

Stakeholder Comments Template

Frequency Response Phase 2 Initiative Working Group

Submitted by	Company	Date Submitted
<i>Mahesh Morjaria – 602-427-2935</i>	<i>First Solar</i>	<i>March 17, 2017</i>

This template has been created for submission of stakeholder comments on the working group for the Frequency Response Phase 2 initiative held on February 9, 2017. Information related to this initiative may be found at:

<http://www.caiso.com/informed/Pages/StakeholderProcesses/FrequencyResponsePhase2.aspx>

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **March 17, 2017**.

The ISO includes a summary of the brainstormed options for potential solutions to reference while responding to Question 1 and its subparts. Seven potential options were brainstormed, they include:

1. Annual Forward Procurement - external BAAs
 - a. Only procures incremental amount to cover expected shortfall
 - b. Requires one contract type (TFR)
 - c. Supports bid submission and settlement of that price if procured
 - d. Does not require any day-ahead or real-time market co-optimized constraint
2. Annual Forward Procurement - external BAAs and internal resources
 - a. Only procures incremental amount to cover expected shortfall
 - b. Requires two contract types (TFR and frequency response awards)
 - c. Supports bid submission and settlement of at least that price if procured
 - d. Requires day-ahead and real-time co-optimized constraint
3. Day-ahead or Real-Time Market Product
 - a. Procures amount to meet total requirement
 - b. Requires one contract type (frequency response awards)
 - c. Supports bid submission and settlement of at least that price if procured
 - d. Requires day-ahead and real-time co-optimized constraint
4. Day-ahead and Real-Time Constraint
 - a. Procures amount to meet total requirement
 - b. Does not support bid submissions but would include some type of settlement for service
 - c. Requires day-ahead and real-time co-optimized constraint
5. Combination Annual for externals and Day-ahead/Real-Time Product
 - a. Procures incremental amount in annual forward procurement that would support bid submission and settlement of at least that price if procured

- b. Separately procures remainder of the amount to meet the total requirement that would support bid submission and settlement of at least that price if procured
- c. Requires day-ahead and real-time co-optimized constraint
- 6. Combination Annual for externals and Day-ahead/Real-Time Constraint
 - a. Procures incremental amount in annual forward procurement that would support bid submission for TFRs and settlement of that price if procured
 - b. Separately procures remainder of the amount to meet the total requirement that would not support bid submission for market constraint but would include some type of settlement
 - c. Requires day-ahead and real-time co-optimized constraint
- 7. "Do nothing"
 - a. Take no proactive action including procuring TFR from external BAAs

Questions:

- 1. The ISO seeks stakeholder input on the brainstormed options for a potential solution to the ISO need to take proactive action to ensure its frequency response is sufficient to support reliability in the event of a loss of two Palo Verde units (BAL-003-1 requirement). These include
 - a. Provide description of view of advantages, disadvantages, or position on option 1 - Annual Forward Procurement - external BAAs.
 - b. Provide description of view of advantages, disadvantages, or position on option 2 - Annual Forward Procurement - external BAAs and internal resources.
 - c. Provide description of view of advantages, disadvantages, or position on option 3 - Day-ahead or Real-Time Market Product.
 - d. Provide description of view of advantages, disadvantages, or position on option 4 - Day-ahead and Real-Time Constraint.
 - e. Provide description of view of advantages, disadvantages, or position on option 5 - Combination Annual for externals and Day-ahead/Real-Time Product.
 - f. Provide description of view of advantages, disadvantages, or position on option 6 - Combination Annual for externals and Day-ahead/Real-Time Constraint.
 - g. Provide description of view of advantages, disadvantages, or position on option 7 - "Do nothing".
- 8. ISO seeks stakeholder input on the proposed frequency response service specifications for fast frequency response, primary frequency response and fast regulation attached separately in the draft frequency control product specifications document found [here](#).

9. ISO seeks stakeholder input on the proposed scope of services for which a procurement mechanism would be designed. The proposed scope shown in the product specification handout is that the ISO only needs to evaluate procurement of primary frequency response whether from external BAAs or internal resource and does not need to procure fast frequency response or fast regulation capable of providing the secondary response shown on slide 47 in the appendices to the working group presentation. If any stakeholders believe that the scope should include the fast frequency response or fast regulation services under its evaluation of a procurement mechanism please provide an explanation.
10. ISO seeks stakeholder input on whether load responsive devices can perform with a proportional response or does it require shedding load at a specific trigger point? Also, whether there has been any exploration of the concept of stopping non-critical processes for short periods has been evaluated?
11. ISO seeks stakeholder input on whether pump storage hydro is pumping rather than generating would frequency control device perform with a proportional response or require shedding load at specific trigger points?
12. ISO seeks stakeholder input on the statement made on Slide 15 of the ISO presentation, “Frequency control services require reserves above operating reserves that are not procured for RA”. The ISO stated that it believes that resource adequacy or flexible resource adequacy capacity procured to ensure RA to ensure energy deliverability cannot be awarded frequency responsive reserves since these reserves cannot be released by ISO dispatch to ensure deliverability during peak or ramping needs. If any stakeholders hold a different belief, the ISO asks that additional information and explanation be provided to continue to move the dialogue forward.

Comments of First Solar, Inc.

First Solar appreciates the opportunity to submit these comments to CAISO’s Frequency Response Phase 2 Initiative Working Group. Based on a recent study conducted by CAISO, NREL and First Solar, titled “Using Renewables to Operate a Low-Carbon Grid,” it is clear that solar PV can and should provide essential reliability services, including primary frequency response (PFR). As part of fashioning a cleaner, greener grid, CAISO should take full advantage of the technical capabilities of all interconnecting resources to provide cost-effective support for grid stability. With respect to frequency response, conventional and new technologies should be put on a level playing field.

As the CAISO/NREL study demonstrates, grid and plant operators will need to coordinate on operational requirements, and new protocols for operators’ interface and communications acceptance of measured plant parameters are required. However, with the right coordination, the study shows that solar PV can provide even greater flexibility than conventional resources for some essential reliability services.

First Solar has extensive experience with the advanced power controls that are required to provide primary frequency response (PFR). For the past few years, our projects have been designed to include the technology that would allow our projects to provide PFR. We urge CAISO to adopt standardized rules to require all new generation resources to have PFR capability as a condition of interconnection (including non-synchronous resources such as wind, solar and battery storage), regardless of the type of generation. We believe this will result in a very large amount of PFR capability in the future generation fleet and will help enhance grid stability.

The primary concern of CAISO is periods where most of the generation is from solar and wind and conventional sources are not committed. The PFR capability from all new generation sources will address that concern. However, the PFR capability from solar (or wind) does not guarantee headroom for provision of PFR in real time for under frequency events. So when CAISO needs the generation plant to intentionally maintain the headroom specifically for providing PFR, CAISO should provide make whole payment to cover the lost opportunity cost. Because solar and wind can effectively be curtailed down to zero output while staying online, these plants can remain available to provide large amounts of PFR.

In addition, First Solar supports revising generator interconnection agreements to provide compensation for the configuration and additional communication, software and control equipment required to provide PFR capability from the existing plants if required. Providing compensation for both equipment (for existing plants) and services (from all plants) will encourage rapid and cost effective adoption and quickly facilitate increased grid reliability going forward.