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**THE OFFICE OF RATEPAYER ADVOCATES' COMMENTS
ON THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION'S
FEBRUARY 9, 2017 FREQUENCY RESPONSE
PHASE 2 WORKING GROUP MEETING**

The Office of Ratepayer Advocates (ORA) files these comments on the California Independent System Operator Corporation's (CAISO) February 9, 2017 Frequency Response Phase 2 Working Group Meeting on the December 15, 2016 Issue paper. The CAISO requested responses to specific questions, which ORA provides below. ORA looks forward to future participation in the development of the CAISO's frequency response (FR) initiative.

I. SUMMARY OF BRAINSTORMED OPTIONS FOR MEETING THE CAISO'S FR OBLIGATIONS

With approval by the Federal Energy Regulatory Commission (FERC) of the North American Electric Reliability Corporation's (NERC) BAL-003-1 reliability standard, frequency response services became mandatory, effective January 16, 2014. Given the first compliance year of December 1, 2016 to November 30, 2017 for the BAL-003-1, the CAISO implemented a Primary Frequency Response Phase 1¹ (PFR Phase 1) on September 16, 2016 and now proposes PFR Phase 2 to meet its Frequency Response Obligation (FRO). The purpose of PFR Phase 2 is help the CAISO evaluate "the need for and merit of introducing long-term market design measures that could incentivize sufficient

¹ The Western Energy Coordination Council (WECC) conducted studies for the Western Interconnection and determined the total frequency response capability needed to maintain the power supply stability of the Western Interconnection, measured in MW/0.1 Hz, and allocated the Frequency Response Obligation (FRO) to the Balancing Authorities within the Western Interconnection. According to WECC, CAISO's FRO is 285 MW/0.1 Hz. Based on CAISO studies, the CAISO will have a shortfall of approximately 100 MW/0.1 Hz for meeting its FRO for the first compliance year. In order to meet the FRO, the CAISO, through its stakeholder processes, developed the Frequency Response Phase 1 approach, which is for the CAISO to procure the 100 MW/0.1 Hz of frequency response capability shortfall from neighboring balancing authorities. The CAISO Board of Governors approved the proposal and the CAISO filed tariff language with FERC on April 21, 2016. FERC approved the filing on September 16, 2016. FR, Phase 2, is a long term approach of CAISO procuring a sufficient amount of FR to meet its FERC obligation.

capability and performance levels to maintain grid reliability” to ensure it meets its FRO per NERC’s BAL-003-1 reliability standard.²

During the February 9, 2017 Working Group call, the CAISO and stakeholders brainstormed several potential options to meet the CAISO’s PFR requirements in Phase 2. Seven potential options were discussed. Below is the CAISO’s summary of these options as listed in the “Stakeholders Comment Template” it provided:

- 1) Annual Forward Procurement - external BAAs [Balancing Area Authorities]
 - a. Only procures incremental amount to cover expected [FR] shortfall
 - b. Requires one contract type (TFR³) [Transferred Frequency Response]
 - 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 [BAAs located outside of CAISO BAA] 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"

² See CAISO, Frequency Response Phase 2 Issue Paper, pp. 4-5 (Dec. 15, 2016).

³ Transferred Frequency Response.

- a. Take no proactive action including procuring TFR from external BAAs.⁴

Question 1, below, addresses these options. In addition, the CAISO asks stakeholders to address five other issues.

II. QUESTIONS AND DISCUSSION

ORA has summarized each of the CAISO's questions below, and addresses each question in turn.

A. Question 1

The CAISO asked stakeholders to comment on the advantages, disadvantages, or their position on each of the above seven options "for a potential solution to the [CA]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)." ORA's response addresses each proposal separately and then provides a recommendation for the CAISO to meet its PFR requirements going forward.

On November 25, 2016 the FERC issued a Notice of Proposed Rulemaking to revise its regulations to require all newly interconnecting large and small generating facilities, both synchronous and non-synchronous, to install and enable primary frequency response (PFR) capability as a condition of interconnection.⁵ The outcome of this rulemaking could increase the amount of required PFR capability in the CAISO's balancing authority area (BAA) and, therefore, impact the CAISO's decision on whether or not to create a market for PFR. In light of this, ORA recommends that the CAISO continue to require generators with PFR capability to provide the service pursuant to the CAISO's tariff.⁶

In addition, the CAISO should continue⁷ to study how much PFR capability it has in its own BAA to determine whether there is a PFR shortfall with enforcement of its tariff requirement and agreements with generators to provide PFR. This information will help the CAISO determine the amount of PFR service it needs to procure from other resources, if any, to meet BAL-003-01 in the future.

⁴ CAISO "Stakeholder Comments Template" for the FR Phase 2 Initiative Working Group, pp. 1-2. Available at <http://www.caiso.com/informed/Pages/StakeholderProcesses/FrequencyResponsePhase2.aspx>.

⁵ 81 Federal Register 85176-01.

⁶ CAISO Tariff, Section 4.6.4 and Section 4.6.5.1 and Appendix Z Large Generator Interconnection Agreement (LGIA) For Interconnection Requests Process Under the GIP, 9.6.2.1 Governors and Regulators (p.2316), available at <https://www.caiso.com/Documents/AppendixZ-FifthReplacementCAISOTariff.pdf>.

⁷ The CAISO has requested frequency response data on participating generating units' plant-level and governor-level control systems pursuant to section 4.6.4 and 4.6.5.1 of the tariff by March 1, 2017. See <http://www.caiso.com/Documents/FrequencyResponseDataRequestCall011717.html>.

To the extent the CAISO cannot meet the PFR reliability standard by enforcing the CAISO tariff and the agreements requiring the generators to provide PFR and a market is indeed needed, ORA makes the following observations on the CAISO's proposed seven options to meet this need:

- ORA does not support Options 1 and 2 because they “only procure incremental amount to cover expected shortfall”. This approach does not treat all the resources equally and could lead to non-compliance by generators who may be required to perform without explicit compensation;
- ORA does not support Option 3 because the bid submission mechanism is a complex process and may not be cost effective.
- Options 5 and 6 are too complex and could lead to a lack of coordination between the annual procurement between Load Serving Entities and generators and the Day-ahead/Real-Time procurement process in CAISO's market.
- ORA does not have a position on Option 7.
- ORA generally supports Option 4 and provides the following refinement.

ORA recommends that the CAISO should not procure PFR in the day-ahead or real-time markets and that market participants need not submit bids to provide PFR service. Instead, the CAISO should institute a settlement mechanism where the CAISO pays market participants after the PFR service is provided based on metered performance by the market participants and at a predetermined price. To ensure the predetermined price is just and reasonable, the CAISO should conduct studies to ensure that the price reflects the value of the PFR service to be provided. The CAISO would then post that price on its website. The CAISO will have some flexibility to adjust the predetermined price, so there is adequate PFR reserve online and BAL-003-1 is complied with. All the capable generators would then be required to provide the PFR service autonomously based on the CAISO's predetermined price.

There are several advantages to this approach. First, this approach would allow all market participants, regardless of technology type, the opportunity to provide the PFR services. This is consistent with the CAISO's market design principle 2, which aims to “allow all technology types to participate in the procurement mechanism through ensuring there are no barriers to entry.”⁸ Second, this approach benefits all capable generators because their unused generation headroom (the remaining generation capacity on top of the dispatched generation level for a particular time period) can be used to provide the PFR service. As a result, the CAISO would not need to pay the “opportunity cost” of the unused generation headroom to potential PFR service providers. Third, this approach would

⁸ See CAISO, Frequency Response Phase 2 Issue Paper, p. 21 (Dec. 15, 2016).

minimize administrative burden and costs, because both the CAISO and the market participants do not need to develop and maintain the bidding, optimization, and clearing mechanisms that are in place for other ancillary services. Lastly, this approach is preferable to a day-ahead or real-time market because there are very few frequency events in a year; therefore, this approach would eliminate the need to develop a complex market mechanism for the PFR service procurement.

In sum, the creation of a PFR market before it is known whether FERC's proposed rule will be adopted and without determining CAISO's PFR shortfall (or the capability of existing generating resources), could lead to unnecessary costs to ratepayers and unwarranted compensation to generators. In addition, complex market mechanisms should be avoided due to the autonomous characteristic of PFR combined with the occurrence of very few frequency events. Therefore, ORA recommends that the CAISO refine Option 4, as described above, if it determines that a market mechanism for PFR service is needed.

B. Question 2

In question 2, the CAISO seeks stakeholder input on the proposed frequency response service specifications for fast frequency response, primary frequency response and fast regulation.

Since the goal for the CAISO is to meet its PFR obligation, ORA recommends that the PFR should be defined as (1) generation that can ramp up within 60 seconds following the frequency event and (2) generation that can sustain for at least 60 seconds after responding to the frequency event. This is because, while PFR is critical to control frequency decay, it is generally not effective for the PFR to continue to provide frequency services after the 60-second window. Regulation services are available to address the frequency decay after the 60-second time period. Specifically, ORA recommends that the CAISO define PFR based on the following criteria:

1. Must be able to deploy within 60 seconds after the frequency event;
2. Must be able to sustain their output level for at least 60 seconds after deployment; and
3. Must have a frequency deadband⁹ that is 18 mHz¹⁰ to ensure that the PFR providers are not deployed due to minor frequency variations.

Any resource that can meet the above performance requirements should be qualified for providing PFR services to the CAISO market and receive payment based on the pre-determined price set by the CAISO.

⁹ The dead-band is the allowable deviation from the required frequency. Within the dead-band, the generator will not be triggered to respond to the minor system frequency variations.

¹⁰ Please refer to CAISO Table **Error! Main Document Only.**: Frequency Control Product Specifications.

In January 11, 2017 comments on the CAISO's Frequency Response Phase 2 Issue Paper, many parties expressed concerns regarding the overlap of the PFR service with the regulation and spinning reserve services. They opined that there is a risk of double payment for generators providing regulation and/or spinning and PFR.¹¹ To address this concern, ORA suggests that the CAISO review and consider redefining other ancillary services such as regulation, ramping, spinning reserves, and non-spinning reserves to ensure these services are coordinated, do not conflict, and are not double counted. For example, after a frequency event while PFR providers are ramping up to arrest the frequency decay, the CAISO should not dispatch regulation providers to ramp down intending to correct the Area Control Errors at the same time. Generators that are awarded and paid for Regulation and Spin services should not be paid for the PFR services.

C. Question 3

The CAISO seeks stakeholder input on the proposed scope of services for which a procurement mechanism would be designed. The proposal is that the CAISO only needs to evaluate procurement of PFR service from external BAAs or from internal resources and does not need to procure fast frequency response¹² or fast regulation¹³ capable of providing the secondary response. Specifically, Question 3 asks whether stakeholders believe that the scope should include the fast frequency response or fast regulation services under its evaluation of a procurement mechanism.

ORA finds that, because the CAISO only needs to procure PFR to meet the NERC standard, there should only be one PFR service, which must be deployed within 1 minute and sustained for at least 1 minute. In addition, ORA recommends that the 1-minute PFR is granular enough to maintain the grid frequency and should not be further differentiated. For example, although batteries may provide the quickest response, they should not receive greater compensation than gas or hydro generator's response that is slower, as long as the response can meet the predefined 1-minute specification. The goal for this PFR service is to ensure that the CAISO maintains the power supply reliability that meets the BAL-003-1 standard, not to create a complex market mechanism that would unnecessarily compensate performances that may not be needed economically.

D. Question 4

¹¹ See SCE Comments, pp. 2-4; Six Cities Comments, p. 1; SDGE Comments, p. 4.

¹² Fast frequency response is the service a resource, mostly batteries, can provide within a very time period as short as one second after the frequency event.

¹³ Fast regulation is the service a resource can provide around 30 second after the frequency event.

The CAISO seeks stakeholder input on whether load responsive devices can perform with a proportional response or whether load shedding is required at a specific trigger point. The CAISO also seeks input on whether exploration of the concept of stopping non-critical processes for short periods has been evaluated.

ORA contends that the PFR services should be open to all types of resources able to provide the services as defined in ORA's response to Question 2, including but not limited to generation, energy storage, and load. This is consistent with the CAISO's market design principle 2, which aims to "allow all technology types to participate in the procurement mechanism through ensuring there are no barriers to entry."¹⁴

E. Question 5

The CAISO seeks stakeholder input on whether pump storage hydro is pumping rather than generating, then would frequency control devices perform with a proportional response or require shedding load at specific trigger points?

Similar to the response to Question 4, the PFR services should be open to all types of resources that can provide the services as defined in ORA's response to Question 2.

F. Question 6

CAISO seeks stakeholder input on the following statement: "Frequency control services require reserves above operating reserves that are not procured for RA." The CAISO's position is that resource adequacy (RA) or flexible RA capacity procured to ensure resource adequacy for energy deliverability cannot be awarded frequency responsive reserves since these reserves cannot be released by CAISO dispatch to ensure deliverability during peak or ramping needs. Question 6 asks whether stakeholders hold a different belief, and if so, to provide additional information and explanation.

ORA's position is that (1) since the PFR is provided based on autonomous response, there is no need for the CAISO to dispatch PFR resources, (2) the RA resources should be allowed to respond to real time frequency event. Notably, since the need for the response lasts only several minutes, RA resources can ramp down to the preset operating point after the frequency decay is recovered, so the RA resources can be ready for peak load deliverability and ramping, (3) RA resources should not be compensated again for any capacity reserves that are used for providing ancillary services, including PFR, since they are already paid under their RA contracts. Moreover, the CAISO can expect the PFR to be provided from unused generation headroom, as mentioned in ORA's answer to Question 1.

¹⁴ See CAISO, Frequency Response Phase 2 Issue Paper, p. 21 (Dec. 15, 2016).

Instead of paying for the unused generation headroom capacity separately, the CAISO can reflect the cost of the unused generation headroom capacity in its PFR price predetermination. The CAISO's use of this unused generation headroom can be reflected in the contract between CAISO and the participating generators.

III. RECOMMENDATION

In general, ORA recommends that the CAISO gather more data on its PFR shortfall and its ability to provide the PFR shortfall without creating a new market for this service at this time. In addition, the CAISO should wait until the outcome of FERC's proposed rule is known and until the CAISO has determined its existing PFR capabilities. If the CAISO determines that a new market for PFR is needed, ORA recommends the CAISO adopt ORA's approach of paying for PFR services at a predetermined set price.