

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 Supplemental Issue Paper posted on November 9.

Submit comments to InitiativeComments@CAISO.com

Comments are due January 6, 2017 by 5:00pm

The Supplemental Issue Paper posted on November 9 and the presentation discussed during the December 9 stakeholder web conference may be found on the [FRACMOO](#) webpage.

Please provide your comments on the Supplemental Issue Paper topics listed below and any additional comments you wish to provide using this template.

Identified opportunity for enhancing flexible capacity product

1. Ramping speed
 - a. Large single hour net load ramps

Comments:

Energy Division staff believes that additional analysis is needed before the current flexible capacity product is revised. While this section is entitled “insufficient ramping speed,” there is no data that demonstrates that the existing fleet of installed resources, RA resources, or flexible RA resources is *insufficient* to meet the one hour ramp now and in the future. CAISO’s analysis only demonstrates that the flexible RA fleet is not composed of the most flexible resources.

Before concluding that existing resources are insufficient, Energy Division staff recommends that CAISO examine the one-hour ramping speed of the existing fleet of installed resources, RA resources, and flexible RA resources. Energy Division staff's preliminary analysis indicates that the one hour ramping capability is 29,000 MW for the existing fleet of resources, 26,000 MW for the RA fleet (for the month of November 2016), and 11,040 MW for the flexible fleet (again for the month of November 2016). Based on this analysis, it does not appear that the existing fleet of resources, RA resources, or flex RA resources has insufficient ramping speed to meet one hour needs now or in the future. In addition, it is useful to consider that a fleet of 10,000 MW of resources with an average ramp rate of only 5 MW/minute could increase output by 3,000 MW in an hour and the same fleet with an average ramp rate of 10 MW/minute could increase output by 6,000 MW in an hour. Therefore, slower ramping resources can play a role in meeting an expected 7,000 MW one-hour ramp.

Additionally, in its supplemental issue paper, CAISO indicates that if it commits slow ramping resources that "these dispatches will result in either over-supply or frequent and voluminous wind and solar curtailment" and that "the best way to mitigate reliability risks and wide-spread renewable curtailment is to ensure that the ISO can utilize resources that can ramp quickly." Energy Division staff notes that 1) having a fleet of fast-ramping flexible RA resource does not necessarily prevent renewable curtailment (if, for example, non RA resources self-schedule), 2) the CAISO system has not yet experienced frequent and voluminous wind and solar curtailment, 3) bidding by wind and solar resources can resolve this issue economically, and 4) as negative pricing shows up in the day-ahead market, imports and self-scheduled resources will have a strong incentive to not provide power. Energy Division staff recommends further analysis regarding the constraints imposed by one hour ramping needs, before limiting the types of resources that can provide flexible capacity.

Finally, Figure 2 presents the monthly one- and three-hour ramps for 2015 – 2019. Energy Division staff requests that CAISO post the forward looking data behind these graphs (i.e., 2018 and 2019) to its website, consistent with past practice of posting results of flexibly capacity studies.

b. The transition from low net loads to steep ramps

Comments:

Additional data analysis regarding low net loads would be helpful. Energy Division staff examined the minimum net loads for 2019 on a monthly basis, and while minimum net loads approach the 4,500 MW shown in Figure 3 in CAISO's paper in April, they are in the 13,000 MW range in some summer and winter months. It would be helpful to examine the monthly variations in minimum net loads and examine whether it makes sense to design the flexible capacity product to address issues that occur in only a subset of months and for which other

solutions may arise (e.g., bidding by variable resources and/or imports, negative prices in the day-ahead market, EIM integration, etc.). It would also be helpful to more fully understand the data and assumptions used for the 2019 and 2021 studies, therefore Energy Division staff reiterates the request for CAISO to post the data and analysis behind this figure.

c. Intra-hour variability

Comments:

With respect to intra-hour variability, it would be helpful to understand why meeting such operational needs cannot be sufficiently addressed using ancillary services and the flexible ramp product. Further, understanding why market products are not, or may not in the future, be capable of reliably managing the operational needs created by intra-hour variability would provide valuable fact-driven insight into what characteristics may be needed in a durable flexible capacity product. It would also be helpful to understand to what extent CAISO believes that this intra-hour variability is not currently being addressed and how changing the flexible capacity product could address this need.

2. Cycle time and flexible capacity qualifications

Comments:

Energy Division staff has no comment on this issue at this time, but looks forward to examining CAISO's proposal in this area.

3. High minimum operating levels from both RA and flexible RA

Comments:

Energy Division staff has no comment on this issue at this time, but looks forward to examining CAISO's proposal in this area.

4. Most significant net load ramps occur on weekends or holiday weekdays

Comments:

From CAISO and DMM analyses, Energy Division staff understands that some of the CAISO's largest net load ramps occur on weekends and holidays. To address this issue, the CAISO indicates that it "will consider changing Category Three Flexible Capacity to seven days a week, similar to Categories One and Two."

Energy Division staff notes that LSEs have, thus far, shown few Flexible Category Three resources and it seems unlikely that changing the bidding hours will provide much in the way of additional flexible resources on weekends and holidays. Based on Energy Division staff analysis, the maximum capacity shown in Flexible Category Three never exceeded 250 MW for CPUC jurisdictional LSEs in 2016 and was 0 for the last three months of 2016. Thus, Energy Division staff recommends that CAISO should not focus resources on changing MOO requirements for Category Three resources at this time, but instead should monitor this issue while allowing LSEs to continue using demand response and other typical Category Three resources to meet a limited amount of flexible capacity requirements.

5. Significant quantities of long start resources may limit the ISO's ability to address real-time flexibility needs

Comments:

While there are long start resources providing flexible capacity at the moment, this is a problem that will correct itself over the next few years as the once through cooling units retire. Key retirement compliance dates include Encina by 2018, and Alamitos, Huntington Beach units and Redondo Beach by 2021. Given these expected retirements over the next five years, CPUC staff questions the need to change flexible requirements to address a short-term issue particularly since there is no indication that there is a lack of flexible resources bidding into the real-time market. Additionally, when designing a future product, it is important that we include any additional authorized new generation in the flexible resource portfolio.

Energy Division staff notes that much of the net load ramp is predictable and that both long-start and fast-ramping resources can address the predictable portion of the ramp. In addition, Energy Division staff acknowledges that CAISO will also have real-time flexibility needs, but cautions that these real-time needs should not drive the overall requirement (i.e., because the system needs fast response resources in the real-time, it does not follow that all flexible capacity resources should be fast-ramping).

To further address this issue, Energy Division staff recommends that CAISO identify its real-time needs and explain why these needs are not currently met through existing market mechanisms (e.g., through price signals in the energy and/or the ancillary services market or through the flexible ramp product). Energy Division staff also recommends that CAISO identify indicators that illustrate that the system has insufficient real-time flexibility (e.g., insufficient upward ramping capacity) and whether this is or has been increasing over time.

6. There is currently no means in place for the ISO to assess the likelihood that the flexible RA showings will adequately meet all ramping needs

Comments:

Energy Division staff has no comment on this issue at this time.

Other comments

Please provide any additional comments not associated with the topics above.

Comments:

Cost Causation Methodology

The issue paper mentions a proposal to allocate negative flexible capacity obligations. However, before this could happen, problems with the allocation methodology should be corrected. CAISO's current cost-causation methodology is problematic in part because it uses the average of percentages, which results in allocations that are not consistent with an overall assessment of need.

Energy Division staff developed the following example to illustrate the issue, which was presented at the Energy Division's November 9, 2016 workshop.

Figure 1. Example of Averaging Percentages

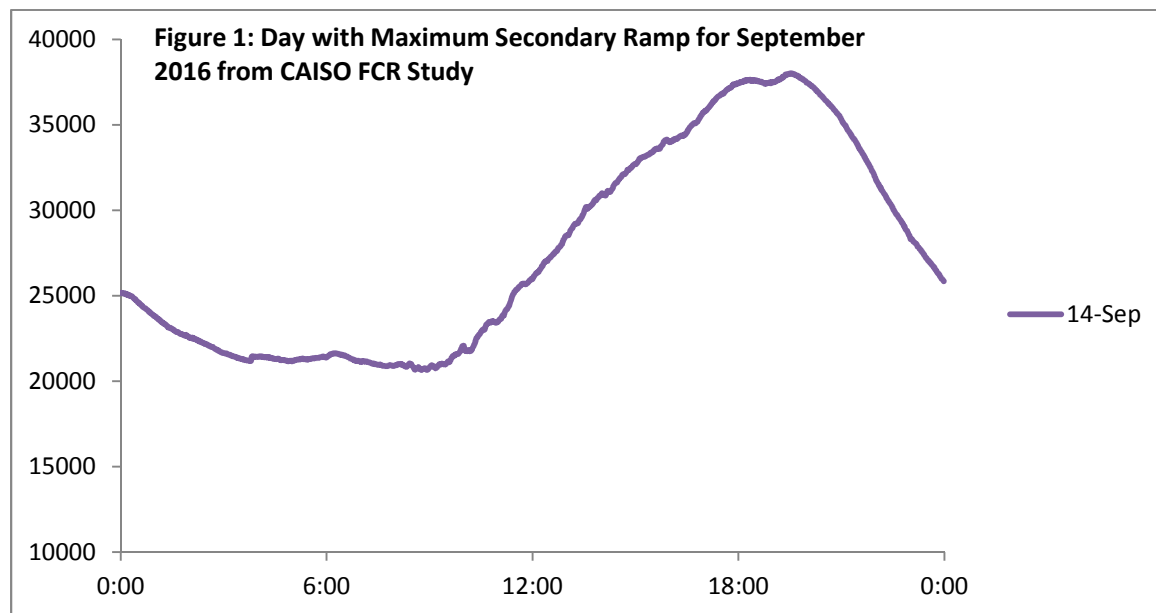
Top Net Load Ramps	LSE1	LSE2	LSE3	Total Ramp		Top Net Load Ramps	LSE1	LSE2	LSE3	Total Ramp
1	-40	50	0	10		1	-40	70	-20	10
2	25	50	25	100		2	25	50	25	100
3	25	10	5	40		3	25	10	5	40
				150		Total	10	130	10	150
						Percentage	7%	87%	7%	100%
1	-400%	500%	0%	100%						
2	25%	50%	25%	100%						
3	63%	25%	13%	100%						
Average	-104%	192%	13%							
Allocation	-156.25	287.5	18.75	150						

As this example illustrates, averaging the percentages can result in an over or under allocation of flexible needs, especially if an LSE has a large ramp compared to the total ramp or has load that moves in the opposite direction of the total ramp. For example, LSE1 in the above illustration (left side) would receive a negative allocation while LSE2 would receive a very high allocation because the LSEs' loads are not moving in the same direction during all ramps. A fairer allocation, would allocate based on the sum of the LSE's ramps (right side). Until the

CAISO corrects its cost causation methodology and ensures an appropriate allocation among LRAs and LSEs, negative obligations should not be allocated.

Category 1 Start Requirements

Category 1 resources are required to have two starts per day available and to bid into the CAISO market 17 hours per day, every day of the week. The need for Category 1 resources is determined by the largest secondary net load ramp of the month. However, in summer, the net load curve has only one long ramp as demonstrated in the figure below. Requiring resources to have two starts on a day without two distinct net load peaks is unnecessary in summer months and CPUC staff recommends that this requirement be removed and/or reconsidered.



Flexible Ramp Product (FRP)

Energy Division staff recommends that the FRACMOO paper discuss the performance of the flexible ramp product and any potential implications for considerations regarding design of a durable flexible capacity product. For example, CAISO discussed FRP performance at the Market Performance and Planning Forum, and presented data showing that FRP awarded prices that were higher for the morning ramp in the CAISO area and were substantially higher in non-CAISO jurisdictional areas. It would be helpful to understand why prices would be higher in the morning than during the steep afternoon ramps and in other states given the high penetration of renewables in CAISO's current footprint and the expected concomitant forecast error.