Stakeholder Comments Template

Submitted by	Company	Date Submitted
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Please use this template to provide your comments on the FRACMOO Phase 2 stakeholder initiative Draft Framework Proposal posted on May 1, 2017.

Submit comments to InitiativeComments@CAISO.com

Comments are due December 13, 2017 by 5:00pm

The Draft Framework Proposal posted on November 20, 2017 and the presentation discussed during the November 29, 2017 stakeholder web conference may be found on the FRACMOO webpage.

Please provide your comments on the Draft Framework Proposal topics listed below and any additional comments you wish to provide using this template.

Identification of ramping and uncertainty needs

The ISO has identified two drivers of flexible capacity needs: General Ramping needs and uncertainty. The ISO also demonstrated how these drivers related to operational needs.

Comments:

The CAISO's identified drivers seem reasonable. NRG has no other comments on this aspect of the framework.

Quantification of the flexible capacity needs

The ISO has provided data regarding observed levels of uncertainty, in addition to previous discussion of net load ramps.

Comments:

The CAISO proposes that its monthly flexible capacity need be defined as the sum of: (1) the maximum projected three-hour net load ramp; (2) the CAISO's maximum monthly spinning reserve requirement (3% of the monthly expected peak load); and (3) 50% of the incremental real-time flexible capacity need related to uncertainty.[1] The CAISO explained at the November 29, 2017 working group meeting that it was proposing to use 50% of the expected real-time uncertainty because, *inter alia*, procuring to a higher number would drive up costs and the consequences of procuring insufficient flexible capacity might be as inconsequential as a Control Performance Standard ("CPS) violation in one or several ten-minute intervals.

The use of some fraction of the uncertainty seems unreasonable, given that the CAISO is not required to ensure it has adequate flexibility to return Area Control Error to zero in every ten-minute interval. Further, an examination of the distribution of day-ahead to FMM error using the data from October 1, 2016 through June 29, 2017 provided by the CAISO suggests that using 50% of that DA-FMM uncertainty provides an uncertainty adjustment that reasonably covers most of that distribution of uncertainty. It is probably reasonable to assume that using 50% of the maximum DA-FMM error would also cover most of the distribution of DA-FMM error across all of the summer peak load months, but having the data from June 30, 2017 through September 30, 2017 would provide a full year's look at the distribution of uncertainty and help confirm that expectation.

Eligibility criteria and must offer obligations

The ISO has outlined the need for three different flexible RA products: Day-ahead load shaping, a 15-minute product, and a 5-minute product. Additionally, the ISO has identified a preliminary list of resources characteristics and attributes that could be considered for resource eligibility to provide each product. Additionally, the ISO is considering new counting rules for VERs that are willing to bid into the ISO markets.

Comments:

Products. The CAISO has proposed three flexibility products:

- A day-ahead "load following" product. Under the current day-ahead market (DAM) structure, with hourly day-ahead schedules, a resource would be able to provide as much of this product as it could ramp across 60-minutes.
- A fifteen-minute product intended to address variability and uncertainty between the DAM and the fifteen-minute market (FMM). Presumably, a resource would be able to provide as much of this product as it could ramp across a fifteen-minute period.

[1] November 20, 2017 *Flexible Resource Adequacy Criteria and Must-Offer Obligation – Phase 2 Draft Flexible Capacity Framework* ("Draft FRACMOO2 Framework") at page 19.

- A five-minute product intended to address variability and uncertainty between the FMM and the five-minute real-time dispatch (RTD). Presumably, a resource would be able to provide as much of this product as it could ramp across a five-minute period.

This proposed three-product framework, which parallels the flexibility framework originally proposed by the CAISO years ago (prior to the adoption of the current simplified flexible capacity framework centered on the three-hour net load ramp), is a reasonable starting point. The different procurement horizons and different product "qualities" will engender interesting discussions about how the procurement targets for these three different products will be determined.

An equally interesting discussion will be how the CAISO will determine whether forward flexibility procurement will be sufficient to provide for the provision of these three products in the operational time frames. Presumably, such an adequacy analysis will need to be done independent of whether forward capacity procurement is done in accordance with these product definitions.

Eligibility to provide each flexibility product - resource characteristics and attributes.

The CAISO has asked market participants to consider several proposed eligibility criteria:

- Minimum and maximum ramp rates
- Start-time
- Cycle time
- Capacity factor
- Start frequency
- Pmin
- Pmin-Pmax ratio

The CAISO's primary need for eligibility criteria to provide flexibility beyond the simple criteria of "how much flexibility does a resource qualify to provide" seems to stem from the concern that taking flexibility from resources that have some significant start-up time means that those resources may not be available to provide flexibility if they are not committed far enough in advance.

Underlying this concern is the problem is that there is little or no value associated with providing flexibility, either on a forward capacity basis or on a spot-market basis. If there was any significant value associated with providing flexibility in either of those time frames, that value should drive rational procurement – either in the far-forward or operation time frames - without the need to add in other eligibility criteria of questionable value. In other words, if the flexibility provided by a resource with a short start-up time was more valuable than the flexibility provided by a resource with a long start-up time, that value would drive procurement of the short-start units. However, currently, there is no difference in the value of the flexibility

provided by either kind of resource, especially in the forward time frame - both have zero incremental value). In the CAISO's markets, the only "value" that differentiates the flexibility provided by the different types of resources is the fact that the long start resource has a cost associated with committing it relative to the short-start unit – so it is not started in the DA market and therefore not available to provide flexibility in real time. If there was some kind of real value associated with the flexibility provided by the long-start unit, the CAISO's optimization could factor in that value (especially relative to the other costs associated with the long-start resource being on-line) and make commitment decisions that would make the long-start unit's flexibility available in real-time.

Unless the CAISO designs and implements a flexibility product that properly values flexibility across all CAISO markets and even across the forward procurement (resource adequacy) time horizon, the CAISO will continue to have to search for somewhat artificial eligibility criteria, like the ones listed above, to deploy in addition to the fundamental "how much can a resource ramp across a given period?" criterion to secure flexibility that better matches the CAISO's operational needs. Given that the once-through cooled fleet will be gone by the end of 2020, and the earliest a new flexibility framework will be in place is 2020, the need to identify and apply other somewhat arbitrary flexibility eligibility criteria apart from the resource's ability to ramp solely to exclude steam turbines from providing flexibility is unclear.

In sum, instead of searching to apply criteria to limit certain resources' ability to provide flexible capacity, the CAISO should be implementing flexibility products that properly value the kind of flexibility that aligns with the CAISO's operational needs.

Counting rules for VERs to provide the flexibility products.

The CAISO asked for stakeholder feedback on two questions:

- How should the ISO determine the EFC for VERs willing to economically bid into the ISO markets? (Note: this may apply to all of the flexible capacity product proposed)

NRG: Inverter-based resources can change output nearly instantaneously, so speed of response will not constrain these resources from providing flexibility. The technical (not commercial, which is another issue entirely) ability of these resources to provide flexibility will be defined by the resource's actual operating level and the resource's achievable operating level. These two things are weather-dependent, and may vary significantly across a given month for the same hour. A forward EFC, then, will have to be defined as the VER's flexibility that it can reliably achieve across that month. A VER may be capable of much more flexibility under ideal weather conditions, but that maximum flexibility cannot be assumed and relied upon except where those weather conditions are actually present. Dynamic EFCs would ideal – but far more complicated.

- What additional studies are needed to ensure that any EFC capacity is deliverable? (Note: this question need not apply only to VERs. The ISO is currently considering a deliverability study for flexible resources. This test could, and probably should, apply to all resources) More specifically, what types of inputs and assumptions would need to be studied to ensure all EFC capacity is deliverable when needed?

NRG: The need to ensure EFC deliverability is not limited to VERs. As with the CAISO's "classic" deliverability studies for RA capacity, the CAISO should conduct power flow analyses to ensure that the CAISO does not procure all of its flexibility in a way that would prevent the CAISO from fully dispatching this flexibility because doing so would exacerbate transmission constraints. Whatever analyses the CAISO is performing to ensure that it can deploy energy from all of its reserves products is where that flexibility deliverability analysis should start. Should those analyses be insufficient, the CAISO and market participants will have to consider a new structure that ensures the CAISO can deploy energy from all resources on which unloaded capacity is being held, whether to provide ancillary service products or flexibility.

Equitable allocation of flexible capacity needs

Equitable allocation of flexible capacity needs is a critical element of a new flexible RA framework. The ISO seeks comments on potential allocation methodologies.

Comments:

At the November 29 working group meeting, the CAISO indicated it was open to considering allocating flexible capacity requirements beyond to load, including, perhaps, to variable generation.

NRG strongly opposes allocating flexible capacity requirements to flexible generation. The procurement of variable resources is driven primarily by state policy goals. If market participants were developing variable resources in response to wholesale market price signals that encouraged and supported the development of such resources, it might be reasonable to consider allocating some of the wholesale integration costs to those variable resources. However, given that the policy-driven proliferation of variable resources is having just the opposite effect, namely, to undermine wholesale market prices, it is clear that policy decisions, not the response of market participants to economic signals, are driving the growing need for flexibility. Inasmuch as the driver for the proliferation of variable resources is state policy, the costs associated with this procurement should be allocated in a manner to those that are deriving the benefits from the underlying state policy (e.g., to load).

That said, causation should be a factor in allocating procurement targets to load. For example, if an LSE procured VERs in a way to exacerbate the need for flexibility or for a particular type of

flexibility, that LSE should be allocated a larger share of the flexibility procurement requirement – or cost.

In sum, the CAISO's current allocation method – which allocates flexible requirements to load and considers how the composition of an LSE's portfolio affects the overall flexibility requirement – is sound, and NRG does not propose a different structure.

Other

Please provide and comments not addressed above, including any comments on process or scope of the FRACMOO2 initiative, here.

Comments:

The CAISO notes (11/29 presentation at slide 8) that "recent intertie declines" are driving the CAISO to explore complementary market design changes in addition considering the draft flexible capacity framework offered in this initiative. To allow market participants to understand the nature and seriousness of this concern, NRG requests that the CAISO provide additional information with regards to these intertie declines at the December 18 Market Performance and Planning Forum.