CAISO's Flexible Resource Adequacy and Must Offer Obligation Phase 2
Revised Straw Proposal
Public Generating Pool and Public Power Council Comments
May 22, 2017

Public Generating Pool (PGP) and Public Power Council (PPC) appreciate the opportunity to comment on the California ISO's Flexible Resource Adequacy and Must Offer Obligation Phase 2 (FRACMOO2) Revised Straw Proposal dated May 1, 2017. PGP represents ten consumer-owned utilities in Oregon and Washington that own more than 6,000 MW of generation, 96% of which is carbon-free. PPC is a non-profit trade organization that represents the common interests of approximately 100 consumer-owned electric utilities in the Pacific Northwest, many of which own hydro-electric and renewable generation.

Overview

With the continued increase in variable energy resource penetration, the ISO market design must evolve to ensure sufficient price signals to incent the resource characteristics necessary to cost-effectively and reliably support the ISO's system. It is imperative that the ISO assume some urgency to the long-term flexible RA solution and other actions that ensure proper flexibility in the day-ahead and real-time markets as the ISO's flexibility needs continue to outpace what the ISO is forecasting.

PGP and PPC urge the ISO to:

- Focus on a long-term flexible RA solution and not pursue the proposed short-term flexible RA solution;
- Ensure any future solution allows for the expanded participation of external resources; and
- Pursue actions that support proper price signals and procurement of flexibility in the day-ahead and real-time markets:
    - Develop a Day-Ahead Flexible Ramping Product
    - Eliminate the Load Bias Limiter

Access to Sufficient Amounts and Types of Flexible Capacity is Critical

Like every Balancing Authority Area, the ISO must have dispatchable, flexible resources at its disposal that can meet the changing load and generation on its system now and into the future. The ISO's November 8, 2016 Supplemental Issue Paper[1] indicated, however, that the current flexible capacity product is not sending the correct signal to ensure sufficient flexible capacity will be maintained long-term. The ISO identified several attributes of resources in the current RA fleet which render the current fleet insufficient to meet the ISO's forecasted flexibility

[1] http://www.caiso.com/Documents/SupplementalIssuePaper-FlexibleResourceAdequacyCriteria-MustOfferObligationPhase2.pdf

needs. These attributes include slow ramp-rates, relatively long lead-times, high minimum-operating levels, and limited daily and hourly availability.

The increased urgency to ensure the ISO's access to appropriate and sufficient flexible capacity is driven by recent findings. The ISO's forecasted net load ramps have increased at a pace much greater than initially contemplated due to the aggressive buildout of both grid- and distribution-level variable energy resources:

- In its Draft Flexible Capacity Needs Assessment for 2018 stakeholder presentation dated April 6, 2017, the ISO showed actual net-load and three-hour ramps materializing approximately four years ahead of the original estimate. The ISO experienced an actual three-hour ramp of 12,960 MW on December 18, 2016, which was not forecasted to occur until 2020.
- The ISO is now projecting the maximum monthly three-hour upward net-load ramp for December 2019 to be 15,495 MW and for December 2020 to be 16,817 MW.

Assuring that the appropriate quantity and quality of flexible capacity is available at the right time is becoming increasingly imperative as renewables are added to meet California's goal of 50% of load served by renewable resources by 2030.

Pursue a Long-Term Solution Rather than Implement a Short-term Solution

The ISO's need for flexible capacity is a multi-dimensional problem that requires solutions that are more comprehensive than a designated amount of resources that can respond to a 5-minute dispatch signal. PGP and PPC agree with the recommendation made by the ISO Department of Market Monitoring (DMM) in its comments on the ISO's Supplemental Issue Paper that the ISO should focus its limited staff and resources on beginning to design a durable flexible capacity RA product rather than making incremental changes as part of another interim solution. DMM makes a valid point that,

> "*[a]lthough doing so would require additional time in this stakeholder process, a single realignment of both flexible requirements and must offer obligations to the ISO's need to address the variability and uncertainty of renewable production would be more efficient than repeated rounds of flexible capacity qualification redefinitions.*[2] "

As the DMM notes, the interim flexibility product is available and intended to fill in the gap until a long-term correction is made.

For similar reasons, PGP and PPC believe that it is not useful to spend valuable ISO staff and stakeholder time on the short-term fixes proposed in the ISO's May 1, 2017 Revised Straw

[2] DMM Comments regarding *Flexible Resource Adequacy and Must Offer Obligation – Phase 2 Supplemental Issue Paper: Expanding the Scope of the Initiative*, p. 2 (Jan. 6, 2017).

Proposal. The short-term fixes do not address key issues that are necessary to meet all of the ISO's flexibility needs. Specifically, the short-term fix does not:

- Assure that procured flexible capacity is available in real-time
- Provide for participation from external resources

The ISO suggested at the May 8, 2017 FRACMOO2 stakeholder meeting that the short-term measure for flexible RA is necessary to send a price signal to the types of resources that are needed in the future. However, at best, the price signal is only for one to two years. Further, the CPM Risk of Retirement Enhancements could and should address this issue. Lastly, spending the remainder of 2017 working through a short-term solution that provides little to no benefit to the flexible RA program only further delays the long-term solution. In consideration of how slow progress has been on this initiative to date, the best use of ISO staff and resources is to pursue the long-term solution now.

Rather than pursue interim changes, PGP and PPC recommend that the ISO use the FRACMOO2 stakeholder initiative process and ISO staff and resources set aside for this process to:

1. Identify the flexible capacity needs of the system today and over the next ten years.
2. Evaluate proposals and options submitted by stakeholders in responses to the ISO's Supplemental Issue Paper for meeting the ISO's flexible capacity challenges.

PGP and PPC agree with the ISO that several of the stakeholder proposals for long-term flexible capacity enhancements submitted in response to the supplemental issue paper warrant additional consideration. In particular, PGP and PPC support further exploration of the proposals submitted by the Bonneville Power Administration (BPA), DMM and Powerex. PGP has outlined the proposed modifications to the Flexible RA requirements based on discussions with BPA, Powerex and the PPC – see document at end of comments.

All Solutions Need to Ensure that Imports Can Reasonably Participate

The short-term solution proposed by the ISO in its May 1, 2017 Revised Straw Proposal perpetuates the inability for external resources with short lead times, fast ramp rates and high availability to compete with the ISO's internal resources for providing flexible capacity. It is unclear why the ISO continues to delay the inclusion of imports into the flexible RA program despite the economic benefit to consumers of doing so.

- *October 2014:* In FERC's Order on the CAISO's August 1, 2014 tariff revisions (Docket No. ER14-2574-000) issued on October 16, 2014, the FERC Commission directed CAISO to:
    - *"assess the feasibility of permitting static import resources to provide flexible resource adequacy capacity and to include this assessment in the informational report" to be submitted 12 months of the date of implementation of the flexible capacity requirements, i.e., January 1, 2016."*

- *"indicate in the report whether it is feasible to expand the eligibility to include imports and, if so, when it will do so. Alternatively, CAISO should explain why the inclusion of imports continues to be infeasible."*

- *December 2015:* On December 11, 2015, in response to FERC's directive and based on its initial assessment, the ISO issued its initial FRACMOO2 Straw Proposal, in which the ISO proposed to allow qualified 15-minute intertie resources to provide flexible RA capacity. The ISO showed the largest changes between real-time dispatch and the time at which 15-minute intertie resources are issued is almost 5,000 MW implying that 15-minute intertie resources can provide significant reliability benefits.

- *July 2016:* However, on July 7, 2016, the ISO issued a Market Notice notifying stakeholders that the scope of the FRACMOO2 stakeholder initiative is being modified to add a holistic assessment of the existing capacity product.

- *November 2016:* The ISO issued the results of its assessment of flexible capacity showings to date, the forecasted flexible capacity needs and issues with the existing flexible capacity product on November 8, 2016 in its Supplemental Issue Paper. The Supplemental Issue Paper assured stakeholders that the proposal to allow intertie resources to provide flexible capacity was still included within the scope of the FRACMOO2 stakeholder initiative.

- *May 2017:* The ISO did not issue a revised straw proposal until May 1, 2017, at which point the ISO decided to change the scope yet again, this time expressing uncertainty about including flexible capacity from intertie resources in any short-term solution.

The most recent proposal indicates that external resources will continue to be largely disqualified from participating in the ISO's flexible RA program until at least the 2019 RA compliance year for RA showings in 2020, if not later. The ISO has not provided a clear path and timeline for expanding the eligibility to include imports in the flexible RA program nor has the ISO explained why the inclusion of imports continues to be infeasible, as was requested by FERC almost three years ago.

Other Near-Term Actions Can Support the Long-Term Solution

In parallel to pursuing the long-term solution for flexible RA, the ISO should pursue other actions that support proper price signals and ensure sufficient flexibility in the real-time markets. These actions should include development of a day-ahead flexible ramping product and elimination of the load bias limiter.

Day-Ahead Flexible Ramping Product: While the ISO ensures procurement of flexible capacity in the year-ahead and month-ahead timeframe through the flexible RA program and has a market-based mechanism to procure flexible resources in real-time

through the flexible ramping product, the ISO has no framework for procurement and optimization of flexible resources on a day-ahead basis.

Extending the flexible ramping product to the day-ahead timeframe will help ensure that flexible capacity is set-aside to be available for real-time operations. A day-ahead flexible ramping product coupled with expanding the flexible RA product to allow for 15-minute system-resource imports can greatly increase the ability for Pacific Northwest (PNW) hydro to help meet the ISO's flexibility needs. As BPA described in its comments to the ISO's November 8, 2016 Supplemental Issue Paper, the ability to make use of the flexibility of PNW hydro systems is greater the farther ahead of real-time operations the obligation is established. Having a day-ahead flexible ramping product can help capture the flexible attributes of PNW hydro resources that can benefit both California and NW parties.

Elimination of the Load Bias Limiter: The frequency and magnitude of the application of the load bias limiter directly reduces the price signal for the value of flexible capacity. The DMM data and Market Surveillance Committee (MSC) conclusions regarding the load bias limiter presented at the May 5, 2017 MSC meeting warrant further consideration by the ISO:

- "*The load bias limiter directly reduces the market value of flexible capacity during the high ramp hours.*
- *If the ISO needs flexible capacity and upward ramp during high ramp hours, real-time prices should reflect this need and not be artificially depressed through the application of the load bias limiter.*
- *The application of the load bias limiter to raise negative prices reduces the value of capacity with low minimum operating levels, short minimum run times, multiple starts and good ramping capability."*

If the load bias limiter simply reduces the frequency with which the CAISO market experiences shortage pricing, elimination of the load bias limiter will allow for efficient shortage pricing that more accurately reflects both the need and value of flexibility and encourage greater participation by flexible resources.

Conclusion

The ISO must have dispatchable, flexible resources at its disposal to meet the changing load and generation on its system now and into the future. It is important to ensure a thorough, coordinated, and timely review of the ISO's flexible capacity needs and the resource adequacy products required to meet those needs. To that end, PGP and PPC encourage the ISO and the CPUC to develop and publish a joint timeline for developing a long-term solution.

Public Generating Pool

www.publicgeneratingpool.com
thampton@publicgeneratingpool.com

Discussion Document: Integrating Renewables in the CAISO market
Near-Term Market Design Options for Consideration

April 26, 2017

CONTEXT: For decades, the California and the Northwest power systems have relied on the diversity of resources and loads to cost-effectively support each other's system needs. Although the resources, loads and markets have evolved over time, the opportunity to support each other continues to exist today.

The addition of renewable generation across the Western Interconnection has changed the level of flexibility that our power system requires. The CAISO market is evolving to meet these changing needs with the creation of the Energy Imbalance Market, the Flexible Resource Adequacy products, the Flexible-Ramping Product and consideration of a Regional ISO. Integration of new renewables across the West will continue. The CAISO market must continue to evolve to ensure a market design that sends sufficient price signals to incent the resource characteristics needed to cost-effectively and reliably meet the needs of the system. Many of these actions will be long-term endeavors. However, there are market design options that can be explored in the near-term that may better incent the use of existing resources in the West.

PURPOSE: Identify options that can be implemented in the near-term to enhance CAISO market design to take better advantage of the import and export opportunities between the Northwest and California.

PRINCIPLES:

- Ensure market rules provide a level playing field for all resources:
  - Inside and outside of CAISO market footprint
  - New and existing resources
- Define flexibility needs on a forward basis to support product differentiation consistent with market dispatch:
  - Hourly shaped deliveries
  - 15-minute and 5-minute standby resources
- Provide forward commitment creating compensation to ensure availability and access to flexibility from resources that are external to the CAISO footprint
- Eliminate any unnecessary barriers to participation

NEAR-TERM OPTIONS FOR CONSIDERATION

A. Flexible Resource Adequacy – Enhance the current Flexible Resource Adequacy Capacity procurement process by separating capacity requirements into the forecasted net load ramp and within-hour uncertainty and variability. Shaped hourly schedules (including exchanges) would qualify to meet forecasted net load ramp. *For more detail, please refer to the attached Concept Paper*

B. Flexible Ramping Product – Add a day-ahead Flexible Ramping Product to ensure that sufficient flexible capacity is set aside in the day-ahead time frame to be available during real-time operations. This will ensure that resources with ramping flexibility are available in the real-time markets to help meet 15-minute and 5-minute within-hour uncertainty.

An Approach to Flexible Capacity in the CAISO Market
Concept Paper

This concept is based on discussions with Bonneville Power Administration, Powerex, and Public Power Council

Proposed Modifications to Flexible Resource Adequacy Requirements

I. Modify the definition of flexible resource adequacy needs

Separate the total flexible capacity requirements into the amount that can be forecasted ahead of time (forecasted net load ramp) and the portion that is not known until real-time (within-hour uncertainty and variability).

a. Define and evaluate forecasted net load ramping requirements

- A substantial portion of the daily max 3-hour net load ramp is known ahead of time, even at the time of the annual and/or monthly resource adequacy showings, because it is the result of predictable changes in load and solar production.
- These forecasted changes can be met through forward commitments for energy deliveries shaped to offset the forecasted ramp and do not require within-hour dispatchability.

b. Define and evaluate within-hour variability and uncertainty

- Within-hour variability and uncertainty encompasses changes in load and resource output that are partially predictable in advance of each hour and partially not predictable in advance.
- To assure system reliability, the CAISO must continuously be prepared to meet unpredictable within-hour changes whether or not they materialize.
- Meeting these within-hour changes require resources on standby that have relatively high ramp rates and that are dispatchable on short lead times.

II. Align resource requirements with the modified flexible resource adequacy definitions

- With a more detailed definition of the flexible resource adequacy needs, specific resource characteristics can be defined.
- It is expected that the portion of the 3-hour net load ramp that is forecastable could be reduced on a forward basis with any resource or contract that is deliverable in a shaped hourly schedule.
- The within-hour requirements could be translated into specific amounts of 15-minute market and 5-minute standby resources, with ramp rates being used to determine the amount of each product that the resource is qualified to provide.
- The specific resource requirements may not necessarily be as stated above, but should be aligned with a more refined definition of flexible resource adequacy needs and the resource characteristics needed to meet them.

III. Match flexible resource adequacy products to market dispatch intervals

- The CAISO currently dispatches resources on an hourly, 15-minute, 5-minute, and 4 second basis.

Public Generating Pool
www.publicgeneratingpool.com
thampton@publicgeneratingpool.com

- Matching flexible resource adequacy products to these dispatch intervals ensures the right quality of resources needed to support flexibility needs and should result in the least costly solution to meeting flexible resource adequacy requirements.

Benefits of this Approach

Provides Greater Ability for NW Hydro to Offer Flexibility

- Product differentiation that provides a forward commitment increases CAISO's access to the flexibility of PNW hydro systems since a hydroelectric system's flexibility is greater the farther ahead of real-time operations that the obligation is established.
  - Flexible Resource Adequacy**:** Procuring shaped energy schedules and standby flexibility on a year-ahead and month-ahead basis under the Flexible Resource Adequacy program will enable PNW systems to provide a greater contribution towards California's flexibility challenges.
  - Flexible Ramping Product**:** Extending the Flexible Ramping Product to the day-ahead time frame will help ensure that flexible capacity is set-aside, including on PNW hydro systems, to be available for real-time operations.
- Product differentiation would eliminate transmission limits on level of PNW participation:
  - The current 5-minute dispatch qualification criterion requires the use of dynamic transfer capability to be delivered and thereby limits any potential participation over the Pacific Northwest-Pacific Southwest intertie to amounts within the intertie's 400 MW dynamic transfer capability limit.
  - Product differentiation would define a portion of Flexible Resource Adequacy to be met with 15-minute standby resources, which would make available the use of the entire California-Oregon intertie capacity for potential Flexible Resource Adequacy, totaling approximately 3,200 MW when all lines are in service.
  - Further, enabling the use of hourly shaped schedules to meet forecasted net load ramp adds up to another 3,000 MW of potential Flexible Resource Adequacy that could be delivered on the Nevada-Oregon DC intertie (which currently does not support intra-hour scheduling).

Assures Access to the Flexibility that is Needed

- As CAISO indicated in its assessment of flexible capacity, the current qualification criteria do not ensure procurement of resources that adequately meet the ISO BAA needs.
- Separately defining and meeting a portion of the flexible capacity requirements on a forward-looking basis effectively deploys the capabilities of long-lead time resources, slower ramping resources, and intertie resources.
- Aligning the remaining flexible capacity product definitions with the market dispatch intervals:
  - Ensures that resources with the necessary ramp rates and dispatchability attributes are available to the CAISO, and
  - Encourages efficient procurement of resources capable of meeting flexibility needs at the least cost, thereby reducing cost to consumers.

Appropriately incents procurement of needed resource characteristics

- Procurement of the appropriate quality of flexible capacity improves the ability to manage within-hour uncertainty and flexibility. These changes create the opportunity to reduce minimum generation requirements that lead to the curtailment of renewable resources, supports continued development of in-state renewable resources, and incents the development of new resources with the appropriate flexibility attributes.
- Enabling access to out-of-state flexible hydro resources provides a cost-effective, carbon free option to meet CAISO's flexible capacity needs, including as a bridge option while storage technologies are developed and deployed in-state.
- Separately defining and meeting a portion of the flexible capacity requirements on a forward-looking basis will also similarly enable participation of long-lead time resources and slower ramping resources.

Cost-Effective

- The current qualification criteria requiring the entire 3-hour net load ramp be met with 5-minute dispatchable standby resources is not necessary or cost effective.
- Further differentiating the within-hour uncertainty needs based on suitability to each market interval (hourly, 15-minute, 5-minute, or regulation) avoids having to procure the entire requirement through the most flexible "premium" standby resources.