



California ISO

Flexible Resource Adequacy Criteria and Must Offer Obligation – Phase 2

Revised Straw Proposal – Short Term Solutions

May 1, 2017

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1. Executive Summary

In November 2016, the ISO issued a supplemental issue paper to expand the scope of the FRACMOO2 stakeholder initiative. As part of the supplemental issue paper, the ISO conducted a preliminary assessment of historic flexible RA showings. The general finding of the assessment was that “flexible capacity showings to date indicate that the flexible capacity product is not sending the correct signal to ensure flexible capacity will be maintained long-term.”¹ Several of the stakeholder submitted proposals warrant additional consideration. However, at this time, **the ISO does not believe any of the proposals are capable of being completed in an expeditious manner either due to policy gaps or implementation complexity**, with the exception of the SCE proposal.² Even given the SCE proposal’s potential to be implementable in a shorter term timeframe, the ISO does not believe it will provide significant benefit in terms of procuring a fleet of flexible resources in moving forward because the proposed assessment will not capture the temporal relationship of flexible capacity needs.

The ISO’s objective in FRACMOO2 must also consider the impact of two additional state energy policies. Specifically, SB 350 required the CPUC to 1) oversee the construction of an Integrated Resource Plan (“IRP”) and 2) oversee its jurisdictional LSEs procurement to reach a 50 percent RPS target. If RPS eligible resources are frequently curtailed, then more RPS eligible capacity must be built to meet established energy targets. Alternatively, if a high priority is placed on mitigating the costs of building incremental RPS eligible capacity, there would be a premium placed on maximizing RPS eligible energy production and minimizing curtailment.

The ISO believes it is prudent to consider a least-regrets approach to short-term modifications to the flexible capacity eligibility rules, with a focus on identifying resource characteristics that help minimize RPS curtailment. This short term solution will provides a stronger signal regarding the type of resources needed in the future (i.e. mitigates the risk of uneconomic retirements) while more comprehensive changes are developed. As a short-term solution, the ISO proposes to require a flexible capacity resource have a start-up time of less than 4.5 hours and minimum run time of less than 4.5 hours. This aligns with the ISO’s current Short-Term Unit Commitment (STUC) outlook and allows the ISO to commit and decommit resources in the real-time time.

Additionally, the ISO believes that the current super-peak flexible capacity resource Must Offer Obligation (“MOO”), which only requires the resources be available on non-

¹ <http://www.CAISO.com/Documents/AgendaandPresentation-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

² <http://www.aiso.com/Documents/SCEComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

holiday weekdays, is no longer consistent with flexible capacity needs and should be modified to cover all seven days of the week.

The long-term flexible capacity need must focus on identifying resource attributes needed longer-term to better connect the annual, year-ahead RA procurement with longer-term planning assumptions. While the ISO is not putting forward a specific long-term proposal, the ISO believes that potential long-term enhancements to flexible capacity provisions should attempt to meet the following objectives:

- 1) Provide for the efficient retention and retirement of resources needed to maintain reliable grid operations by aligning resource adequacy requirements with operational needs;
- 2) Simplify RA procurement and showing processes through alignment with system and local capacity provisions;
- 3) Refine requirements to more closely differentiate particular resource attributes of flexible capacity needed to maintain operational reliability and achieve state policies;
- 4) Align long-term planning and annual RA processes to ensure the long-term planning objectives and assumptions are properly reflected through RA procurement and vice versa;
- 5) Provide opportunities for internal and external resources to qualify to supply flexible capacity if they are able meet the specified requirements; and
- 6) Scalable regardless of number of LSEs or size of LSEs.

2. Changes to Scope and Timing

The ISO has reviewed all of the stakeholder proposals provided in response to the supplemental issue paper. The ISO expects that a complete assessment of all stakeholder proposals and aligning a holistic flexible capacity solution with the important policy objectives of a 50 percent RPS and the developing IRP process will take a significant amount of time. Therefore, the ISO proposes a two-step solution. The first step, which is the primary focus of this proposal, focuses on short-term modifications to the flexible capacity eligibility criteria to provide a greater emphasis on start-up and minimum run times. These are explained in further detail below in Section 5. The ISO is still exploring the possibility of including flexible capacity from intertie resources as part of the short-term solution, however, at this time is not proffering a specific proposal. However, the ISO remains open to any proposal to flexible capacity from intertie resources that is compatible with the short-term nature of the current proposal. The ISO will look to conclude this stakeholder process by Q4 of 2017 and collaborate with CPUC to implement in the 2018 RA compliance year. Given the short-term horizon, the ISO

will not propose any changes to the ISO’s current flexible capacity study process or flexible capacity needs determination; maintaining the current three-hour ramp evaluation. The second step, which will be conducted in a separate initiative is to develop a long-term RA road map in conjunction with the CPUC and other LRAs to fully integrate system, local, and flexible capacity needs, 50 percent RPS planning, and the IRP process.

3. Plan for Stakeholder Engagement

The current schedule for the FRACMOO2 for this initiative is shown below. This schedule only reflects actions directly related to the short-term solution. The ISO will consider long-term RA map in a separate initiative, coordinated with the CPUC and other LRAs.

Milestone	Date
Revised straw proposal posted	May 1, 2017
Revised straw proposal stakeholder meeting	May 8, 2017
Stakeholder written comments due	May 22, 2017
Second revised straw proposal posted	Early July 2017
Second revised straw proposal stakeholder meeting	Mid July 2017
Stakeholder Written Comments Due	Late July 2017
Draft final proposal posted	Early September 2017
Draft final proposal stakeholder Meeting	Mid-September 2017
Stakeholder Written Comments Due	Late September 2017
Board of Governors Meeting	Q2 2018

4. Background

In 2014, the ISO filed, and FERC subsequently approved, tariff revisions to implement ISO’s FRACMOO proposal. The ISO developed the original FRACMOO proposal and accompanying tariff provisions through an extensive stakeholder process in conjunction with the CPUC, municipal utilities, investor-owned utilities, generators,

and environmental groups. The FRACMOO proposal represented the first step towards ensuring that load serving entities procure and make available to the ISO through enhanced must-offer obligations sufficient flexible capacity to ensure a clean and reliable energy grid. The tariff provisions provide the ISO with a flexible capacity framework that complements the system and local capacity requirements already existing either through the local regulatory authorities' RA programs or ISO tariff provisions. Specifically, the FRACMOO tariff provisions established:

- A study methodology for determining flexible capacity needs and allocating them to local regulatory authorities;
- Rules for assessing the system-wide adequacy of flexible capacity showings;
- Backstop procurement authority to address system-wide deficiencies of flexible capacity; and
- Must offer obligations to ensure the ISO has access to flexible resources through its markets.

When the ISO filed the tariff revisions to implement ISO's FRACMOO proposal with FERC, the ISO stated:

This simplified initial approach provides a smooth transition to establishing durable flexible capacity requirements. The ISO has committed to re-evaluating the effectiveness of the flexible capacity requirements in 2016 to consider, among other matters, whether enhancements are needed to meet system flexibility needs or to allow resources that are dispatchable on a fifteen-minute basis to fulfill a portion of the flexible capacity needs.³

The original FRACMOO proposal represented an initial step towards ensuring that adequate flexible capacity is available to the ISO to address a changing grid. The FRACMOO proposal also represented the first ever flexible capacity obligation in any ISO market, recognizing that an RA program should include both the size (MW) of resource needs and the attributes of the resources providing them (dispatchability). The ISO expected that enhancements to the original FRACMOO tariff provisions would be needed based on actual experience with the programs and as flexible capacity needs became clearer.

In November, 2016 the ISO issued a supplemental issue paper to expand the scope of the FRACMOO2 stakeholder initiative. As part of the supplemental issue paper, the ISO conducted a preliminary assessment of historic flexible RA showings. The general finding of the assessment was that "flexible capacity showings to date indicate that the

³ Transmittal letter at p. 19.

flexible capacity product is not sending the correct signal to ensure flexible capacity will be maintained long-term.”⁴ The ISO identified the following issues and potential enhancements that warrant further assessment:

- Requiring that resources have a minimum weighted average ramp rate to be eligible to provide flexible capacity;
- Resource daily start requirements to qualify for category one flexible capacity (*i.e.* Base Flexible Capacity) will be based on a resource’s full cycle time and additional limitations as identified through the data provided in use-limited plan data template;
- Resources with a Pmin/Pmax ratio of greater than a predetermined level must have at least two starts per day to provide flex RA;
- Category three (*i.e.* Super-Peak Flexible Capacity) should be available seven days a week because many of the ISO’s peak three-hour ramps occur on weekends;
- The ISO is considering the need to cap the quantity of long-start resources that can be shown as flexible capacity; and
- The ISO is considering developing an assessment of the Flexible RA showings to assess how likely it will be that the flexible fleet is able to meet ramping needs.

The ISO sought stakeholder comments on the above issues and proposals for potential resolutions. The ISO received numerous stakeholder comments supporting enhancements to address the above issues, while only nine stakeholders submitted specific proposals. The ISO reviewed the proposals submitted in response to the supplemental issue paper using the following criteria: 1) identifiable policy gaps 2) implementation challenges, and 3) potential benefits. These criteria allowed the ISO to establish potential implementation horizons and determine if interim modifications are needed prior to the development of longer-term flexible capacity provisions. Several of the submitted proposals warrant additional consideration. However, at this time, **the ISO does not believe any of the proposals are capable of being completed in an expeditious manner either due to policy gaps or implementation complexity**, with the exception of the SCE proposal. As discussed below, even given SCE proposal’s potential to be implementable in a shorter term timeframe, the ISO does not believe it will provide significant benefit in terms of procuring a fleet of flexible resources in

⁴ <http://www.CAISO.com/Documents/AgendaandPresentation-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

moving forward because the proposed assessment will not capture the temporal relationship of flexible capacity needs.

The ISO's objective in FRACMOO2 must also consider two additional state energy policies. Specifically, SB 350 required the CPUC to 1) oversee the construction of an Integrated Resource Plan ("IRP") and 2) oversee its jurisdictional LSEs procurement to reach a 50 percent RPS target.

Currently, California LSEs must meet a 50 percent RPS standard by 2030. While the target is established state policy, the means by which LSEs meet this target are not yet clear. There are currently rules in place to facilitate the 33 percent RPS goals. However, it is not clear if those rules will remain in place or if additional rule changes are needed or will occur. One of the most critical outstanding policy determinations that the ISO believes must be made is the need, or willingness, to curtail the output of RPS eligible resources. There is currently no clearly established state policy regarding how LRAs or LSEs should procure resources to achieve the RPS objective when the procured resources may need to be curtailed to allow the ISO to maintain ramping resources at a minimum operating level in the afternoon to have them ready and positioned to meet the late afternoon ramp. This determination is outside of the domain of the ISO's oversight and requires additional guidance from state policy makers.

If RPS eligible resources are frequently curtailed, then more RPS eligible capacity must be built to meet established targets. However, dispatchable RPS eligible resources allow the ISO greater flexibility to dispatch resources to allow sufficient ramping capabilities without relying on uneconomic curtailments to maintain reliable operations. Alternatively, if a high priority is placed on mitigating the costs of building incremental RPS eligible capacity, there would be a premium placed on RPS eligible energy production. This, in turn, will require that the fleet supporting the production by RPS resources to be more flexible, with capability of numerous starts and stops per day becoming increasingly important. The ISO believes it is prudent to send bilateral capacity procurement signals that specifically focus on sustaining fast ramping and fast starting resources and minimize curtailment in order to achieve a 50 percent RPS mandate while the specific details surrounding the implementation of the state's 50 percent RPS target are determined.

The ISO also sees the need for broader coordination between the current year-ahead RA resource procurement construct and long-term resource planning. For example, the CPUC is currently working on developing an IRP. The CPUC's IRP studies rely on critical assumptions about what resources will be available to maintain reliability. Ensuring resources that have been assumed available and needed in long-term planning studies are indeed available long-term depends largely on the ability of those resources to earn sufficient revenue through short-term and intermediate-term

bilateral capacity procurement. Based on the ISO's initial assessment, and discussed in greater detail in Section 5.1, below, the ISO does not feel that the short-term and intermediate-term bilateral procurement is sending strong enough signals to identify the type of resources needed, and have been assumed available, in the long-term.

This revised straw proposal explains why there is a need to enhance the existing flexible capacity product in the short term and identifies the potential enhancements the ISO considers to be within the scope of this phase of the initiative.

Future Consideration

The ISO expects that the proposal contained in Section 5, below, provides a temporary solution to ensure that a fleet of sufficiently flexible resources remain financially viable through the transition of OTC resource retirements and beyond. The proposed short term solution is unlikely to be sustainable long-term because the forecasted three-hour net load ramps could exceed the available flexible capacity in several years under this proposal without additional enhancements. The ISO believes that it is necessary to begin contemplating long term flexible capacity solutions under a future effort.

In response to the supplemental issue paper, the ISO has received stakeholder proposals for long-term flexible capacity enhancements that warrant additional consideration. There are several critical elements from each proposal that require additional time and development before any of these proposals could be considered a complete solution. Therefore, the ISO believes it is appropriate to begin a deeper stakeholder vetting of the future long-term enhancements needed. In this long-term effort, the ISO will work collaboratively with the CPUC and other LRAs and consider how any long-term flexible capacity proposals that have been submitted would meet the objectives identified above. A summary of the most complete proposals provided by stakeholders are included in Appendix 1 below.⁵

The ISO believes that potential long-term enhancements to flexible capacity provisions should attempt to meet the following objectives:

- 1) Provide for the efficient retention and retirement of resources needed to maintain reliable grid operations by aligning resource adequacy requirements with operational needs;
- 2) Simplify RA procurement and showing processes through alignment with system and local capacity provisions;

⁵ Additional proposals have been submitted in response to the supplemental issue paper. However, based on the information submitted, the ISO does not believe there is sufficient detail in those proposals at this time. Stakeholder wishing to expand their proposal for additional consideration may do so at anytime.

- 3) Enhance requirements to more closely differentiate particular resource attributes of flexible capacity needed to maintain operational reliability and achieve state policies;
- 4) Align long-term planning and annual RA processes to ensure the long-term planning objectives and assumptions are properly reflected through RA procurement and vice versa;
- 5) Provide opportunities for internal and external resources to qualify to supply flexible capacity if they are able meet the specified requirements; and
- 6) Solutions should be scalable regardless of number of LSEs or size of LSEs

The remainder of this section will provide greater detail regarding the objectives described above.

Provide for the efficient retention and retirement of resources needed to maintain reliable grid operations by aligning resource adequacy requirements with operational needs

Part of the basis for the RA program and associated capacity payments is the need to ensure that sufficient capacity resources are under contract for the upcoming year. However, the fact that there is not currently sufficient revenue being provided to resources through the ISO energy and ancillary services markets in order to sustain the long-term financial viability of existing resources that do not have RA contracts is often overlooked. The current reality is that system wide ISO LMPs will continue to decrease as more low and zero marginal cost energy resources come on line. This means that many resources will need to rely even more on capacity payments in the future than they do today. In other words, the *revenue* adequacy aspect of RA will become a larger part of sustaining the resources needed to maintain reliability and meet state policy goals long-term. The resources needed to meet the flexibility needs of the future system need to start receiving signals and revenue streams today, lest they retire before they are needed (*i.e.* retire uneconomically).

California is in the midst of an unprecedented transformation to its generation fleet. Part of this transformation requires a review of the operating characteristics needed to ensure reliability. The current flexible RA (as well as system RA) do not currently provide the price signals needed to value needed operational attributes. A long-term RA paradigm should ensure that resources with needed operational attributes receive price signal that reflect the need for that type of capacity. The need for a given attribute should, in turn, be based on grid reliability needs. By defining the operational needs of the grid, resources can more accurately value the need for its capacity and make rational economic decisions to stay on-line, make upgrades and/or major maintenance, or retire.

Simplify RA procurement and showing processes

Under the ISO's current RA provisions an LSE must make three RA demonstrations to the ISO (and typically three more similar showings to its LRA). The ISO notes that there continues to be a significant amount of confusion regarding a number of issues surrounding the three products currently identified under the ISO's RA provisions, including: 1) what capacity can be used to meet a specific RA obligation, 2) what is the must-offer obligation for the resource, and 3) what are the substitute capacity rules. The ISO believes that any future proposals must not add complexity to the current structure and that further development of long-term flexible capacity solutions is an opportunity to find ways to simplify the RA processes. Further, while the short-term enhancements outlined below focus only on the flexible capacity product, better aligning system, local, and flexible RA needs for a long-term solution will likely require additional modifications to existing system and local RA structures. As such, the ISO expects that any long term solution will require detailed collaboration with the CPUC and other LRAs, as well as other stakeholders, all of which will require extensive coordination.

Enhance requirements to more closely differentiate particular resource attributes of flexible capacity needed to maintain operational reliability and achieve state policies

The ISO believes that any long-term efforts for flexible capacity enhancements should improve upon the specifications of the needed attributes of the RA fleet. A common theme throughout stakeholder comments has also been a request for the ISO to better define the flexible capacity product it needs. Flexibility is fundamentally different from system and local capacity. The ability of resources to ramp, start, stop, and start again are inherently characteristics specific to the underlying resource just as much as the maximum potential deliverable capacity. As such, the ISO sees flexibility clearly as a capacity issue akin to system RA, not simply an energy issue.

Unlike system capacity, which is designed to ensure adequate capacity to meet peak load, the flexibility of a resource is multidimensional and has proven to be extraordinarily difficult to define in a one-dimensional product. For example, some of the needed flexible capacity capabilities can only be achieved if the resource is committed or committable, but not to its full output. In this way, flexible capacity resembles ancillary services. However, given the tools currently in use, the ISO cannot assess the ability of the shown flexible capacity fleet to address real-time flexibility needs. The current accounting tools, the multi-interval assessment proposed by SCE, and other stakeholder proposals to date, lack any dynamic assessment of how well the

ISO could commit resources to the proper output level to ensure adequate flexible capacity has been shown. The ISO continues to try to define the multidimensional aspects of flexible capacity, but so far, has struggled to comprehensively define it as a single need or attribute. Additional efforts to define the various aspects of flexible capacity are included above in Sections 4 and 5, below. Given the multidimensional nature of a resources flexibility, the ISO believes it may be necessary to either 1) develop more than a single flexible RA product or assessment of the adequacy of flexible RA showings as part of the long-term solution or 2) develop an assessment process that is capable of examining the entire portfolio of RA resources to determine if the shown RA fleet is capable of ensuring reliable grid operations.⁶ The ISO understands that defining more than a single product will require additional review of counting rules and eligibility criteria towards meeting each of those specified needs. Alternatively, developing a portfolio based analysis is capable of capturing synergies and complementarities that could exist between resources but is an extremely large and computationally challenging process to develop. The ISO plans to explore these multidimensional characteristics and flexible operational needs further under future long-term efforts.

Align long-term planning and annual RA processes to ensure long-term planning objective and assumptions are reflected through RA procurement and vice versa

An important coordination effort is needed to align the annual RA process and longer-term resource planning and procurement. The CPUC currently conducts two proceedings that directly connect to the need for, and procurement of flexible capacity: The CPUC's annual RA proceeding and the new Integrated Resource Plan (IRP) and the ISO's Transmission Planning Process. The goal of the annual RA proceeding is to ensure sufficient capacity is procured to ensure the ISO has sufficient capacity to meet system, local, and flexible needs on an annual and monthly basis. The goal of the IRP is to ensure CPUC jurisdictional entities have sufficient capacity to serve peak load ten years into the future. However, in addition to this goal, the IRP process will look to ensure that other state policy goals, like the 50 percent RPS are also achieved. Finally, the ISO's TPP identifies the transmission necessary to ensure capacity is deliverable and that state policy objectives are achieved.

The CPUC's IRP studies must rely on assumptions about the resources that are available in the year being studied. Currently, there is no consideration for economic retirements of resources that have not received RA contracts between the current year and the study year. Because of this gap, the ISO believes that any proposed long-term solutions for flexible capacity must also consider these long-term needs. Specifically, any flexible capacity procurement that occurs in the annual RA procurement should

⁶ Several stakeholders have also suggested this approach may be necessary.

receive similar market signals and messages as those sent in the IRP process. Absent this feedback loop, the IRP studies may be relying on assumptions that are invalidated due to the annual RA market procuring resources that might be useful in the present, but not further into the future, while those that are needed into the future remain uncontracted and risk premature and uneconomic retirement.

Provide opportunities for both internal and external resources to qualify to supply flexible capacity

Current flexible capacity provisions prohibit resources located external to the ISO from providing flexible capacity. Import resources have several benefits that will help the ISO meet its operational needs. For example, imports do not have minimum operating levels, can be ramped quickly, and, in many cases, can be provided from clean hydro resources from the northwest. The ISO has explored the ability to open flexible capacity eligibility to intertie resources as part of the short-term solutions. However, due to the complexity of the changes needed, the ISO cannot implement the system changes that would be necessary in order to facilitate the large scale modifications needed to allow intertie flexible capacity in time for a short-term solution. The ISO believes that larger scale changes aimed at how flexible capacity is defined and how resources meet that need may not fully capture the variety of ways the intertie resources could help the ISO meet its flexible capacity needs.

Instead of requiring that intertie resources fit into the current flexible capacity product definition while potentially making significant system changes to accommodate the participation of intertie resources, the ISO believes a superior approach is possible. To achieve this the ISO proposes to take a long-term view for this aspect of the flexibility provisions that considers all the ways that external resources can help meet the ISO's flexibility needs through both the provision of RA and through enhancement of coordination and availability requirements that might provide benefits to both the ISO system and the external resources' native BAA.

Scalable regardless of number of LSEs or size of LSEs

There are a growing number of LSEs in the ISO footprint. As shown at the February 1, 2017 CPUC en banc on Community Choice Aggregation, there are over 30 entities either operating, preparing to operate, or exploring the possibility of creating a Community Choice Aggregation.⁷ These entities will range in size and location and any enhancements made to the capacity procurement should be scalable and work for all

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http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Costs_and_Rates/CCA_and_Direct_Access/FinalStaffEnBancPresentation2.1.17.pptx

entities, regardless of the LSE size. Additionally, enhancements should not depend on the number of LSEs in the ISO footprint.

5. Revised Straw Proposal

The goal of the original FRACMOO tariff was to design a single flexibility capacity product that could address multiple flexible capacity needs, while being a simple and fungible product that could be transacted bilaterally. With increased penetration of variable energy resources, the ISO continues to assess how well this single flexible capacity product works towards addressing the various flexible capacity needs. The ISO's initial assessment shows that the current product, as currently defined, is overly broad, risks exacerbating ISO operational challenges, and does not send sufficiently strong signals to ensure flexible capacity resources are procured and remain financially viable in the long-term.

Problem Statement

There is a need to send bilateral capacity procurement signals that specifically focus on sustaining fast ramping and fast starting resources in order to achieve a 50 percent RPS mandate while the specific details surrounding the implementation of the state's 50 percent RPS target are determined.

Proposed Resolution

The ISO believes it is prudent to consider a least-regrets approach to short-term modifications to the flexible capacity eligibility rules, with a focus on identifying resource characteristics that help to facilitate minimizing RPS curtailment. The short-term solutions focus on modifications to the flexible capacity rules to qualify resources with short start and minimum run times to help meet the ISO's flexibility needs while minimizing the curtailment of RPS eligible resources. This will ensure that attributes such as fast start, fast ramping, and low minimum operating levels (minimum operating level is also referred to as Pmin) are more appropriately valued while a comprehensive long-term plan is developed. The ISO believes it is important to modify the flexible capacity eligibility criteria in order to signal that resources that can be started up and shut down within the ISO's real-time market are increasingly valuable in order to increase the likelihood that the ISO can simultaneously address ramping while reducing the Pmin burden of committed resources, minimizing the uneconomic curtailment of renewable resources.

The long-term plan will focus on identifying the types of resources needed as part of an important effort to better connect the annual, year-ahead RA procurement with long-

term planning assumptions. While this long-term plan will assess the specific proposals put forward by stakeholders in response to the supplemental issue paper, the scope and specific direction of the envisioned long-term enhancements will ultimately depend on the specific implementation details of California state energy policy.

In the long-term, the ISO believes that enhancements to the flexible capacity product and the definition of need must support and aligned with state goals and the IRP. Due to the time required to develop longer-term solutions and the ongoing development of the state IRP process, the ISO is not making a long-term proposal at this time.

5.1. Demonstration of need for changes to flexible capacity eligibility

One of the initial goals of FRACMOO was to provide a broad opportunity for a variety of resource types to provide flexible capacity. The rules allowed for virtually all technology types to provide flexible, regardless of operational attributes like start-up time and minimum run time. It also did not contain any requirements regarding the dispatch frequency of resources. This highly inclusive set of eligibility criteria has allowed LSEs maximum discretion over how to meet flexible capacity requirements. It has also allowed the ISO to gain insight about how the resources shown could meet future ISO needs and what signals are being sent for mid-term and long-term flexible resource procurement. The ISO's initial assessment has shown that the current product is overly inclusive. This risks exacerbating the ISO's operational challenges by sustaining largely inflexible resources (long starting, long minimum run times, and high Pmins) over more flexible resources, and not sending strong signals to ensure more flexible capacity resources are procured and remain financially viable long term.

ISO analysis has indicated that many of the fastest ramping resources may not be available to the ISO during periods of greatest flexible capacity need. As noted in the supplemental issue paper, the ISO also determined that as much as 40 percent of the flexible RA showings are long-start resources that receive infrequent day ahead dispatches. Without a day-ahead commitment, these resources are not required to be available to the ISO for real-time flexibility and other operational needs.⁸ Further, between 25 and 33 percent of total flexible RA showings come from Once-Through-Cooling ("OTC") resources. While these resources are eligible under the current criteria and are on the ISO's Effective Flexible Capacity ("EFC") list, they rate as some of the slowest ramping resources on the list and all have an expected retirement of 2020. The ISO has also cross-referenced system RA showings to assess the impact on other faster ramping resources. Although many, but not all, fast ramping resources were shown on summer RA showings, the same resources have not been consistently shown

⁸ Alternatively, if these resources are committed, they could be exacerbating the PMin burden.

as either system or flexible RA resources in non-summer months, when flexible capacity needs are highest.

Continued reliance on long-start and OTC resources for flexible capacity has three potential adverse consequences:

1. The first potential consequence is a transitional concern during the timeframe between today and 2020. While some OTC resources provide local reliability benefits today, they should not be considered as providing reliability benefits long-term given their impending retirement. In the interim, up until the expected retirement date for these OTC resources, additional fast ramping and flexible resources may be displaced by OTC capacity in the interim and not receive RA contracts needed for long-term financial viability. As average LMPs decrease and the capacity factor for many of these potentially displaced resources decreases, they will become more dependent on capacity payments to remain financially viable long-term for those instances when their flexibility is critically needed. If these resources continue to be bypassed in favor of OTC resources for RA contracts, then there is a significant risk they may elect to retire, even if they will be needed once the OTC resources retire.
2. The second potential consequence is over reliance on slow ramping, long start resources for flexible capacity is a concern that extends beyond the 2020 OTC retirement horizon. Specifically, the ISO believes that continued reliance on a flexible capacity product that does not consider more granular operational characteristics will likely increase the frequency of exceptional dispatch CPM designations. One cause of this may be a reliance on resources that may not provide sufficient ramping speed to address real-time operational needs caused by forecast error or forced generation and/or transmission outages. Thus, in order to keep pace with ramping needs, the ISO would have to issue an exceptional dispatch to a fast ramping but non-RA resource. Because these resources have not been shown as RA, the exceptional dispatch would also result in the resource being offered a CPM designation. If the composition of the RA fleet continues have significant quantities of long-start resources that may not have the necessary upward dispatch capabilities⁹ during particular times of need, then the ISO may be forced to rely more heavily on exceptional dispatching resources to meet flexibility needs. While this potentiality exhibits aspects that overlap with the risk of retirement issue identified above, it also exists even if larger quantities of needed flexible resources have secured RA contracts for

⁹ An example of this type of resource would be solar resource that is producing at full output, but decreasing, capability as the sun sets.

summer months, but not during the other months that exhibit high flexibility needs.

3. The final consequence impacts the means by which RPS goals are met and sustained, and was detailed in section 4, above. Specifically, long start, slow ramping resources can help meet ramping needs, but the slower the average resource ramp rates, the more resources must be committed by the ISO at their minimum operating levels, forcing the ISO to manage the supply demand balance with a greater Pmin burden. In many instances, this will result in the ISO being forced to curtail renewable resources through economic or exceptional dispatches, causing reduced RPS eligible energy output. As a result, LSEs may have to contract with additional RPS capacity or risk long-term non-compliance with RPS targets.¹⁰ This additional procurement could result in steeper ramps over some time intervals.

5.2. Short-term modifications

The ISO believes that it is prudent to establish short-term modifications to the current flexible capacity provisions. Prior efforts to provide broad eligibility rules for flexible capacity, while viewed as an important step towards ensuring the ISO's flexibility needs are met, has resulted no incremental value for many of the fastest ramping and most flexible resources. Additionally, the current product has not provided an increased incentive to procure more flexible resources over other comparably priced capacity resources and no incentive to show more flexible resources in non-summer months. This is because under the current paradigm there is no differentiation between vastly different resources eligible to provide flexible RA. Therefore, the ISO believes that it is necessary to modify eligibility criteria in order to establish meaningful value for faster starting and faster stopping resources. This ensures that the greater flexibility from resources with faster start up times and lower minimum run times to compose the flexible capacity fleet. At this time, the ISO is not proposing changes to the ISO's current flexible capacity study process or flexible capacity needs determination; maintaining current three-hour ramp evaluation.

There is currently no clearly established state policy direction regarding how the LRAs or LSE should manage procurement to achieve RPS objective with the potential that the procured resources may need to be curtailed to allow the ISO to maintain

¹⁰ The ISO is aware the LSEs may "bank" excess Renewable Energy Credits and use them at a later date. However, the banked RECs should only be considered a temporary stop gap or bridge measure. If insufficient capacity is in place or the existing capacity is being curtailed, the banks will eventually be depleted, and the RPS targets will have to be met by additional RPS energy output within a year. Alternatively, green-house gas emission limits may require more renewable energy production within a given year, making bankable credits unusable.

resources at a minimum operating level for ramping needs. In the absence of such guidance, the ISO believes it is important to send a signal to procure resources that can be started and shut down to increase the likelihood that the ISO can simultaneously address ramping needs while minimizing the Pmin burden of resources.

5.2.1. Proposed changes to EFC eligibility criteria

The ISO proposes to modify the flexible capacity eligibility criteria to more squarely focus on start-up and minimum run times. Specifically, the ISO proposes to require a resource to have a start-up and minimum run times of less than 4.5 hours. This aligns with the ISO's current STUC outlook horizon. Establishing this narrower criterion will allow for the real-time commitment and decommitment of all flexible capacity resources. The intent and impact on overall EFC eligibility of adding these two additional criteria to the EFC eligibility rules is discussed in greater detail below.

EFC eligibility will be limited to resources able to respond to a real-time commitment instruction and ramp in real-time

The ISO reviewed the Flexible RA showings for February 2016 and compared these showings to the 2016 EFC list. The 2016 EFC list contains 35,234 MW of EFC eligible capacity, including 16,860 MW of long-start capacity. The February 2016 Flexible RA showings indicate that 6,066 MW of long-start resources were shown towards meeting a 10,507 total system wide flexible RA requirement. As noted in the ISO supplemental issue paper, these long-start resources were rarely committed. The ISO proposes that any resource with a start-up time of greater than the ISO's STUC time horizon will not be eligible to provide flexible capacity. Removing the 16,860 MW of long start capacity that would be excluded by the proposed criteria will leave 18,374 MW of flexible capacity resources eligible. As a point of reference, the ISO's largest monthly flexible capacity requirement for 2018 was 15,743, or about 85 percent of the total remaining flexible capacity eligible under the proposed modification.

EFC eligibility will also be limited to resources with minimum run times of less than the ISO's STUC horizon

The ISO also reviewed the additional impact of ensuring the remaining eligible flexible capacity could be shut-off in the middle of the day in order to ensure the ISO does not further exacerbate Pmin burden levels. The ISO made this assessment by determining that once a resource was fully started (i.e., completed its full start-up), could the resource then be decommitted in a single STUC interval. For example, if a resource with a start-up time of 240 min receives a commitment from STUC at time (t), then ISO would want to be able to decommit that resource during the STUC that runs at time (t+240). For the purposes of this discussion, these resources are referred to as long-run resources. The ISO identified 16,612 MW of long-run capacity that is currently

eligible to provide flexible capacity, with 5,045 MW of that long-run capacity shown in the February 2016 RA showings. It should also be noted that this 5,045 MW of flexible capacity value excludes the Pmin burden for these resources. The total amount of Pmin burden for the resources shown on the February 2016 RA showings is approximately 2,570 MW of additional capacity. The resulting system impact of committing these long-run resources is 7,615 MW.¹¹

Removing long-start and long-run resources from flexible capacity eligibility will ensure a fleet of fast ramping resources is available while minimizing the associated Pmin burden

Section 4 of this proposal references the six issues that have become a growing concern for the ISO. Modifying the EFC qualification rules to remove long-start and long-run resources addresses three of the issues. Specifically, this modification will:

- 1) Mitigate the minimum operating levels that must be maintained due to start-up and minimum run times;
- 2) Eliminate the ISO's reliance on long-start resources that are not likely to be available to address real-time ramping needs, and;
- 3) Establish a faster ramping flexible capacity fleet because most long-start and/or long run-times are also slower ramping resources.

A majority of the resources that are currently eligible to provide flexible RA and identified as long-start are also long-run resources. Only 1,332 MW of long-start capacity the ISO proposes to deem ineligible to provide flexible capacity are not also long-run capacity.

The total magnitude of resources that would be deemed ineligible to provide flexible capacity under the proposed modifications would be 18,191 MW, leaving 17,042 MW of remaining eligible flexible capacity. While this remains higher than forecasted 2018 and 2019 flexible capacity needs as currently defined, the ISO expects that this proposal may not be sustainable beyond 2019. The ISO's currently forecasted flexible capacity needs may exceed available flexible capacity under the proposed modification if long-term enhancements to the current flexible capacity paradigm are not developed. Therefore, the ISO believes it is also appropriate to immediately commence the discussion for long-term reform discussed above in Section 4.

¹¹ As a point of reference, the ISO is currently forecasting a minimum net load of 7,750 MW in February 2020.

5.2.2. Proposed changes to Super Peak resource availability requirement

As noted in the ISO supplemental issue paper, and the DMM's 2015 Annual Report, many of the largest three hour net-load ramps occur on weekends.¹² The ISO believes that the current super-peak flexible capacity resource Must Offer Obligation ("MOO"), which only requires the resources be available on non-holiday weekdays, is no longer consistent with flexible capacity needs and should be modified. The ISO proposes to extend the MOO for super-peak resources to all seven days a week. However, the ISO is not proposing to change the requirement to provide a minimum of 5 dispatches per month. The resulting MOO for super-peak flexible RA resources would be every day of the month and at least five dispatches per month. The ISO will address the following issue identified in the supplemental issue paper with this proposed MOO modification:

- Category three (*i.e.*, Super-Peak Flexible Capacity) should be available seven days a week because many of the ISO's peak three-hour ramps occur on weekends.

6. Next Steps

The ISO will discuss this revised straw proposal with stakeholders during a Stakeholder meeting on May 8, 2017. Stakeholders are asked to submit written comments by May 22 to initiativecomments@caiso.com.

¹² Based on initial analysis and discussions with the Department of Market Monitoring, the ISO expects that this trend is also evident in 2016.

Appendix 1

Summary of Stakeholder Proposals¹³

Stakeholder	Summary	Determination of needs	Eligibility criteria	Counting Rules	Assessment of showing	Miscellaneous
BPA¹⁴	Day-ahead resources can help address ISO flexibility needs.		Create new products for decremental resources and day-ahead ramping.			
CESA¹⁵	The ISO should revisit the need for downward flexible capacity.		The CAISO Should Develop Downward Flex Capacity requirements to ensure reliable grid operations . CAISO should consider a beta solutions to build experience and test effects			

¹³ This appendix focuses specifically on stakeholder comments that offer specific enhancements to the flexible capacity product and does not reflect all comments submitted by stakeholders. All stakeholder comments can found at <http://www.aiso.com/Pages/documentsbygroup.aspx?GroupID=EC633241-F8E2-4735-B1CD-FD81C7A9D883>.

¹⁴ <http://www.aiso.com/Documents/BPAComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

¹⁵ <http://www.aiso.com/Documents/CESACComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

Stakeholder	Summary	Determination of needs	Eligibility criteria	Counting Rules	Assessment of showing	Miscellaneous
Cogentrix¹⁶	ISO should develop more granular flexible capacity products with eligibility criteria keyed to operational attributes of resources	No change from current methodology proposed for primary and secondary net load ramps. Adds additional need based on largest one hour ramp.	Based various resource attributes such as start time, minimum run time, and daily availability.	No new counting rules proposed	Assessment of risk of shortfall in the 15 minute, one hour, and three hour time intervals, and risk of over-generation.	
CPUC Staff¹⁷	Adjust the eligibility criteria seasonally		Category one resources should only require one start per day during the summer.			

¹⁶ <http://www.caiso.com/Documents/CogentrixComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

¹⁷ <http://www.caiso.com/Documents/CPUCStaffComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

Stakeholder	Summary	Determination of needs	Eligibility criteria	Counting Rules	Assessment of showing	Miscellaneous
DMM¹⁸	Require a reevaluation of the design of both flexible resource adequacy requirements and must offer obligations	Define a set of flexible resource adequacy must offer obligations consistent with a clearly identified flexibility reliability requirement may be more precisely described by identifying the uncertainty and variability that requires resolution to maintain reliability				
LS Power¹⁹	The ISO should revisit the need for downward flexible capacity.		The ISO should revisit the need for downward flexible capacity.			

¹⁸ <http://www.caiso.com/Documents/DMMComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

¹⁹ <http://www.caiso.com/Documents/LSPowerComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

Stakeholder	Summary	Determination of needs	Eligibility criteria	Counting Rules	Assessment of showing	Miscellaneous
PG&E²⁰	PG&E is supportive of a comprehensive review of the flexible RA program and refining the definition of flexible RA to address specific flexibility needs if they are based on identified reliability issues	Three hour ramp may not be the correct metric. ISO should, instead focus on real-time forecast uncertainty.				Needs to specifically consider economically bidding VER resources ISO and CPUC efforts should be coordinated.

²⁰ http://www.caiso.com/Documents/PG_EComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf

Stakeholder	Summary	Determination of needs	Eligibility criteria	Counting Rules	Assessment of showing	Miscellaneous
<p>Powerex 21</p>	<p>The determination of the flexible RA requirement, needs to be more granular to adequately reflect the CAISO’s multi-dimensional flexible capacity needs. Additionally, the criteria that resources must meet to provide flexible RA should encourage the efficient procurement of those resources most capable of meeting the CAISO’s flexibility needs.</p>	<p>Needs determination should be split into forecastable flexible movements and uncertainty.</p>	<p>Forward procurement of flexible resources to meet demand and supply uncertainty should have a direct relationship to the products optimized and deployed by CAISO in its markets</p>	<p>Capable movement between 15 minute market, five, minute market, and regulation needs</p>	<p>LSEs’ portfolios of flexible RA resource showings must be required to meet a variety of metrics to ensure that the portfolios include resources with the range of operational characteristics needed to meet both forecasted changes in load and uncertainty</p>	<p>To the extent that an LSE’s annual and monthly resource showings do not contain sufficient resources to meet both forecasted hourly demand plus uncertainty, Powerex believes that CAISO should continue to have the authority, subject to a reasonable cure period, to procure resources with the needed operational attributes using its backstop authority. Cautions against attempting to manage oversupply conditions through the design of a long-term flexible RA framework.</p>

Stakeholder	Summary	Determination of needs	Eligibility criteria	Counting Rules	Assessment of showing	Miscellaneous
SCE ²²	No major changes needed, develop a new showing assessment tool	No change from current methodology proposed	Long-start resources should remain eligible	Include cycle times	Determine if flexible RA fleet can meet ramping needs of 5 minute to multiple hours	Include weekends and holidays for Category three ISO must demonstrate system failures if it seeks additional products

²¹ <http://www.caiso.com/Documents/PowerexComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>

²² <http://www.caiso.com/Documents/SCEComments-FlexibleResourceAdequacyCriteriaMustOfferObligationPhase2-SupplementalIssuePaper.pdf>