Submitted By	Company	Date Submitted
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Responses to CAISO Questions

How should the ISO ensure there is sufficient frequency response capability on the system in all hours to satisfy the new requirement?

First, the CAISO should analyze its past frequency response performance (e.g., including the 25-event 2013 performance shown on page 11 of the Frequency Response Issue Paper) to (1) identify why it was able to meet its frequency response obligation for some events but not for others, and (2) based on that analysis, project what will be needed in order to comply with BAL-003.

After the CAISO and market participants understand what is needed for the CAISO to comply with BAL-003, the CAISO and its market participants should collectively and collaboratively work to develop a market framework that will enable the CAISO to comply with BAL-003.

Should the ISO develop a market product to procure frequency response?

Yes. Consistent with its *raison d'être*, the CAISO should always look to create a market product to procure the reliability services needed to operate the bulk power systems under its operational control. Where a particular service does not allow for the creation of a competitive market product, the CAISO should still seek to create uniform, non-discriminatory compensation for that service.

If the ISO cannot develop a product in time for the fall 2016 release, what interim solution would be appropriate? For example, using existing or modifying spinning reserve procurement.

The CAISO's suggestion that it purchase additional spinning reserve to ensure adequate frequency response performance is an interesting one, and likely the best option available to it as an interim measure. However, it is not clear that buying more spinning reserve headroom on the same number of synchronous machines will necessarily increase the amount of needed frequency response. Should it be deemed necessary to increase unit commitment to obtain the needed amount of frequency response, NRG expects that the CAISO would commit those additional units through mechanisms that would clearly signal through market prices the need for that additional capacity rather than obtaining that additional capacity either through extra-market mechanisms (exceptional dispatch) or through market mechanisms that do not convey meaningful price signals (e.g., minimum online commitment constraints).

If the CAISO considers changes to governor droop settings, it should thoroughly vet any contemplated changes with its market participants prior to proposing or implementing such changes.

Whatever frequency response interim solution is selected, the CAISO must account for and appropriately compensate the generator response that makes up the frequency response.

WECC standards apply only to synchronous generators. Should the ISO explore a requirement that non-synchronous generators have primary frequency response capability?

NRG does not object to the CAISO exploring such a requirement, as long as that requirement does not become the default mechanism through which the CAISO would obtain the necessary frequency response. As noted by NREL, asynchronous machines, properly configured and dispatched, can be an effective source of frequency response,[1] though, for example, either significant shifts in the commercial contracting structures or a market product that appropriately covers opportunity cost for such resources would be required to facilitate the provision of frequency response from solar resources. Energy storage seems ideally suited to provide frequency response, but, as with other inverter-based resources, doing so will require commercial and market structures that compensate storage resources both for holding headroom to provide this response and for the response itself.

[1] See Section 7.2 of NREL's Western Wind Western Wind and Solar Integration Study Phase 3 – Frequency Response and Transient Stability, available at http://www.nrel.gov/docs/fy15osti/62906.pdf.