

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.

As indicated in numerous comments on the December 9th call to discuss the supplemental issue paper as well as the November 9th CPUC workshop on flexible RA, it is difficult to assess potential changes to flexible RA without a more thorough understanding of how operational flexibility challenges are actually managed in operations. For example, what types of resources are used to manage large and/or rapid ramps? Are the resources used to manage operational flexibility challenges generally procured and shown as flexible or generic RA? To what extent are specific resource attributes that are helpful for managing operational flexibility challenges rewarded by energy and AS markets?¹ In what circumstances have shortages of operationally

¹ Data from CAISO Market Planning and Performance meetings continue to suggest that the majority of Bid Cost-Recovery results from real-time operations, indicating that energy and AS prices may not sufficiently compensate the resources on which the CAISO relies in real-time. For example, see slide 65 of http://www.caiso.com/Documents/Agenda-Presentation-MarketPerformance-PlanningForum-Dec7_2016.pdf.

flexible resources led to Exceptional Dispatch and/or CPS1 or other specific reliability violations?

As a first step into gaining some insight into some of these issues, Calpine recommends detailed and public post mortems of a few recent historical days with large operational challenges of the types highlighted in the supplemental issue paper, e.g., days with large or particularly rapid ramps, days with sharp ramps out of the “belly of the duck,” days with a lot of intra-hour variability in net load, etc.

Throughout both FRACMOO stakeholder initiatives, the CAISO has characterized thoroughly the impact of increasing penetrations of renewables on net load shapes. At this juncture, Calpine believes that it would be helpful to take a closer look at how these changes impact actual operations. To that end, Calpine recommends that the CAISO develop figures and supporting data similar to the following for a few historical days.

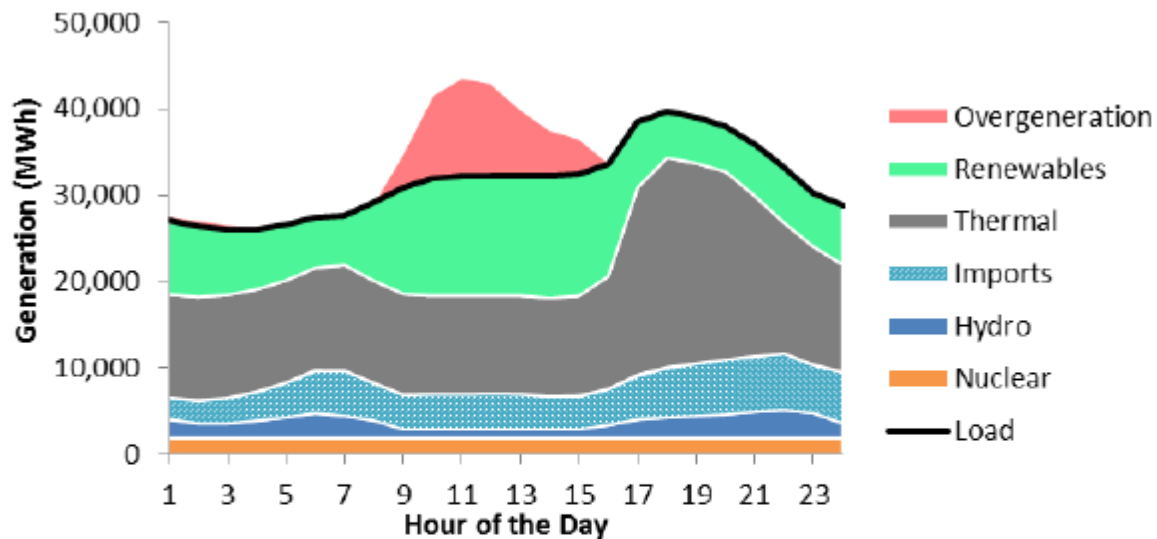


Figure 15: Generation mix on an example 50% RPS 2030 day with low cost renewable curtailment, resulting in significant amounts of thermal generation online during the middle of the day and high overgeneration

(https://ethree.com/documents/E3_Final_RPS_Report_2014_01_06_with_appendices.pdf)

Such figures should differentiate between different types of thermal generation including CTs, CCGTs, and steam units. For example, the figures might illustrate that the CAISO relies on CTs to meet sharp ramps as the sun goes down or the Pmin burden associated with CCGTs that are committed through the “belly of the duck” to meet ramps along the “neck of the duck.” In the supporting data, it might be helpful to provide unit level generation data (without identifying specific units) so that unit starts can be identified. In addition, the data should show which

resource or classes of resources are providing ancillary services including regulation. To the extent that renewable curtailment was observed on the historical days, the data should identify the volume of curtailments that were effected through economic bids versus uneconomic curtailment. In addition, daily profiles broken down by RA class, i.e., generic RA, flexible RA, non-RA, might also illustrate the extent to which procurement according to current RA product definitions actually meets the CAISO's operational flexibility requirements. Finally, the timing of any CPS 1 or other reliability violations should be clearly identified in supporting data.

In the absence of such information, notwithstanding the substantial analysis that the CAISO has marshalled to demonstrate that operational flexibility challenges are increasing, it is difficult to assess in what ways current procurement practices and market/RA rules might be failing to provide the CAISO with adequately flexible resources. The following comments primarily address the specific questions that might be addressed by additional analysis focused on the specific elements of the supplemental issue paper.

Identified opportunity for enhancing flexible capacity product

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

Comments:

Has insufficient 1-hour ramping speed of the RA fleet led to specific reliability problems that could not be addressed by committing additional resources and/or limiting ramps by curtailing renewables? What resources have been used to meet large single hour ramps? Have these resources been procured and shown as flexible or generic RA?

With respect to the analysis in the supplemental issue paper of the ramping speed of the RA fleet, Calpine shares the concerns expressed by SDG&E during the December 9th call about Figure 1 of the issue paper, i.e., that in failing to normalize by unit size, the figure provides a confusing representation of the flexibility of different resources, i.e., it might place a 300 MW steam unit and a 100 MW CT that both ramp at 10 MW/min in the same speed bin, even though most would consider the later significantly more flexible. It might be more helpful to produce a version of Figure 1 that groups resources by speed as a percentage of capacity.

- b. The transition from low net loads to steep ramps

Comments:

What resources are currently used to meet these ramps? Would there be significant improvements in reliability and/or reductions in renewable curtailments if the CAISO could

meet these ramps with resources with lower Pmins and/or faster start times than the resources that are currently being used to meet these ramps? Could fewer resources dispatched into their optimal ramping range better meet the needs of the fast transition as opposed to many slow-ramping resources dispatched at Pmin? Are the resources that are currently being used to meet these ramps procured and shown as flexible or generic RA?

c. Intra-hour variability

Comments:

In actual operations, is the CAISO exhausting resources capable of addressing intra-hour variability? What resources is the CAISO using to address intra-hour variability? Are the resources that are currently being used to address intra-hour variability generic or flexible RA resources? Could the CAISO have more resources available in real-time to address intra-hour variability by committing resources in the day-ahead time frame? Would committing additional resources require changes to CAISO energy and ancillary service markets? To what extent does the CAISO rely on regulation to address intra-hour variability? What types of resources provide regulation? Are resources that provide regulation typically procured and shown as generic or flexible RA?

2. Cycle time and flexible capacity qualifications

Comments:

Calpine supports the accurate representation of limitations associated with cycle times in flexible RA rules. Calpine has two main concerns about how cycle time limitations are treated under current rules: First, the current rules allow relatively inflexible resources to meet less rigorous performance requirements, i.e., under current rules, if a resource cannot start twice in a day due to cycle time limitations, then it need not. Calpine believes that resources should be subject to relatively uniform performance requirements, e.g., maybe all flexible RA resources should be capable to starting twice per day. Second, Calpine believes that in relying on cold start times to determine whether the Pmin block of a resource is flexible, the current flexible RA rules do not reflect how resources are actually operated. For example, as Calpine previously has documented, Calpine's CCGTs rarely start cold.²

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

Comments:

² <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M064/K207/64207304.PDF>

How do high minimum operating levels constrain operations? Can the CAISO document specific instances in which it has curtailed renewables to keep gas-fired generation on-line in order to provide ancillary services or to meet later ramps? In overgeneration conditions, what are the relative magnitudes of minimum load generation from gas-fired generation and self-schedules, including self-scheduled imports. Is there a particular start time threshold at which high minimum operating levels no longer meaningfully constrain operations, e.g., many peakers have high minimum operating levels, but because they can be started quickly, they do not generally need to operate for long periods when they might not be needed/economic in order to be available when they are needed/economic? Is the CAISO convinced that the current 90-minute threshold for determining whether or not a resource's Pmin block is flexible appropriately captures whether or not a resource's Pmin block may impose a "Pmin burden"? To what extent are high minimum generation levels attributable to local reliability constraints. Could high minimum generation levels attributable to local reliability constraints be reduced if local reliability constraints were addressed with different types of resources?

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

Comments:

It seems reasonable to modify the flexible RA must-offer obligation to ensure that flexible RA resources are generally available and offering into CAISO markets when the largest ramps are likely to occur.

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

Comments:

To what extent has the CAISO had insufficient operationally flexible resources in real-time due to the failure to commit long-start units? Could the CAISO address any such insufficiencies by committing more resources or introducing new spot market products, such as a day-ahead Flexi-Ramp product?

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:

As indicated above, Calpine believes that a detailed analysis of how the CAISO actually uses resources to manage the operational challenges associated with large net load ramps could shed light on potential changes to the flexible RA product definition. Such analysis might include ex post analysis of days with big or particularly difficult net load ramps. It might also

include simulations that realistically reflect CAISO operations, i.e., either production cost simulations or simulations in some version of the CAISO’s market software.

Other comments

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

Comments:

[insert comments here]