Stakeholder Comments Template

Flexible Ramping Product Refinements Initiative

This template has been created for submission of stakeholder comments on the revised straw proposal that was published on March 16, 2020. The proposal and other material related to the Flexible Ramping Product Refinements (FRPR) initiative may be found on the ISO website at: http://www.caiso.com/StakeholderProcesses/Flexible-ramping-product-refinements.

Upon completion of this template, please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on April 6, 2020.

Submitted by	Organization	Date Submitted
JK Wang (415-973-5162)	Pacific Gas & Electric	March 25, 2020

Please provide your organization's overall position on the FRPR revised straw proposal:

☐ Support
☒ Support w/ caveats
☐ Oppose
☐ Oppose w/ caveats
☐ No position

PG&E supports CAISO's effort to continue improving the deliverability and effectiveness of FRP. While PG&E appreciates CAISO's goals, we believe that significant additional effort and time is needed to develop an effective proposal. In particular, the technical sections related to pricing, requirements and settlement of nodal FRP procurement will likely require extensive time and revisions.

We believe certain portions of this initiative (e.g. the Proxy Demand Response changes) could move forward in a first phase as they are more fully developed. However, the sections of the FRP proposal which will result in a substantial impact to price formation and settlements should be given more time given the significant impact to CAISO's markets.

We request that CAISO provide further information to address the following concerns:

- Spreading FRP requirement pro-rata over demand nodes may lead to (i) FRP not being deliverable to meet variations arising at VER nodes and (ii) greater FRP surplus than necessary, resulting in reduced reliability and distorted price signals.

- It is not clear that at what level the demand curve is constructed (*i.e.,* nodal or system-wide) and how the FRP surpluses are calculated at the nodal level to ensure FRP deliverability.

- The proposed scaling method may not be able to account for the joint probability distribution among the variables (*i.e.,* wind, solar and demand).

Please provide written comments on each of the revised straw proposal topics listed below:

1. Proxy Demand Response Eligibility**:**

PG&E has no comments at this time.

2. Ramp Management between fifteen-minute market and real-time dispatch**:**

PG&E has no comments at this time.

3. Minimum Flexible Ramping Product Requirement for BAA**:**

PG&E has no comments at this time.

4. Nodal Procurement**:**

PG&E appreciates that CAISO developed a nodal approach for FRP procurement to ensure procured FRP can be delivered to where it is needed. PG&E agrees that a nodal approach would likely improve FRP deliverability, if it is properly formulated.

CAISO must manage the solution time for a nodal FRP model to ensure that markets can be cleared in the time available. We believe that CAISO's draft proposal provides a good start toward managing solution time by limiting the number of deployment scenarios. The current proposal uses two deployment scenarios: one for the 97.5% confidence level of Net Demand (Demand minus VER production) and one for the 2.5% confidence level of Net Demand. More information is required to evaluate whether using two scenarios can model variations across the CAISO BAA and across the BAAs in the EIM Area. In the following, we raise some questions about how FRP requirements and FRP surplus in the two scenarios in the current proposal will be modeled.

How the scenarios are modeled in the market optimization is important. On page 15, Draft Technical Description[1], CAISO states:

> *"In the FRU/FRD deployment scenarios, … the demand forecast is increased/decreased* pro rata *by the FRU/FRD requirements net of the FRU/FRD surplus[2]."*

PG&E has two concerns with this approach and requests further information from CAISO to evaluate the approach:

1. The proposed approach could misallocate FRU/FRD requirements to some locations. We request that CAISO justify its proposal to spread the FRU/FRD requirements *pro-rata* over demand nodes only. PG&E believes that it is necessary to procure FRP from resources that can be delivered to cover uncertainties in both forecasts of demand and forecasts of VER production.

   It should be noticed that the FRU/FRD required to cover uncertainties in VER output occur at the VER generation nodes, not at demand nodes[3]. Under the proposed approach, allocating the part of FRU/FRD requirements arising from uncertainty in VER output to demand nodes pro-rata over demand nodes will not ensure that FRU/FRD procured can be delivered to the locations at which VER uncertainties occur. The proposal to allocate FRP requirements to demand nodes only may be acceptable when uncertainties in demand are sufficiently greater than those in VER output. However, no analysis has been done to support the decision.

   Hence, we request that CAISO compare the magnitude of the uncertainties in VER (wind and solar) with the magnitude of the uncertainties in demand. If the latter is not sufficiently greater than the former, CAISO should consider modifying the approach, which only allocates FRU/FRD requirement pro-rata over demand nodes.

2. The proposed approach may lead to a greater FRU/FRD surplus (shortfall in meeting the FRU/FRD requirement).

   In the following, we will discuss FRU (FRD would be similar). Suppose that there is a single demand node (say node A) that is trapped behind a transmission constraint so that CAISO is not able to procure sufficient FRU from resources that can be delivered to node A to meet the FRU requirement allocated to node A. The

---

[1] Flexible Ramping Product Refinements: Appendix B, Version 1.0, March 16, 2020, http://www.caiso.com/InitiativeDocuments/DraftTechnicalDescription-FlexibleRampingProduct-Procurement-Deployment-Scenarios%20pdf

[2] For clarity, PG&E recaps its understanding of the meaning of surplus in the proposal. *i.e.,* FRU surplus is the amount of FRU requirement that is not met, which is the shortfall in meeting the FRU requirement. Similar for FRD.

[3] The SCUC and SCED optimization models use a linearized power flow model. Consequently, the power flows caused by the base schedules together with a reduction in VER output from the base schedule and deployment of required FRU can be modeled as an additional withdrawal at the VER node and an additional injection at the node where the FRU is located while keeping the base schedules unchanged.

CAISO would not be able to serve the total amount of FRU requirement at node A so the unmet amount would be in the FRU surplus.

CAISO proposes to spread the FRU surplus for the system *pro rata* over the demand nodes. Suppose that CAISO would only be able to deliver FRU to meet 70% of the FRU requirement at node A. That is, the FRU surplus ascribed to node A would have to be 30% of the FRU requirement allocated to node A. Given the proposal to allocate the system-wide FRU surplus *pro rata* to the demand nodes, for the FRU surplus ascribed to node A to be 30% of the FRU requirement ascribed to node A, the total system-wide FRU surplus would have to be 30% of the system-wide FRU requirement. That means that the FRU surplus ascribed to each demand node would have to be 30% of the FRU requirement ascribed to the demand node. This causes two problems:

a. The modeling approach may not procure FRU to meet FRU requirement ascribed to a node even when there is adequate FRU available from resources that could be delivered to the node. It may significantly overstate the shortfall in deliverable FRU.
b. The incorrect FRU surplus may distort the price signal for FRU and for energy.

We suggest that while the FRU/FRD requirement could be allocated *pro rata* over the demand nodes (or demand and VER nodes), CAISO may want to consider modeling the FRU/FRD surplus (shortfall) as an independent variable at each demand node rather than modeling the system-wide FRU/FRD surplus as a variable that is allocated *pro-rata* over the demand nodes. The FRU/FRD surplus should be calculated at each node based on conditions of available supply and transmission.

5. FRP Demand Curve and Scarcity Pricing**:**

The revised straw proposal does not provide sufficient information for PG&E to evaluate the feasibility of the proposed method for calculating the FRU and FRD demand curves and scarcity pricing.

PG&E understands that CAISO's proposal to produce scarcity pricing in steps will improve the accuracy of modeling supply sufficiency. However, it is not clear in the proposal how the demand curves will be built in the nodal approach and when the FRP requirement will be relaxed in the market clearing process. We request that CAISO clarify:

- Whether the demand curves will be constructed for individual nodes. If so, CAISO should provide technical details and justify the feasibility of implementation time.

- Whether the demand curves will be constructed for the system. If so, how will CAISO calculate the cost of shortages at the nodes? Consider a node to which CAISO allocated a share of the system wide FRU/FRD requirement. Will CAISO multiply the system-wide FRU/FRD demand curve by the percentage used to

allocate FRU/FRD requirement to that node to produce an FRU demand curve for the node?

6. Scaling FRP Requirements**:**

PG&E appreciates CAISO's efforts to improve the accuracy of setting FRP requirements. Since the proposed quantile regression approach is also stated in the straw proposal of Day-Ahead Market Enhancements initiative[4] for setting Imbalance Reserves requirements, our concerns mirror those expressed on this topic in our comments on the DAME proposal.

As PG&E understands the proposed regression approach, CAISO will run a quantile regression individually for each component of net demand (demand, wind production, and solar production) to produce the 97.5[th] percentile and 2.5[th] percentile for each component.

In the revised straw proposal, CAISO recognizes that summing the percentiles for the components of net demand will likely incorrectly estimate the 97.5[th] percentile and 2.5[th] percentile of net demand and proposes a scaling approach to correct the estimates.

However, it is still not clear that the proposed scaling method will account for the joint probability distribution among the variables (*i.e.,* wind, solar and demand). We request CAISO to justify the proposed approach with references from existing market practices or academic references.

7. EIM Governing Body Categorization – Advisory Role:

PG&E has no comments at this time.

8. Additional comments:

---

[4] http://www.caiso.com/InitiativeDocuments/StrawProposal-Day-AheadMarketEnhancements.pdf