 40.9.3.

B) Nuclear

The capacity of nuclear resources will be determined by the tested and validated Pmax value of the resource.

C) Solar and Wind

The ISO's current default counting methodologies, under Tariff Section 40.8, uses the historical data methodology for solar and wind resources. The ISO has not established a preferred uniform counting methodology for wind and solar resources at this time, instead, the ISO seeks stakeholder feedback on which of the following uniform counting methodology options for solar and wind resources should be adopted for use in the proposed Reliability Assessment.

1) Exceedance methodology

The exceedance methodology is one way of evaluating the capacity value of wind and solar resources. The exceedance methodology measures the minimum amount of generation produced by a resource during a certain percentage of included hours. The resource is measured based on the output level it can produce in at least a certain percentage (%) of the studied hours. The hours included for study vary seasonally and are based on the time of system peak demand. The advantage of using exceedance is its simplicity for implementation, its general ability to account for expected performance during hours of greatest system need, and the ISO's familiarity with the methodology. One of the disadvantages is that the exceedance methodology does not study when variability occurs and the certainty of a resources ability to serve load at a given point in time. For example, exceedance utilizes resource's output duration curves and may separate significant output changes that occur on a single day while other options such as the ELCC method examines hourly probabilistic assessment of a resource's ability to serve load.

2) Effective load carrying capability (ELCC)

The Effective Load Carrying Capability (ELCC) of a resource is defined as the amount of incremental load a resource can dependably and reliably serve, while considering the probabilistic nature of generation shortfalls and random forced outages resulting in unserved load. The ISO will consider this methodology for potential use in evaluating capacity values for wind and solar resources. A general overview of the ELCC methodology and both pros and cons associated with the ELCC are described below.

The Loss of Load Expectation (LOLE) based ELCC (LOLE-ELCC) calculates the value of a resource through the probabilistic measurement of load not being served over a specific time frame.

Also of importance to note regarding use of an ELCC approach for wind and solar resources is the current regulatory review of this methodology in California. Currently, the California Public Utilities Commission has an open proceeding to review an ELCC methodology based on California Senate Bill 2, which states;

> "…the commission shall determine the effective load carrying capacity of wind and solar energy resources on the California electrical grid. The

> commission shall use those effective load carrying capacity values in establishing the contribution of wind and solar energy resources toward meeting the resource adequacy requirements established pursuant to Section 380."[10]

As an illustrative example; in the context of a solar-PV resource, the LOLE-ELCC methodology would follow these general steps[11]:

(1) Calculate the LOLE of the system with a given set of conventional generators without the specific PV plant.
(2) The PV plant will be added to the system and the LOLE is recalculated.
(3) With the PV plant in the system, a constant load is added in each hour and adjusted until the LOLE systems calculations for with and without the PV resource equal each other. The value of the load that achieves the equality is defined as the ELCC of the PV plant.

A benefit of an ELCC approach is the ability to probabilistically assess the ISO's ability to serve load under uncertainty. For example, as noted above, an ELCC model could determine if there is a significant possibility of loss of load events due to random variability of potential events in a dynamic system.[12] Also, the ELCC calculation of comparing a specific resource to the whole system represents a resource's capacity over the full 24 hours of the day. The reality of utilizing an ELCC-LOLE approach is that it requires detailed system data, including Equivalent Forced Outage Rates (EFORs) of all of the generators in the system, generator capacities, and loads. Also, due to seasonal and annual weather pattern changes, NREL suggests that one will need several years' worth of data to accurately estimate the capacity value of any type of renewable generation technology including PV.

Table 6 below describes RA criteria, methods, and tools for selected regions.

[10] http://www.leginfo.ca.gov/pub/11-12/bill/sen/sb_0001-0050/sbx1_2_bill_20110412_chaptered.pdf 2
[11] http://www.nrel.gov/docs/fy12osti/54704.pdf
[12] http://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6557

Table 6: Resource Adequacy criteria, methods, and tools for selected regions[13]

Region / entity	Reliability Standard	Reliability Model	Wind and Solar Capacity Rating Method	Wind and Solar Model	Comments on Reliability Standard	Comments on Wind and Solar Capacity Rating Method	Capacity procurement method
PJM	0.1 LOLE	PRISM and GE-MARS	Approximation method: Peak hour average production	Approx. method	The LOLE based target reserve margin and various other calculations provide inputs into the PJM capacity market.	Existing wind and solar, capacity factor using 3-year rolling average during summer peak hours, defined as June through August, HE 2 p.m. to 6 p.m. local time. The class average capacity factors for new resources are 13% for wind and 38% for solar.	Reliability Pricing Model (RPM) (centralized capacity market) which operates 3 years-ahead. LSEs can also meet capacity obligations through self- supply, bilateral purchases.
MISO	0.1 LOLE used to determine system-wide Planning Reserve Margin (PRM). State regulators may determine different PRMs.	GE-MARS	ELCC for wind; peak-hour approximation method for solar	GE-MARS used to calculate ELCC	Performed annually by MISO. For 2015-16 planning year, a regional planning reserve margin (ICAP) of 14.3%, but see MISO manuals for other adjustments to reflect UCAP.	Wind system-wide ELCC is 14.7% for 2015-16 planning year. For non-wind resources, including solar , the most recent consecutive three years of hourly net output (MW) for HE 15, 16, and 17 EST from June, July and August. For new resources, or resources on qualified extended outage where data does not exist for some or all of the previous 36 historical months, a minimum of 30 consecutive days' worth of historical data during June, July or August for the hours ending 15, 16, and 17 EST.	Self-ownership or bilateral trans-actions to meet RA requirements
California Public Utilities Comm.	15%-17% planning reserve margin; currently evaluating LOLE-based approaches	SERVM is currently being evaluated	Approximation methods; ELCC model for wind and solar in development with draft results available.	SERVM for ELCC	Planning reserve margin has been static since the start of the CPUC RA program in 2004. LOLE models were evaluated in 2008-2010. Currently, CPUC projects a long-term capacity surplus due to renewable procurement.	Current approximation method: 70% exceedance factor. Capacity values set monthly. Uses monthly hourly wind and solar production data from previous three years between 4:00 p.m. and 9 p.m. January through March and November through December and between 1:00 p.m. and 6:00 p.m. April through October. Diversity benefits added to capacity value.	Self-supply and bilateral contracts. Separate require-ments for local, system and flexible capacity.

D) Hydro

The capacity of a hydro resource will be assessed on its tested and validated Pmax value. Run-of-the-river hydro (ROR) resources will be assessed on a historical methodology with a three year rolling average. A resource with no historical data will be evaluated based on technology factors.

E) Storage

The ISO's current default tariff language for counting Non-Generating Resources (NGR) states that NGRs must either be Participating Generators or System Units to qualify as Resource Adequacy Capacity, and must be tested by the ISO. The ISO test will measure the resource's sustained output over a four-hour period. Additionally, an NGR's NQC shall not exceed the resource's maximum instantaneous discharge capability. The ISO proposes the following two options as possible uniform counting methodologies for NGRs for feedback on which method the ISO should ultimately decide to propose.

1) Four hour test

This first option is the four hour output test method, which would continue to utilize the current ISO default tariff language for counting NGRs. The ISO would conduct a test similar to the Pmax test for all NGR resources that wish to be eligible to provide RA capacity. The test would require

[13] http://www.largescalesolar.org/files/_docs/White-Paper-Solar-Technologies-and-Resource-Adequacy-(Nov-2015)-REV.pdf

an NGR to provide four hours of continuous output to determine its maximum discharge capability in order to establish the NGRs QC value.

2) Registered capacity value

The registered capacity value methodology will require scheduling coordinators to submit the NGR's capacity factor, based on a sustained output for four hours, which the ISO will accept and establish as the NGRs QC value. Under this option, the ISO would also conduct compliance testing and audits on NGR resources periodically to verify the NGR's registered capacity value, based on its ability to sustain is registered level of output for a four hours duration. Non-compliance or failure to meet the resource's submitted registered capacity value will result in a penalty that would lower the NGR's NQC value for the following RA year, as well as notification to its respective LRA and FERC.

F) Proxy Demand Response (PDR), Reliability Demand Response Resources (RDRR), and Participating Load

The ISO proposes the following options for PDR, RDRR and Participation Load uniform counting methodologies:

1) Historical

The historical method would be similar to the current default tariff language. The ISO will evaluate PDR, RDRR, and Participating Load resources by the resource's average monthly historic demand reduction during the established Availability Assessment Hours, using a three-year rolling average. The ISO would also add a provision for the ability to conduct compliance tests and audits during any month in which the resource has been shown as RA. Failure to perform based on a resource's listed capacity will result in a penalty that would lower the PDR, RDRR, and Participating Load's NQC value for the following month, as well as notifications to its respective LRA and FERC.

2) Registered capacity value

The registered capacity value methodology would be similar to the same option proposed for NGRs and would require scheduling coordinators to submit to the ISO the PDR, RDRR, and Participating Load's capacity value, based on a sustained output for four hours which the ISO will accept and establish as the resource's capacity value. The ISO would conduct compliance testing and audits on PDR, RDRR, and Participating Load resources periodically to verify the deliverability of the resource's registered capacity value based on a sustained output for four hours. Non-compliance or failure to meet the resource's submitted registered capacity value will result in a penalty that would lower the PDR, RDRR, and Participating Load's NQC value for the following RA year, as well as notification to its respective LRA and FERC.

G) Qualifying Facilities including Combined Heat and Power

The ISO proposes to evaluate the capacity value of Qualifying Facilities (QFs), Combined Heat and Power (CHP) through the historical methodology with a three year rolling average. A QF or CHP resource with no historical data will be evaluated based on technology factors.

Summary of counting methodologies

Table 7 below summarizes the proposed counting methodologies.

Table 7: Summary of counting methodologies

Resource type	Counting Method
Thermal	Pmax
Nuclear	Pmax
Solar & Wind	Option 1: Exceedance Option 2: ELCC
Hydro	Pmax and Historical
Storage	Option 1: Four hour test Option 2: Registered Capacity Value
Demand Response	Option 1: Registered capacity value Option 2: Historical Option 3: Class Average
QF and CHP	Historical

Establishing the Net Qualifying Capacity value

The ISO currently receives each resource's Qualifying Capacity (QC) from a scheduling coordinator and uses the submitted QC value to establish a Net Qualifying Capacity (NQC) value for each resource annually with the ability to revisit NQC on a monthly basis. The ISO proposes to update this process under this proposal and will now use the methodologies proposed above to determine resource's capacity value, established by the ISO, for use in the ISO's proposed reliability assessment and RA showings. The ISO will use the uniform methods described above to establish the initial capacity value of each resource and then determine the resource's final NQC through the following three criteria.

1) **Testing**
   The ISO will evaluate that the resource's QC value will not surpass the maximum power plant output or Pmax as approved in their Interconnection Agreement.
2) **Performance Criteria**
   Currently under development.
3) **Deliverability to Aggregate of Load**
   The deliverability of Generation to the aggregate of Load measures the capability of the transmission system given the dispatch of other proximate Generation resources to deliver power output from a particular Generator to Load in the ISO Control Area during peak Demand conditions. A resource whose output is not fully deliverable will have the capacity that it may offer for resource adequacy purposes reduced.

For a detailed description of the current NQC process, please refer to the Reliability Requirements BPM.[14]

[14] Business Practice Manual for Reliability Requirements

The ISO believes that it will simplify the counting of resources and establishing of individual NQC's for resources by developing a process that will only utilize the ISO's proposed uniform counting methodologies in establishing a resource's capacity value. This will allow the ISO to inform the procurement process through the posting of the ISO determined NQCs. The ISO will also utilize the established NQCs in order to evaluate the overall procurement of resources under the proposed reliability assessment.

5.6.5 Backstop Procurement Authority

Resource Adequacy ("RA") in the ISO's balancing authority area is based on bilateral procurement overseen by LRAs, which include the California Public Utilities Commission ("CPUC") and publicly owned utilities. Under this framework, load serving entities ("LSEs") procure capacity through bilateral contracts to meet their RA requirements for system, local, and flexible capacity. The ISO is permitted to engage in backstop procurement pursuant to its Capacity Procurement Mechanism ("CPM") only in a limited number of defined circumstances to maintain reliability. Importantly, backstop procurement is not automatic or mandatory under the CAISO tariff. Rather, the CAISO has discretion whether to procure backstop capacity if there is a capacity deficiency or potential reliability event. Below the ISO discusses the various categories of existing CPM and the protections that are in place to limit the ISO's ability to procure backstop capacity and ensure transparency regarding the ISO's designations of CPM capacity. Thereafter, the ISO discusses potential changes to the CPM that it is considering in this initiative. For further information regarding the CPM mechanism going forward, stakeholders should refer to section 43A of the ISO tariff.[15] The ISO notes that in the near future the ISO will begin procuring CPM capacity pursuant to a competitive solicitation process. That will allow the ISO to procure the lowest cost resource(s) to meet identified reliability needs that require backstop procurement.[16]

A) Categories of CPM Designation

Under the CPM, the ISO may procure capacity to maintain grid reliability or supplement RA procurement by LSEs only under the following circumstances defined in section 43A of the ISO tariff: (1) insufficient RA resources in a LSE's annual or monthly RA plan; (2) deficiency in local capacity area resources in a LSE's annual or monthly RA plan; (3) collective deficiency in a local capacity area after accounting for all procured RA resources; (4) cumulative deficiency in the total flexible RA capacity in the annual or monthly flexible RA capacity plans or in a flexible capacity category in the monthly RA plans of LSEs; (5) a "Significant Event" occurs that threatens reliability and there are insufficient RA resources available to address the problem; (6) reliability or operational need requires the ISO to "Exceptionally Dispatch" non-RA capacity; and (7) capacity that is at risk of retiring in the current RA compliance year and will be needed for reliability by the end of the calendar year following the current RA compliance year. Each of these seven types of procurement are described below.

(1) <u>Insufficient RA Resources in LSE's Annual or Monthly RA Plan</u> - Tariff section 43A.2.3 gives the ISO authority to designate CPM capacity where a LSE fails to demonstrate in an annual or monthly RA plan that it has procured sufficient RA resources to comply with its

[15] The CAISO's CPM filing and tariff language approved by FERC is available at: http://www.caiso.com/Documents/May26_2015_TariffAmendment_CapacityProcurementMechanism_Revisions_ER15-1783.pdf

[16] This revised straw proposal does not discuss the mechanics of the competitive solicitation process. Stakeholders seeking additional information regarding that process should refer to section 43A of the ISO tariff.

annual and monthly demand and resource margin requirements. The ISO cannot procure backstop capacity pursuant to this section until after the LSE has had an opportunity to cure and can only procure capacity if there is an overall net deficiency in meeting the annual or monthly demand and planning reserve requirements, after taking into account all LSE demonstrations in their applicable annual or monthly RA plans. In other words, even if an individual LSE is deficient, the ISO can only designate CPM capacity if there is an aggregate deficiency. This protects against any over-procurement by the ISO.

(2) Deficiency in Local Capacity Area Resources in LSE's Annual or Monthly RA Plan - Under tariff section 43A.2.1.2, the ISO has authority to procure CPM when a LSE fails to demonstrate in its monthly RA plan that it has procured its share of Local Capacity Area Resources for the reported month. Section 43A.2.1.1 contains similar authority when a LSE fails to demonstrate in its annual RA plan that it has procured its share of Local Capacity Area Resources for the RA compliance year. Under either situation, the ISO cannot designate CPM capacity until after the LSE is given an opportunity to cure the deficiency in accordance with tariff section 40.7. Further, as specified in the tariff, the ISO's authority to designate CPM capacity under these sections is to ensure that each Local Capacity Area in the TAC area in which the LSE serves load has Local Capacity Area Resources in the amounts and locations necessary to comply with the Local Capacity Technical Study, after assessing the effectiveness of all generating units under Reliability Must-Run ("RMR") contracts and all RA resources reflect in the (annual or monthly) RA plans. In other words, even if an individual LSE is deficient in meeting its share of Local Capacity Area Resources, the ISO will not engage in backstop procurement under these sections unless there is an aggregate deficiency of Local Capacity Area Resources in the Local Capacity Area, based on all of the RA showings. Stated differently, if other LSEs have over-procured, the ISO will not designate CPM capacity if a specific LSE has not met its specific obligation. This protects against unnecessary procurement by the ISO.

(3) Collective Deficiency in Local Capacity Area after Accounting for All Procured RA Resources - Under section 43A.2.2, the ISO has authority to designate CPM capacity where the Local Capacity Area Resources specified in the annual RA plans of all LSEs fail to ensure compliance in one or more Local Capacity Areas with the Local Capacity Technical Study, even if the procured resources satisfy for the Local Capacity Area, the minimum amount of Local Capacity Area Resources identified in the Local Capacity technical study, after assessing the effectiveness of generating units under RMR contracts and all RA resources reflected in annual RA plans, whether or not such resources are located in the applicable Local Capacity Area. In other words, it is possible that even if all LSEs in a particular local areas meet their procurement obligation for the Local Capacity Area that collective procurement may not be sufficient to permit the ISO to meet reliability criteria. This is referred to as a "collective deficiency" of Local Capacity Area Resources. The ISO can procure backstop capacity under this section only if a collective deficiency remains after providing an opportunity for cure. Each LSE in the affected Local Capacity Area can cure by procuring its share of the collective deficiency. If a LSE procures its share of the collective deficiency, the ISO will not assign it any CPM costs if the ISO is required to procure CPM capacity because other LSEs did not "cure" their share of the collective deficiency. Collective deficiency

backstop is intended for situations where LSEs procure sufficient Local Capacity Area Resources to meet their RA obligations, at the TAC or aggregate level, but there still remains a need in a particular local capacity area or sub-area that the ISO must address in order to comply with reliability criteria. Under the existing tariff framework, this potentially can occur because LSEs are only required to procure minimum Local Capacity Area Resources at the TAC or aggregate level; they are not required to procure their share of resources needed to maintain reliability within each local area or sub-area and two they may purchase resources that are less effective than does used by the ISO in order to establish the minimum local capacity needed per LCR criteria, methodology and assumptions. Not requiring LSEs to procure their share of Local Capacity Area Resources in each area or sub-area arose to protect against the potential exercise of market power by a limited number of suppliers in certain local areas and/or sub-areas. However, under these circumstances, even though each LSE met its Local Capacity RA obligation, the ISO would still need additional capacity to meet the LCR criteria, hence the need for a collective deficiency CPM designation.

(4) Cumulative Deficiency in Total Flexible RA Capacity in Annual or Monthly Flexible RA Capacity Plans or in Flexible Capacity Category in Monthly RA Plans of LSE - Under tariff Section 43A.2.7, the ISO can also designate CPM capacity if there is a cumulative deficiency in flexible RA capacity in annual or monthly RA plans. A cumulative deficiency exists in annual flexible RA plans if the total amount of flexible RA capacity shown in the plans of all LSEs, based on the effective flexible capacity value for each resource, is less than 90 percent of the annual flexible capacity need determined by the ISO. A cumulative deficiency exists in monthly flexible RA plans if (1) the total amount of flexible RA capacity shown in the plans of all LSEs, limited on a collective basis to the maximum monthly requirement for each category and based on the effective flexible capacity values for each resource, is less than the applicable monthly flexible capacity need determined by the ISO, or (2) the total amount of flexible RA capacity shown in the base ramping flexible capacity category in the plans of all LSEs, based on the effective flexible capacity value of each resource, on a collective basis is less than the minimum monthly requirement for the base ramping flexible capacity category determined by the ISO.

If the notification and deficiency resolution processes under tariff sections 40.10.5.4, 40.10.5.5, and 40.10.4.6 do not fully resolve a deficiency and the ISO determines that a deficiency exists and there is a need for a flexible capacity CPM designation, the ISO can issue such a designation only after the following: (1) the ISO issues a market notice that describes the cumulative deficiency and specifies the quantity of flexible RA capacity necessary to meet the applicable flexible capacity need and notify LSEs that are deficient and the local regulatory authority with jurisdiction over such LSE; (2) for a LSE that is deficient, or a LSE subject to the jurisdiction of a local regulatory authority that is deficient, may submit a revised annual or monthly flexible RA plan to demonstrate procurement of additional flexible RA capacity. The ISO cannot designate flexible CPM capacity until the opportunity to cure the cumulative deficiency has been exhausted and the total required flexible capacity reported to the ISO in revised annual or monthly flexible RA capacity plans does not meet the flexible capacity need.

(5) "Significant Event" occurs that Threatens Reliability and there are Insufficient RA Resources available to address the Problem - Under section 43A.2.4, the ISO may designate CPM capacity to provide service on a prospective basis following a "Significant Event" to the extent necessary to maintain compliance with applicable reliability criteria and taking into account the duration of the Significant Event. The ISO tariff defines a Significant Event as "a substantial event, or combination of events, that is determined by the ISO to either result in material difference from what was assumed in the RA program for purposes of determining the RA Capacity requirements or produce a material change in system conditions or ISO Controlled Grid operations that causes, or threatens to cause, a failure to meet Reliability Criteria absent the recurring use of a non-RA Resource(s) on a prospective basis."

(6) Reliability or Operational Need requires ISO to Exceptionally Dispatch Non-RA Capacity - Under section 43A.2.5, the ISO may designate as CPM capacity on a prospective basis non-RA capacity that responds to an "Exceptional Dispatch" issued pursuant to tariff section 34.11.1, subsections (6), (9), or (10) of section 34.11.2, or section 34.11.3, unless the Exceptional Dispatch directs the curtailment or shutdown of a resource. Under section 34.11.1, the ISO may issue a manual Exceptional Dispatch "during a System Emergency, or to prevent an imminent System Emergency or a situation that threatens System Reliability and cannot be addressed by the Real-Time Market ("RTM") optimization and system modeling." The section 34.11.2 Exceptional Dispatches eligible for CPM designation are those involving the provision of voltage support, in the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption, and reversing the operating mode of a pumped-hydro storage unit. Finally, under section 34.11.3 the ISO may issue a manual Exceptional Dispatch to address transmission-related modeling limitations in the Full Network Model.

(7) Capacity that is at Risk of Retiring in Current RA Compliance Year and will be needed for Reliability by End of Calendar Year following Current RA Compliance Year - Under tariff section 43A2.6, the ISO can designate capacity to keep a resource in operation that is at risk of retirement during the current RA compliance year and that will be needed for reliability by the end of the calendar year following the current RA compliance year. The ISO must meet all of the following requirements for a risk of retirement CPM designation. First, the resource cannot be contracted for RA capacity or listed on any annual RA plan during the current RA compliance year. Second, the ISO did not identify any deficiency in a LSE's annual RA plan that resulted in a CPM designation for the resource during the current RA compliance year. Third, ISO technical assessments show that the resource will be needed for reliability purposes, either for locational or operational characteristics, by the end of the calendar year following the current RA compliance year. Fourth, no new generation is projected by the ISO to be in operation by the start of the subsequent RA compliance year that will meet the identified reliability need. Fifth, the resource must submit to the ISO and the Department of Market Monitoring, at least 180 days prior to terminating its Participating Generator Agreement or removing the resource from PGA Schedule 1, a request for a CPM designation, including an offer price and an affidavit from an officer with supporting financial information and documentation that attests the it will be uneconomic for the resource to remain in service in the current RA compliance year and that the decision to retire is definite unless CPM

procurement occurs. Finally, the resource must have offered its capacity into all CPM competitive solicitations for the current RA year. If these requirements are met, the ISO then must prepare a report explaining the basis and need for the CPM designation, post the report on its website, allow stakeholders to submit comments on the report, and allow LSEs the opportunity to procure capacity from the resource. If such capacity is not procured, the ISO may issue a risk of retirement designation if it determines that the designation is necessary and all other procurement measures have failed to procure the resource needed for reliable operation. The tariff expressly provides that the ISO "will not issue CPM designations in order to circumvent existing procurement mechanisms that could adequately resolve reliability needs.

B) Duration of CPM Designation

The term of a CPM designation varies from one month to one year, depending on the category of designation, underlying circumstances, and the duration of the deficiency or reliability problem. The tariff provisions are designed to correlate the designation period to the time that the designated resource will be needed, recognizing that FERC has ruled that the minimum CPM designation period is one month (to correspond to the monthly RA showing requirement).

- ***RA Deficiency CPM*** – The designation is for the length of time needed to remedy the RA deficiency, with a minimum designation period of one month. Because RA showings are an annual process, the potential maximum term for a deficiency-based CPM designation is one year (if there is a deficiency in every month).[17] The ISO limits its procurement to the term of the deficiency. For example, if a LSE is deficient for only one month of its annual RA plan, the ISO would not engage in 12 months of CPM procurement. See tariff Sections 43A.3.1. 43A.3.2, 43A.3.3, and 43A.3.4,

- ***Flexible Capacity CPM*** – A flexible CPM capacity designation for failure to show sufficient flexible RA capacity in an annual flexible RA capacity plan will have a minimum commitment term of one month and a maximum term of one year. The term of the designation must begin and end during the same calendar year. A flexible CPM capacity designation for failure to show sufficient flexible RA capacity in a monthly flexible RA capacity plan must have a commitment term of one month. The term of the designation must begin and end during the same calendar month. *See* tariff Section 43A.3.8.

- ***Significant Event CPM*** – The initial designation is for a 30-day term, but the ISO may extend that term for an additional 60-days if the triggering event is likely to persist.[18] During the additional 60-day period, the ISO will provide market participants with an opportunity to provide alternative solutions to meet the IOS's operational and reliability needs on response to the Significant Event rather than rely on the designation of capacity under the CPM. If the alternatives are acceptable to the ISO, the ISO will implement them. If market participants do not submit any solutions that are fully effective in addressing the deficiency in reliability criteria

[17] ISO Tariff Sections 43.3.1, 43.3.2, 43.3.3, 43.3.4, & 43.3.8.

[18] ISO Tariff Section 43.3.5.

resulting from the Significant Event, the ISO will extend the term of the CPM designation for the expected duration of the Significant Event. See tariff Section 43A.3.5.

- ***Exceptional Dispatch CPM*** – The designation is for a 30-day term if the designation was necessary to address a system reliability need (*i.e.*, a need that does not depend on a resource in a specific geographic area) and a 60-day term if the designation was necessary to address a local reliability need (*i.e.*, resolution depends on a resource in a specific geographic area).[19] If the circumstances that led to the Exceptional Dispatch are likely to extend beyond the initial designation period, the ISO may issue an Exceptional Dispatch CPM or other CPM designation for an additional 30 days or 60 days depending on whether the designation is for system or local reasons. See tariff Section 43A.3.6.

- ***Risk-of-Retirement CPM*** – The designation is for a minimum of one month and a maximum of one year. Within that range, the term is based on the number of months the resource is not otherwise under contract to provide RA capacity.[20] The term may not extend into the subsequent RA compliance year. See tariff Section 43A.3.7.

C) CPM Reporting Requirements

To ensure transparency, the ISO has a number of reporting obligations regarding any CPM designations. Under tariff section 43A.6.1, the ISO must issue a market notice within two business days of making a CPM designation that includes a preliminary description of what caused the CPM designation, the name of the resource the ISO procured, the preliminary expected duration of the CPM designation, the initial designation period, and an indication that a designation report is being prepared in accordance with section 43A.6.2. CPM designations resulting from Exceptional Dispatches are subject to the reporting requirement set forth in tariff section 34.9.4. For Exceptional Dispatch CPM designations, the market notice will also indicate whether the designation was made to address a system reliability need or a non-system reliability need, specify the quantity of capacity procured and the CPM term, and identify the engineering assessment the ISO used to determine the quantity of capacity needed from the resource to address the reliability issue.

Under tariff section 43A.6.2, the ISO must post a designation report to its website and issue a market notice regarding the report within the earlier of 30 days after procuring a resource under the CPM or 10 days after the end of the month. The report must contain the following information: a description of the reason for the designation and an explanation why it was necessary for the ISO to utilize its CPM authority; the resource name, amount of capacity designated, explanation of why that amount of capacity was designated, the date of the designation, the duration of the designation, the price of the resource, the reason for the designation if it is a Significant Event designation including a discussion of the event(s) that occurred and why the ISO procured CPM capacity, as assessment of the expected duration of the Significant Event, the duration of the initial designation, and a statement whether the initial designation has been extended and the length of the extension; and if the designation results from an Exceptional

[19] ISO Tariff Section 43.3.6.

[20] ISO Tariff Section 43.3.7.

Dispatch, additional information regarding the ISO's determination of the quantity and term of the designation.

Under tariff section 43A.6.3, within 10 days after the end of each month, the ISO must post a report to its website that identifies the following: (1) any non-market commitments of non-RA Capacity; and (2) all market commitments of Non-RA Capacity. The ISO will provide a market notice regarding the report's availability. The report will include the following information: the name of the resource, the investor-owned utility ("IOU") service territory, the maximum capacity committed in response to the event, how capacity was procured (*e.g.*, residual unit commitment, Exceptional Dispatch), the reason the ISO committed the capacity, and information as to whether or not RA resources and previously designated CPM capacity were used first and, if not, why not.

Finally, under tariff section 43A.6.4, the ISO will publish all final offers in a CPM competitive solicitation on a rolling quarterly basis with a five-quarter delay.

D) Experience with CPM Authority

The ISO has rarely used its CPM authority, which became effective on April 1, 2011, issuing only 14 designations. All CPM designations have been either Significant Event or Exceptional Dispatch designations. Of those designations, about one-half were associated with the unexpected circumstances leading to the eventual closure of the San Onofre Nuclear Generating Station ("SONGS"). The remaining designations resulted from events such significant transmission outages, the September 8, 2011 power outage, low gas inventories in Southern California on the SoCal Gas and Southwest Gas systems that resulted in over 2,000 MW being offline, and wildfires that were threatening certain key transmission facilities, and to prevent thermal overload on a line in a local reliability area for N-1 contingency event of a parallel facility. Except for certain designations to address reliability concerns associated with the closure of SONGS, which totaled 180 days each, all other CPM designations have been for 30 or 60 days. The ISO has never issued a CPM designation because of a RA deficiency, a collective local deficiency, or failure to replace capacity. The ISO has never made a risk of retirement CPM designation.

Certain stakeholders have expressed concern that the ISO may issue a CPM designation if it disagrees with the annual forecast provided by LSEs or the applicable regulatory authority. That is not the purpose of the CPM, and such an event does not fit into one of the specified CPM categories. It does not constitute a RA deficiency. Further, it does not constitute a change from what was assumed in the RA program (indeed it is an assumption in the RA program for purposes of determining RA requirements) and by itself does not result in a material change in systems conditions that would threaten reliability.

5.6.6 Modifications to Backstop Procurement Authority and Capacity Procurement Mechanism Proposal

Under this revised straw proposal, the ISO proposes to conduct a reliability assessment (see section above regarding the reliability assessment). If the ISO determines that there is a shortage of capacity based on the reliability assessment, the ISO proposes to follow the standard practice of notifying stakeholders of the shortage, providing load serving entities an opportunity to cure the shortage, and if load serving entities do not cure the shortage then the ISO may engage in backstop procurement to cure the shortage. Importantly, the ISO will continue providing the same level of transparency and protections against over-procurement that exist under today's backstop procurement framework. The current ISO

tariff language does not expressly acknowledge the ISO performing a reliability assessment; therefore, the ISO will need to revise the tariff to recognize that a reliability assessment may identify a shortage that the ISO needs to cure and authorize the ISO to procure backstop capacity as a last resort to cure the shortage.

Specifically, the ISO proposes to revise Section 43A of the ISO tariff for the following four categories of CPM designation to recognize a potential shortage that could result from the reliability assessment: (1) insufficient RA resources in a LSE's annual or monthly RA plan; (2) deficiency in local capacity area resources in a LSE's annual or monthly RA plan; (3) collective deficiency in a local capacity area after accounting for all procured RA resources; and (4) cumulative deficiency in the total flexible RA capacity in the annual or monthly flexible RA capacity plans or in a flexible capacity category in the monthly RA plans of LSEs. These four categories of CPM designation are affected because applying the ISO PRM or resource counting rules that are used in the reliability assessment may result in a shortage of one of these four types of RA capacity, *i.e.*, system, local or flexible RA capacity. Only the category of CPM designation would be affected. Other CPM tariff language regarding reporting requirements, transparency, opportunities to cure, duration of designation, etc. would not change.

The ISO does not propose any changes to the tariff language related to the following three categories of CPM designation: (5) a "Significant Event" occurs that threatens reliability and there are insufficient RA resources available to address the problem; (6) reliability or operational need requires the ISO to "Exceptionally Dispatch" non-RA capacity; and (7) capacity that is at risk of retiring in the current RA compliance year and will be needed for reliability by the end of the calendar year following the current RA compliance year. These three categories of CPM designation are unaffected by the addition to the tariff of a reliability assessment.

6. Regional RA Analysis

The ISO has received many requests for additional analysis and information related to how the current RA provisions would potentially be applied to an expanded BAA and in particular, what the potential RA requirements might be for PacifiCorp, should it join the ISO BAA. The ISO and PacifiCorp have been working together and are currently in the process of conducting this sort of analysis to apply the current provisions for RA to an expanded ISO and PacifiCorp footprint. The ISO has developed some initial results that are able to be shared with stakeholders for the projected system, local, and flexible requirements for PacifiCorp and an expanded ISO and PacifiCorp footprint. The initial results of these three analyses are summarized below.

The ISO understands stakeholder needs for additional information is also continuing to finalize other related aspects of the studies, including MIC results for interties into the PacifiCorp area. The results of these additional analysis are still pending and the ISO will provide stakeholders with further information when it is available.

6.1 Projected RA System Requirements Analysis for PacifiCorp

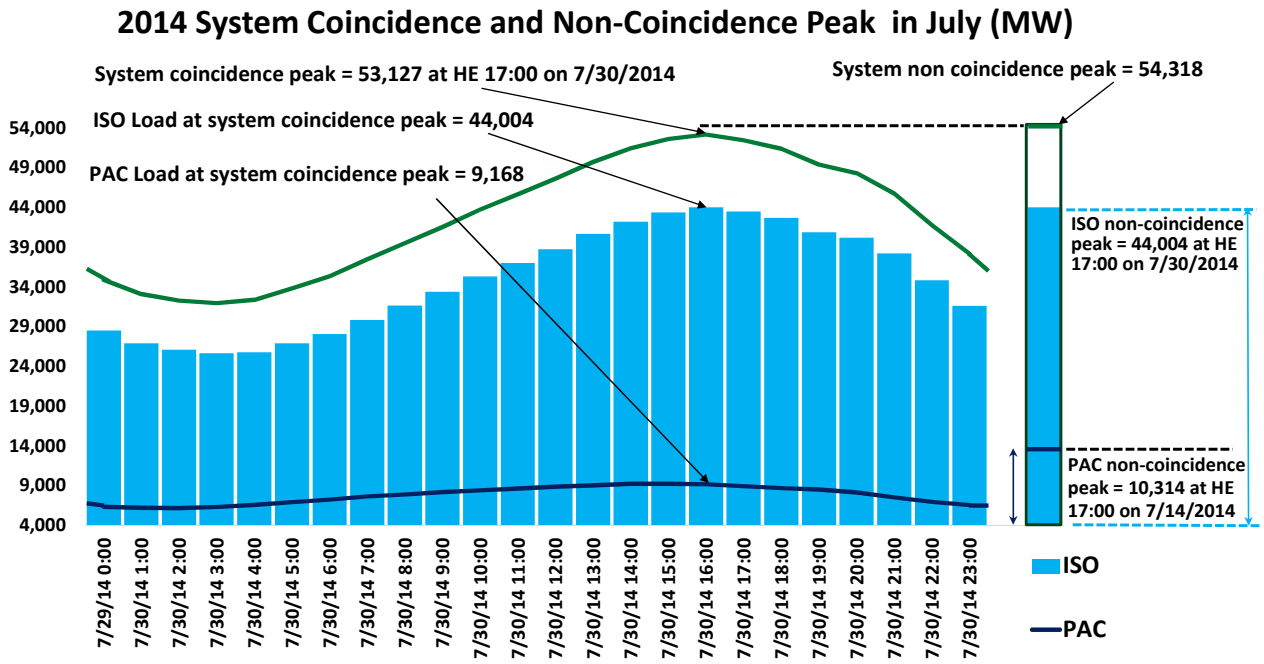
The ISO worked with PacifiCorp (PAC) to analyze what a monthly system RA requirement might be for PacifiCorp if it were to be part of an extended ISO BAA. The analysis projected what the RA system

requirement might be for the test year 2016, using forecast data for 2016 and historical data for the years 2012 through 2014.

It is important to note that all of the data that was analyzed pertains only to the PacifiCorp load (*e.g.*, historical hourly data for the period 2012 through 2014 and 2016 forecast data) and this data does not include the other 13 Load Serving Entities (LSEs) within PacifiCorp's current BAA. PAC provided the ISO with 2016 forecast data for PAC loads. In addition to the 2016 forecast data for PAC, the ISO received PAC's historical hourly load data for the years 2012 to 2014. The ISO used historical data for the period 2012 to 2014 from PAC and the ISO to calculate PAC's coincidence with the ISO system peak load.

The following figure provides a sample month of data for the current ISO system, PAC, and a hypothetical combined ISO/PAC system to show the coincident and non-coincident peaks for all three entities during the month of July 2014.

Figure 3: Sample ISO System and PAC System Coincidence and Non-Coincidence Peak (July 2014)

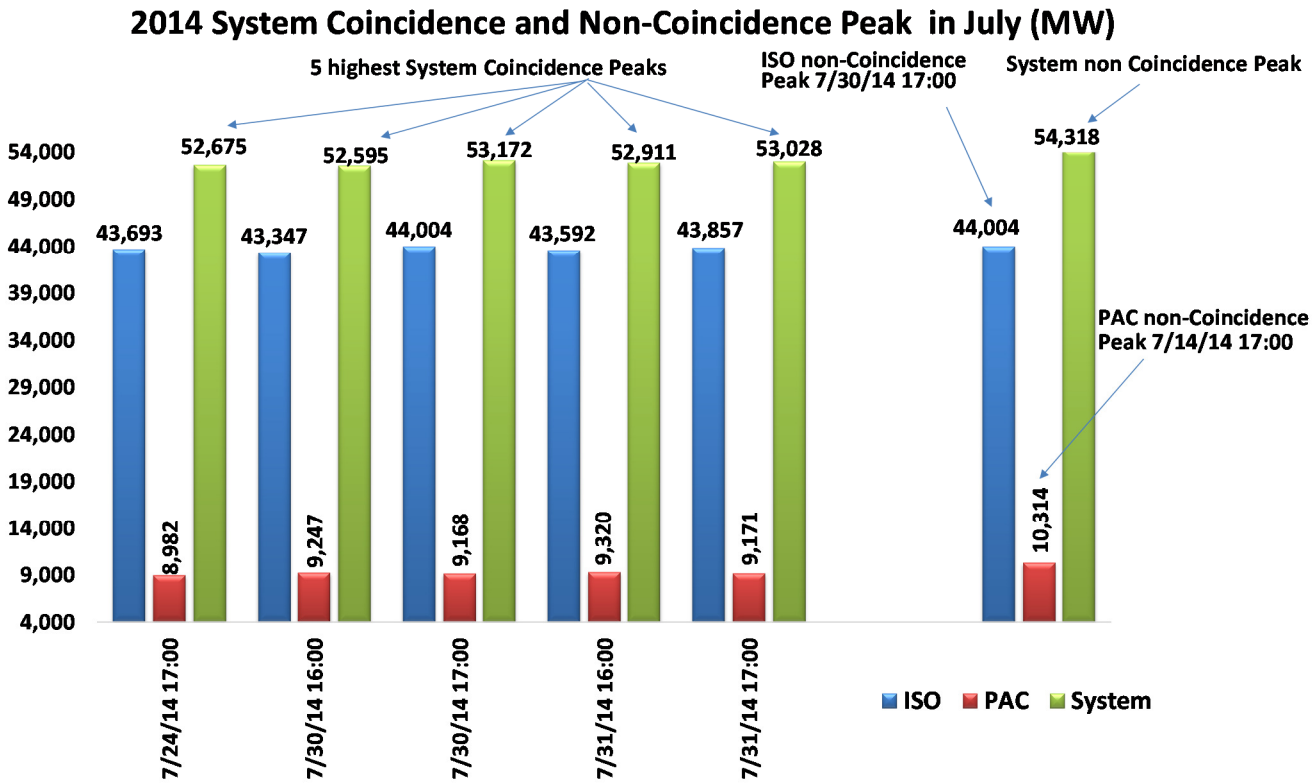


To calculate the projected monthly PAC system RA requirements, the ISO used the current methodology that is used for the ISO's BAA, which is based on a calculation of monthly coincident factors using a formula that is currently being used by the California Energy Commission (CEC). The CEC defines a LSE-specific monthly coincidence factor by calculating the ratio of the LSE's peak load at the time and hour of the five highest monthly ISO's system peak loads to the specific LSE's actual non-coincident peak load in any given month. The CEC coincidence factor for each LSE can be expressed as:

$$Coincidence\ Factor_{CEC}\ (CF_{CEC}) = \frac{Median\ of\ PAC\ Loads\ at\ five\ highest\ System\ Peak}{PAC\ Non{-}coincidence\ peak}$$

Figure 4 below shows a sample of monthly data that is used to determine a monthly LSE specific coincidence factor, which is used in the calculation of system RA requirements.

Figure 4: Coincidence Factor Sample Data for Monthly PAC Coincidence (July 2014)



LSE-specific coincidence factors are calculated for each month based on historical hourly loads for the 2012 through 2014 period. The median monthly coincidence factor is selected from the five available as the LSE-specific monthly coincidence factor. The monthly coincidence factors are then applied to each LSE's year-ahead monthly peak forecasts to adjust the LSE's non-coincident peak to a forecast of the LSE's peak coincident with the ISO system peak. Finally, the RA monthly requirement is calculated by multiplying PacifiCorp's load at system coincident peak with the percent reserve margin. For purposes of this analysis, a 115% percent reserve margin was used for the projected PAC system RA requirement calculation. The 115% PRM target is only for example purposes.

RA system requirements are calculated for each LSE within the expanded BAA and are calculated for each month. Table 8 below shows the projected monthly PAC RA system requirements for 2016.

Table 8: 2016 PAC Coincident Monthly Peak Load Forecast & Projected Monthly System RA Requirement

Month	2016 Forecast PacifiCorp Load at combined system peak	115% of Forecast PacifiCorp load at combined system peak
Jan	8,592	9,881
Feb	8,194	9,423
Mar	7,768	8,933
Apr	6,665	7,665
May	7,584	8,722
Jun	8,666	9,966
Jul	9,459	10,877
Aug	9,393	10,802
Sep	8,276	9,517
Oct	7,538	8,669
Nov	8,180	9,407
Dec	8,665	9,964
Please note: 115% PRM target used for example is illustrative only		

Because a key input to the projected RA system requirements results are the monthly coincidence factors, the table below summarizes the monthly coincidence factors for the years 2012 through 2014 and the coincidence factors used for each month for the calculation of the monthly 2016 RA system requirements. Note that the coincidence factors in Table 9 were determined through the use of the current CEC coincidence factor methodology that is described above.

Table 9: PAC Monthly Coincidence Factors from 2012 to 2014

Month	2012	2013	2014	Average (used to determine 2016 RA system requirements)
Jan	0.975930	0.983512	0.960642	0.973361
Feb	0.979673	0.974192	0.977840	0.977235
Mar	0.959394	0.976299	0.953361	0.963018
Apr	0.843077	0.923836	0.894913	0.887275
May	0.965557	0.958913	0.868427	0.930966
Jun	0.904702	0.984555	0.961557	0.950271
Jul	0.966728	0.990747	0.889176	0.948884
Aug	0.979680	0.949768	0.960101	0.963183
Sep	0.883333	0.962289	0.964920	0.936847

Month	2012	2013	2014	Average (used to determine 2016 RA system requirements)
Oct	0.983537	0.910702	0.990720	0.961653
Nov	0.983878	0.956466	0.984705	0.975016
Dec	0.984934	0.983641	0.943307	0.970627

6.2 PacifiCorp Draft Local Capacity Technical Analysis and LCR Results Summary

PacifiCorp (PAC) has been in the process of conducting a 2016 Local Capacity Technical (LCT) analysis for its BAA with the assistance of the ISO and Utility System Efficiencies, Inc. (USE). Since this is essentially an inaugural LCT analysis, the technical study consists of two parts: 1) the definition of each Local Capacity Area (LCA) within the BAA, and the determination of the Local Capacity Requirement (LCR) within each resulting LCA. Once LCAs are clearly defined and established, an annual LCT study is limited to the determination of LCR.

LCT analysis is always performed under anticipated 1-in-10 peak load conditions. Since PAC West can achieve its peak load during summer and winter seasons, PAC West LCT analysis was conducted under anticipated 2016 summer peak conditions and verified/validated under anticipated 2016-17 winter peak conditions. On the other hand, PAC East peak loads are observed only during summer months. PAC East LCT analysis was conducted under 2016 summer peak conditions exclusively with no winter testing.

PAC Transmission Planning Areas (TPA) served as the starting point to determine PAC LCA boundaries. In most cases, a strong correlation was found to exist between the pre-defined TPAs and the newly-determined LCA boundaries. When alignment between TPAs and LCAs occurred, LCAs adopted the TPA name. Some LCAs included multiple TPAs. In this case, the predominant TPA name was used. LCAs within LCAs (micro pockets) adopted the TPA label followed by an alphabetical suffix. Newly defined LCAs that did not correlate with existing TPAs (mega pockets) were given a new designation based on the region.

The PAC 2016 LCT analysis was performed in alignment with the requirements and procedures listed in the *California ISO Final Manual, 2016 Local Capacity Area Technical Study*[21]. For all instances of Applicable Rating, the criteria in the April 1, 2015 version of the *California ISO Planning Standards*[22] was used. Based on recommendations made by the CAISO, the focus of the PAC 2016 LCT analysis for determining LCR concentrated on N-1-1 thermal and voltage performance.

The initial results of the study have identified the potential for 15 independent LCAs. However, the Walla Walla and Salt Lake Valley areas may be able to collapse into two LCAs (down from four) in a similar manner to the way the Stockton LCA is treated today. This would bring the total initially identified LCAs to 13 potential areas in the PAC footprint. The ISO and PAC are still conducting further analysis to identify if it will be possible to collapse additional pockets into combined areas since some of them are very small

[21] https://www.caiso.com/Documents/2016LocalCapacityRequirementsFinalStudyManual.pdf
[22] https://www.caiso.com/Documents/FinalISOPlanningStandards-April12015_v2.pdf

and a number are relatively small (*i.e.*, smaller than the current Humboldt LCA). Additionally, some changes to the LCA definitions and requirements for the PAC system are anticipated prior to integration due to planned transmission projects and development of revised operating procedures to better align with the LCT methodology.

The initial analysis used "LCR Responsibility" by "Load Impact" methodology, which is comparable to "Flow Impact" methodology that the ISO utilizes in deliverability studies for "Shared Responsibility Areas". Additional analysis is necessary to understand the impacts to shared responsibility areas, including examination of simply assigning load share ratio requirements in the areas in question that potentially span multiple BAAs. Table 10 below summarizes the draft results for the PAC LCT analysis.

Table 10 - PAC LCT/LCR analysis summary of draft results

Local Area	QF/ MUNI (MW)	Under Long-term Contract	Market (MW)	Total NQC (MW)	Shared respon-sibility with others	Existing resources needed (MW)	Deficient Area	NR. of pockets
Southern Oregon	115.2	419.1	0	534.3	No	534.3	Yes	3
Central Oregon	35.6	1.11	0	36.71	Yes	36.71	Yes	1
Portland	300	566	0	866	Yes	90.2	No	1
Walla Walla A	41	0	0	41	No	41	Yes	1
Walla Walla B	64.6	0	474	538.6	Yes	22.1	No	1
Yakima	0	37	0	37	Yes	37	Yes	2
TOTAL PAC WEST	**556.4**	**1023.21**	**474**	**2053.61**	**-**	**761.31**	**-**	**9**
East Wyoming	1049	729.2	0	1778.2	Yes	718.8	No	1
Trona/ Naughton	371	697.4	0	1068.4	No	540	No	1
Goshen	619.88	0	0	619.88	Yes	367	No	2
Southeast Idaho	43	104	0	147	No	90	No	1
Southwest Utah	0	115.2	55.2	170.4	No	80	No	2
Ogden	10.8	0	0	10.8	Yes	1.3	No	1
Salt Lake Valley A	0	0	149	149	No	25	No	1
Salt Lake Valley B	24	331.4	0	355.4	No	15	No	1
Spanish Fork	720.8	591.9	0	1312.7	Yes	435.5	No	2
TOTAL PAC EAST	**2838.48**	**2569.1**	**204.2**	**5611.78**	**-**	**2272.6**	**-**	**12**
TOTAL PAC	**3394.88**	**3592.31**	**678.2**	**7665.39**	**-**	**3033.91**	**-**	**21**

6.3 Analysis of Potential ISO and PacifiCorp Flexible Capacity Needs

The ISO has done analysis of what the RA flexibility requirements would be for an expanded BAA that includes the ISO and PAC. The test year chosen was 2016. This section provides background information on the flexibility requirements and the results of that analysis.

Each year, through a stakeholder process that starts in January and concludes in May, the ISO determines the quantity of flexible capacity needed to reliably address the various flexibility and ramping needs for the BAA for the upcoming RA year and publishes the findings through a flexible capacity needs assessment. To calculate the flexible capacity needs, the ISO uses the calculation method codified in the ISO tariff Section 40.10.1. This methodology includes the ISO's calculation of system-wide flexible capacity needs, allocations of these needs to LRAs/LSEs, the seasonal proportions permissible into each of the three flexible capacity categories, and, lastly, seasonal must-offer obligations for two of these flexible capacity categories.

As described in ISO tariff Section 40.10.1.5, the ISO divides its flexible capacity needs into various categories based on the system's forecasted operational needs. These categories are based on the expected characteristics of the system's net load ramps and define the mix of resources that can be used to meet the system's flexible capacity needs. The minimum qualifying criteria for resources to provide each of the flexible capacity categories is detailed in ISO tariff Sections 40.10.3. Certain use-limited resources may not qualify to be counted under the base flexibility category and may only be counted under the peak flexibility or super-peak flexibility categories, depending on their characteristics. While there is no limit to the amount of resources that can be shown as flexible RA to meet the base flexibility criteria that can be used to meet the system's flexible capacity, there is maximum amount of flexible capacity that can come from resources that only meet the criteria to be counted under the peak flexibility or super-peak flexibility categories. The quantity how much of each of the three categories and how each is derived is shown below.

> **Category 1 - Base Flexibility**: Operational needs determined by the magnitude of the largest forecasted 3-hour secondary net load[23] ramp
>
> **Category 2 - Peak Flexibility**: Operational need determined by the forecasted difference between 95 percent of the maximum forecasted 3-hour net load ramp and the largest 3-hour secondary net load ramp
>
> **Category 3 - Super-Peak Flexibility**: Operational need determined by five percent of the forecasted maximum 3- hour net load ramp of the month

These categories include different minimum flexible capacity operating characteristics and different limits on the total quantity of flexible capacity within each category. In order to calculate the quantities needed in each flexible capacity category, the ISO conducts the following assessment process:

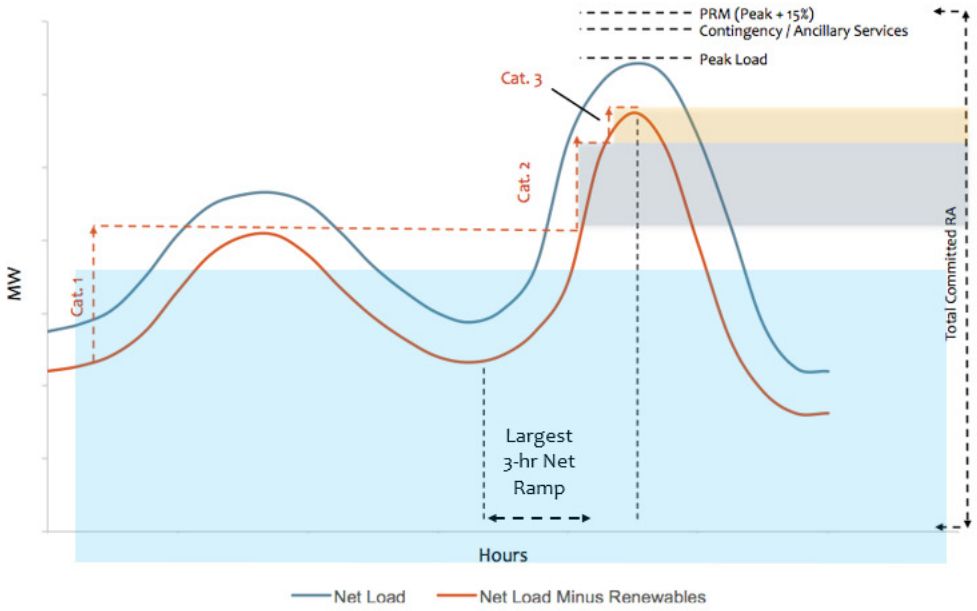
1) Calculate the forecast percentages needed in each category in each month;

[23] The largest daily secondary 3-hour net-load ramp is calculated as the largest net load ramp that does not correspond with the daily maximum net-load ramp. For example, if the daily maximum 3-hour net-load ramp occurs between 5:00 p.m. and 8:00 p.m., then the largest secondary ramp would be determined by the largest morning 3-hour net-load ramp.

2) Analyze the distributions of both largest three-hour net load ramps for the primary and secondary net load ramps to determine appropriate seasonal demarcations; and
3) Calculate a simple average of the percent of base flexibility needs from all months within a season.

Figure 5: Three Flexibility Categories and System Ramping Needs

Flexible RA needs are based on the largest 3-hr net BAA load ramp for that month.



Parameter	Category 1 (Base Ramping)	Category 2 (Peak Ramping)	Category 3 (Super-Peak Ramping)
Must-Offer Obligation	5:00 a.m. – 10:00 p.m.	5 hour block	5 hour block
Energy Requirement	Minimum 6 hours	Minimum 3 hours	Minimum 3 hours
Daily Availability	7 days/week	7 days/week	Non-holiday weekdays

Based on the three categories defined above, the ISO calculates the system level needs based only on the maximum monthly 3-hour net load calculation. Then the ISO calculates the quantity needed in each category in each month based on the above descriptions. The ISO then adds the contingency requirements into the categories proportionally to the percentages established by the maximum 3-hour net load ramp. For example, for the month of January, the ISO adds 90 percent of the contingency reserves portion into the base flexibility category 1, 5 percent into the peak flexibility category 2, and the final 5 percent into the super-peak flexibility category 3

The results of the ISO's analysis of the flexibility needs for the total ISO system, including PAC and the current ISO system in an expanded BAA, using ISO data and data provided by PAC and are shown in Figure 6 and Table 11 below:

Figure 6: ISO + PacifiCorp Combined Projected 2016 Flexibility Needs

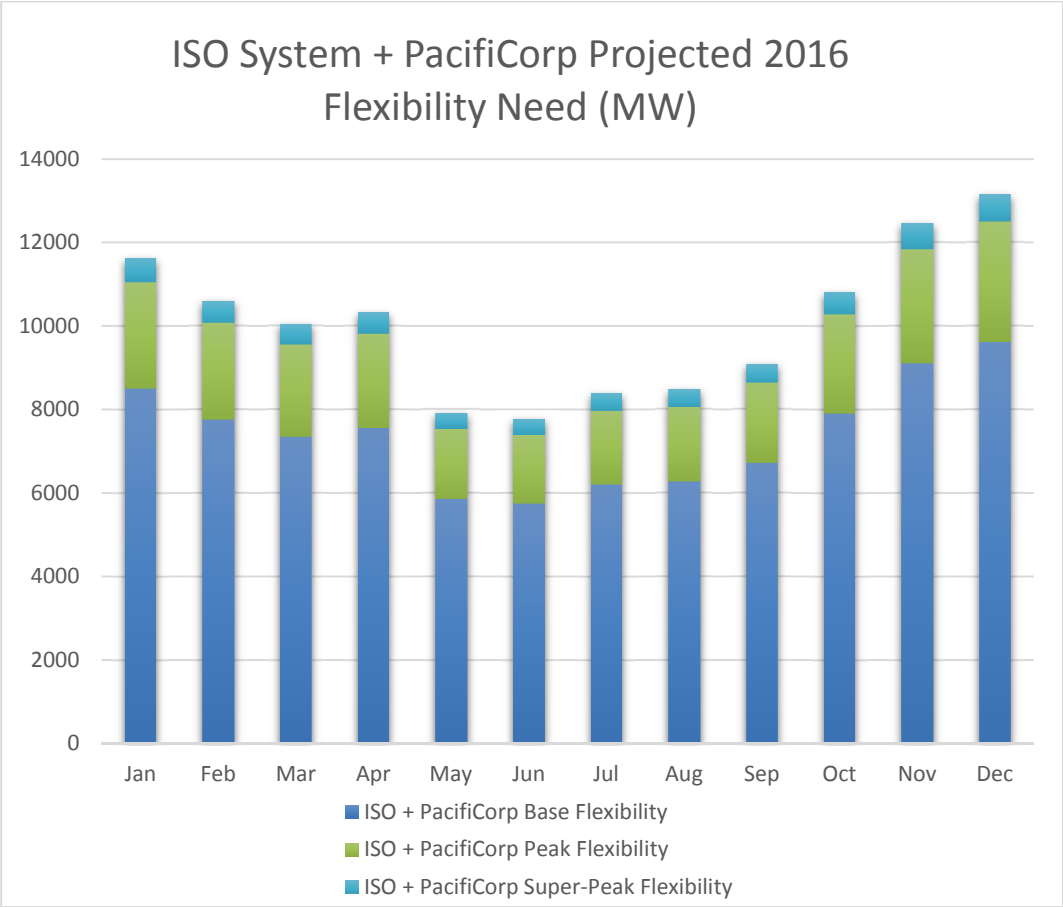


Table 11: ISO + PacifiCorp Combined Projected 2016 Flexibility Needs (MW)

Month	ISO + PacifiCorp Base Flexibility	ISO + PacifiCorp Peak Flexibility	ISO + PacifiCorp Super-Peak Flexibility	ISO + PacifiCorp Combined 2016 Flexibility Need
Jan	8501	2546	581	11628
Feb	7745	2320	530	10595
Mar	7341	2199	502	10042
Apr	7549	2261	516	10326
May	5851	1663	395	7909
Jun	5748	1634	389	7771
Jul	6206	1764	419	8389
Aug	6263	1780	423	8466
Sep	6713	1908	454	9075
Oct	7907	2369	541	10817

Month	ISO + PacifiCorp Base Flexibility	ISO + PacifiCorp Peak Flexibility	ISO + PacifiCorp Super-Peak Flexibility	ISO + PacifiCorp Combined 2016 Flexibility Need
Nov	9105	2728	623	12456
Dec	9607	2878	657	13142

The results of the ISO's analysis of the 2016 flexibility needs for PAC using data provided to the ISO by PAC are shown in Figure 7 and Table 12 below:

Figure 7: PacifiCorp 2016 Projected Flexibility Needs

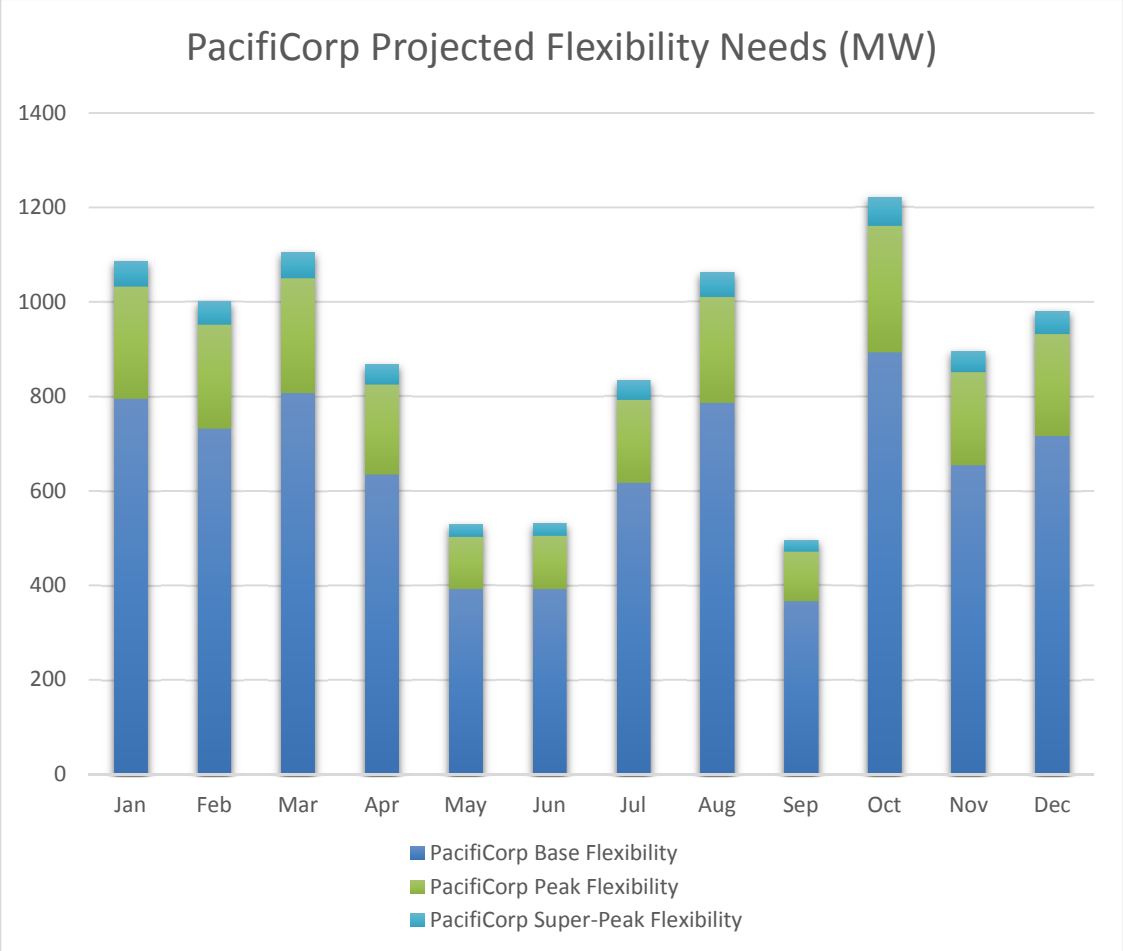


Table 12: PacifiCorp 2016 Flexibility Needs (MW)

Month	PacifiCorp Base Flexibility	PacifiCorp Peak Flexibility	PacifiCorp Super-Peak Flexibility	PacifiCorp Total Flexibility Needs
Jan	795	238	54	1087
Feb	732	219	50	1001

Month	PacifiCorp Base Flexibility	PacifiCorp Peak Flexibility	PacifiCorp Super-Peak Flexibility	PacifiCorp Total Flexibility Needs
Mar	808	242	55	1106
Apr	634	190	43	867
May	391	111	26	528
Jun	393	112	27	532
Jul	616	175	42	833
Aug	786	223	53	1062
Sep	366	104	25	495
Oct	893	267	61	1221
Nov	655	196	45	897
Dec	717	215	49	980

The current ISO system's actual 2016 flexibility needs are included in Figure 8 and Table 13 below[24]. These are included to provide a baseline that can compared to the projected ISO+PAC flexibility requirements that are described above. Further below the change in flexibility requirements is included to illustrate the potential benefits of an ISO+PAC system in regards to the flexibility requirements.

[24] Actual 2016 ISO flexibility needs: http://www.caiso.com/Documents/FinalFlexibleCapacityNeedsAssessmentFor2016.pdf

Figure 8: ISO Actual 2016 Flexibility Needs

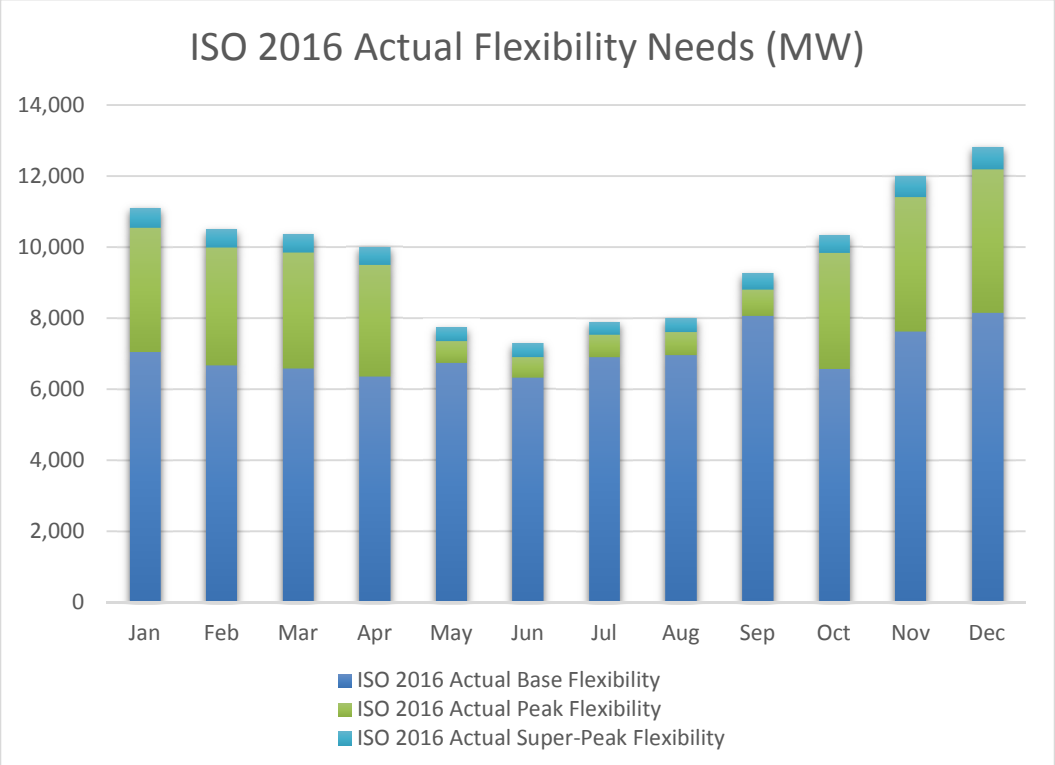


Table 13: ISO Actual 2016 Flexibility Needs (MW)

Month	ISO 2016 Actual Base Flexibility	ISO 2016 Actual Peak Flexibility	ISO 2016 Actual Super-Peak Flexibility	Total ISO Actual 2016 Flexibility Needs
Jan	7,053	3,495	555	11,103
Feb	6,674	3,307	525	10,506
Mar	6,582	3,262	518	10,362
Apr	6,345	3,144	499	9,988
May	6,730	614	387	7,731
Jun	6,306	575	397	7,278
Jul	6,908	630	362	7,900
Aug	6,963	635	400	7,998
Sep	8,061	735	463	9,259
Oct	6,563	3,252	517	10,332
Nov	7,626	3,779	600	12,005
Dec	8,142	4,034	641	12,817

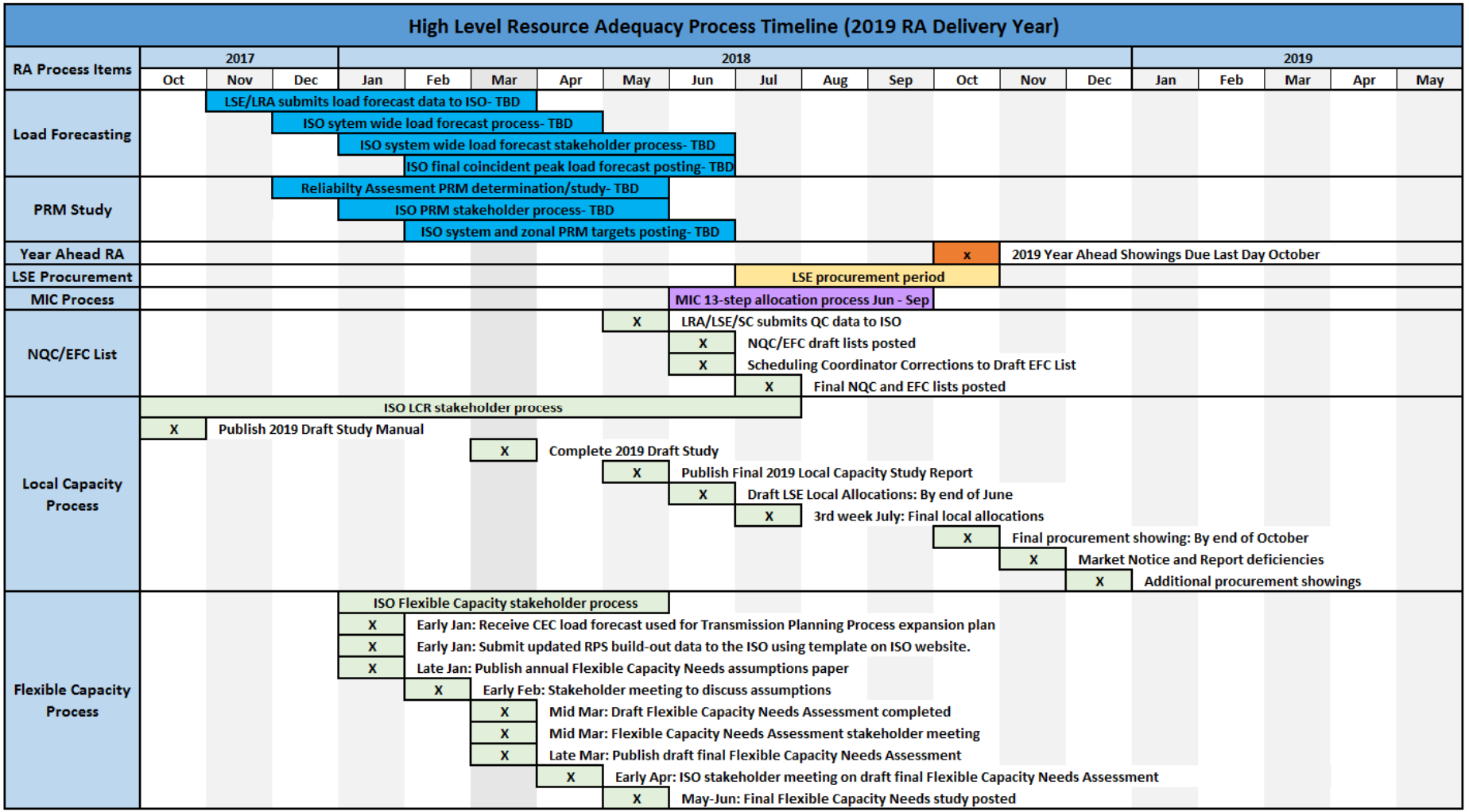
7. Next Steps

The ISO will discuss this revised straw proposal with stakeholders during a meeting on April 21, 2016 in Salt Lake City, Utah. Stakeholders are asked to submit written comments by May 4, 2016 to initiativecomments@caiso.com. Please use the template available on the ISO website at the following link to submit your comments: Regional Resource Adequacy.

Appendix A – Resource Adequacy Process Timelines

A-1 High Level Resource Adequacy Process Overview

Figure A-1 is a high level overview of the RA process that is envisioned for illustrative purposes. The chart includes current RA processes and potential new RA processes that are proposed. These proposed process are still under development and until further details are determined through subsequent proposals the timeframes for these items is still to be determined.



A-2 Resource Adequacy Plans and Supply Plans Submittal Dates

Table A-2 provides the submittal dates for RA Plans, Programmatic Information, monthly Demand Forecasts and Supply Plans

Annual Information	**Submittal Date**
Annual Resource Adequacy Plans, Programmatic Information and Supply Plans	The last business day of October
Monthly Information: Resource Adequacy Plans, Demand Forecasts and Supply Plans	
Trade Month	**Submittal Date**
All	As posted on the Reliability Requirements website.[25]

A-3 Local Capacity Process Schedule

Table A-3 provides the schedule for the Local Capacity Process.

Task	**Entity**	**Date**
Publishes Draft Study Manual	ISO	October
Stakeholder Meeting	ISO/All	October – November
Publishes Final Study Manual	ISO	End of November – 1st Week December
Base Case Development	PTO	December
Receive Base Cases	PTO/ISO	1st Week January
Publish Base Cases	ISO	Mid-January

[25] California ISO - Reliability Requirements

Task	Entity	Date
Comments on Base Cases	All	Late January
Complete Draft Study	ISO	1st Week March
Stakeholder Meeting Draft Study Results	ISO/All	2nd Week March
Propose New Operating Procedures	All	Late March
Review and Validate New Operating Procedures and Publish Revised Study	ISO	Early April
Stakeholder Meeting on Revised Study	ISO/All	2nd Week in April
Receive Comments on Study	All	3rd Week in April
Publish Final Study Report	ISO	1st Week in May; No later than end of June
Draft LSE Local Allocations	LSEs	(Sum of next year's TAC local resource needs / sum of current year's TAC local resource needs) x current year LSEs local allocation for its load in that TAC
Updated CEC load forecast	CEC	No later than end of June
Final local allocations	ISO/LRA	2nd-3rd week of July
Final procurement showing	LSEs	The last business day of October
Market Notice and Report with individual and potential collective deficiencies	ISO	Twenty-one (21) Calendar days after the Final Procurement Showing
Additional procurement showings	LSEs	Thirty (30) Calendar days after the date the Market Notice is issued.
ISO backstop (as needed)	ISO	As needed, following the expiration of the thirty (30) calendar day period for an LSE to show additional procurement has been made to correct an RA deficiency.

A-4 Flexible Capacity Needs Assessment Schedule

Table A-4 provides the schedule for the Flexible Capacity Needs Assessment.

Task	Entity	Date
Receive CEC load forecast used for Transmission Planning Process expansion plan	CEC	Early January
Submit updated RPS build-out data to the ISO using template on ISO website.	Scheduling Coordinator for LSEs	Early January
Publish annual Flexible Capacity Needs assumptions paper	ISO	Late January
Stakeholder meeting to discuss assumptions, stakeholder comments, and posting of comments with ISO response	ISO/All	Early February
Draft Flexible Capacity Needs Assessment completed, including draft allocations to LRAs and minimum and maximums for each flexible capacity category, and draft adjustment factor.	ISO	Early March
Flexible Capacity Needs Assessment stakeholder meeting	ISO/All	Mid-March
Publish draft final Flexible Capacity Needs Assessment, draft allocations to LRAs and minimum and maximums for each flexible capacity category including draft final allocations to LRAs and minimum and maximums for each flexible capacity category, and draft adjustment factor.	ISO	Late March
ISO stakeholder meeting to discuss draft final Flexible Capacity Needs Assessment	ISO/All	Early April
Final Flexible Capacity Needs study posted	ISO	1st Week in May; No later than end of June

A-5 Import Capability Posting and Submittal Dates

Table A-5 provides the posting and submittal dates related to the Available Import Capability Process. Only those steps of the Available Import Capability Process that have postings or submittals are shown in the exhibit.

Item	Posting Date	Submittal Date	Frequency
Market Notice requesting Import Commitment Data and contact person		1st week in June	Annual
LSE to submit Data requested		2 weeks after previous Market Notice	Annual
Step 1: Posting of Maximum Import Capability on Interties	1st of July or next business day if 1st falls on a weekend		Annual
Step 6: Posting of Assigned and Unassigned Capability	9th of July or next business day if 9th falls on a weekend		
Step 7: Notification of LSE Assignment Information	9th of July or next business day if 9th falls on a weekend		Annual
Step 8: Transfer of Import Capability		18th of July, or next business day if 18th falls on a weekend	Annual
Step 9: Request to assign Remaining Import Capability		19th of July, or next business day if 19th falls on a weekend	Annual
Step 10: ISO Notification of Initial Remaining Import Capability Assignments and Unassigned Capability	26th of July, or next business day if 26th falls on a weekend. The ISO will begin accepting requests for Step 11 at the date and time indicated in the market notice published after Step 10.		Annual
Step 11: Secondary request to assign Remaining Import Capability		1st of August, or next business day if 1st falls on a weekend. The ISO will begin accepting requests for Step 11 at the date and time indicated in the	Annual

Item	Posting Date	Submittal Date	Frequency
		market notice published after Step 10.	
Step 12: Posting of Assigned and Unassigned aggregate Import Capability	8th of August or next business day if 8th falls on a weekend. The ISO will begin accepting requests for Step 13 at the date and time indicated in the market notice published after Step 12.		Annual
Step 13: Requests for Unassigned Available Import Capability		9th of August, or next business day if 9th falls on a weekend. The ISO will begin accepting requests for Step 13 at the date and time indicated in the market notice published after Step 12.	Annual
Step 13: Publish list of Unassigned Available Import Capability	5th day of September, or next business day if 5th falls on a weekend		Annual
Registration for Bilateral Import Capability Transfers		Anytime	One time
Reporting Bilateral Import Capability Transfers occurring outside of Step 8		Anytime. To be counted on an RA Plan, must be submitted on or before the 20th of the Month, two months prior to the Compliance Month (*i.e.*, 9/20/2008 to count on Nov 2008 RA Plan)	Upon transfer of Import Capability
Posting of Eligible Import Capability Trading Parties	5th day of each month, or next business day if 5th falls on a weekend		Monthly

Item	Posting Date	Submittal Date	Frequency
Posting of Import Capability Transfers	Within 5 business days of receiving a transfer request.		On Event
Posting of Interties and holders of Import Allocation per Intertie	5th day of each month, or next business day if 5th falls on a weekend		Monthly
Posting of Import Allocation usage on Annual RA Plans	15 business days after Annual RA Plans are due		Annual