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Submitted to the CAISO at initiativecomments@CAISO.com by Shannon Eddy (Executive Director) and Susan Schneider (Consultant)

RE: Comments of the Large-scale Solar Association on Frequency Response Phase 2 – Issue Paper

The Large-scale Solar Association (LSA) hereby submits these comments on the CAISO's December 15th document, Frequency Response Phase 2 – Issue Paper (Paper), and the discussion on the December 22nd stakeholder conference call to discuss the Proposal. LSA's comments are summarized below and discussed in more detail in the remainder of this document.

Summary of LSA comments

- **LSA generally supports the findings in the Paper and the CAISO's general approach**, specifically that
  - The CAISO should pursue development of additional Primary Frequency Response (PFR) capability within its own area.
  - Solar generators (and other technologies) can provide PFR capability with modern inverters, controls, and related equipment.
  - PFR capability and provision by solar generators requires consideration of compensation issues.
- **The CAISO should provide additional information to stakeholders that would help the current process**, e.g., estimates of future PFR deficits and information from the CAISO about Transferred Frequency Response (TFR) bids and costs.
- **LSA recommends that the CAISO do the following** (pending receipt of the information from the above request and further discussions in this initiative):
  - **Rely first on a market approach** – e.g., defining and implementing a bid-based, voluntary competitive market approach for PFR acquisition, similar to those for Ancillary Services – before imposing any mandatory requirements.
  - **Implement any new mandatory requirements in the least disruptive manner.** In particular, the CAISO should follow FERC's proposed policy to impose any new interconnection rules only on generation projects requiring a new Interconnection Request (IR).

<u>The CAISO should pursue development of additional PFR in its own area.</u>

There is no guarantee that other Balancing Authorities (BAs) will have extra PFR to sell in the future. In addition, limiting the market to the few potential sellers at that level could result in higher prices even if the service is available from other BAs.

Finally, the Paper indicates that CAISO FPR capability is already inadequate, and that development of additional in-area capability will require additional capital investment, which in turn requires some degree of lead time. Thus, the CAISO should start soon to send market signals (and, if necessary, adopt new requirements) to obtain the needed capability.

Solar generators (and other technologies) can provide PFR. However, PFR capability <u>and provision by solar generators requires consideration of compensation issues.</u>

LSA agrees that solar and wind generators can provide PFR capability with modern inverters, and related equipment. In other words, there is no technical reason why such resources should not be considered a potential part of the solution. However, as the Paper indicates, PFR provision would entail both additional capital and opportunity costs, specifically (for solar resources):

- **<u>Capital costs:</u>** As the Paper indicates, PFR provision by solar resources will require enhanced inverters and additional control equipment. (This is a primary reason that the CAISO should be especially wary of imposing any requirements on existing resources, which could not recover such costs under current market arrangements.)

- **<u>Operating costs:</u>** **A**s the Paper indicates, the need for "headroom" (holding output below otherwise achievable levels) to enable PFR response creates economic issues, i.e.,

  - **Less-efficient operation**, e.g., operating at reduced/increased DC voltage than optimal DC operation voltage (VMPPT), which would reduce power output; and

  - **Lower production**, i.e., opportunity costs of not selling as much power as possible.

This loss of output is a particular concern to intermittent-resource owners, since (as LSA has pointed out before) such resources are only paid for actual production under most Power-Purchase Agreements (PPAs); so, for example, reducing output by 5% to create "headroom" for PFR provision could reduce revenues to these resources by the same percentage. (A bid-based approach could reduce the economic impact, since most output reductions based on off-taker bids are compensated under most PPAs.)

The Paper states that these factors "drive a need to compensate" intermittent resources "for the capital expenses, operating expenses, and opportunity costs…" LSA agrees.

<u>The CAISO should provide additional information to stakeholders.</u>

Development of a plan of action in this initiative could benefit from additional information from the CAISO – specifically, about the following:

- **<u>The expected scope of the problem.</u>** PFR shortfalls to date seem to be relatively small, and it is not clear whether establishment of a competitive market would be worthwhile to cover such small requirements. The CAISO should use its information on expected conventional generation retirements to forecast future PFR needs.

- **TFR experience to date:** Bid submission information (entities bidding, amounts, and bid prices), bid selection information (selected vendor(s), price, other contract terms), and expected costs under the contracted arrangements.
- **Cost comparison:** Comparison of options, e.g., TFR costs vs. additional CAISO Ancillary Services costs for Regulation/Spinning Reserve or Exceptional Dispatch (to provide "headroom") vs. cost of equipment and operation under mandatory standards.

LSA notes that there was considerable resistance to the initial CAISO proposals in Phase 1 to using existing Ancillary Services procurement tools to provide PFR. However, if the requirements are expected to be small, reliance on these existing mechanisms might be both feasible and cost-effective.

There is no reason to remove any technically feasible options from consideration at this early stage in the Phase 2 process, and all of them – continued TFR procurement, establishment of a new competitive PFR market, use of existing market tools, and even mandatory standards – should be assessed in this initiative. The ultimate selection (standalone or mix of actions) should depending on the best available information about the scope of the problem and the relative costs (and other factors) of the potential solutions.

As a related matter, LSA notes that the proposed Phase 2 schedule calls for a CAISO Board decision in September 2017. This initiative should thus include consideration of a transitional strategy for the period following expiration of the current TFR arrangements, e.g., information from the CAISO about the lead time needed to implement other options.

Reliance on market approaches

As a market operator, the CAISO should seek to use voluntary, market-based approaches to resolve reliability problems wherever feasible and cost-effective, and to avoid disrupting existing market arrangements.

Mandatory standards should be a last resort and, as FERC has recognized, should be imposed only on a going-forward basis unless that approach will be insufficient to address the problem (hence, as noted above, the need for more information about the future expected extent of the PFR problem). Any imposition of mandatory standards on existing market arrangements or facilities should include additional compensation for the additional capital and/or operating costs to those affected – the CAISO should not avoid this issue by, for example, assuming that existing contracts can simply be renegotiated.