



October 27, 2015

To: CAISO at InitiativeComments@caiso.com

From: Rachel Gold (Policy Director) and Susan Schneider (Consultant) for LSA

RE: Comments of the Large-scale Solar Association on Reactive Power & Financial Compensation – Revised Straw Proposal

The Large-scale Solar Association (LSA) appreciates the opportunity to comment on the CAISO's October 8, 2015 document, Reactive Power & Financial Compensation – Revised Straw Proposal (Proposal), and the discussion of the Paper on an October 15 stakeholder conference call. LSA's comments her focus on specific technical issues, and on positive suggestions intended to ease implementation of the CAISO's proposed requirements. They do not address LSA's concerns – stated in its last comments – with the CAISO's determination of these requirements or the efficiency of this approach.

Specifically, LSA recommends that the CAISO include the clarifications and modifications listed below, and described in more detail in the rest of this document, in the next Proposal version.

- **Retain the current proposed Effective Date**, which would implement the new requirements with Cluster 9, and clarify that timeline for Independent Study Projects (ISPs) and Fast-Track Projects (FTPs).
- **Clarify/modify compliance options on the generator side of the Point of Interconnection.**
 - Incorporate collective compliance options into the regular interconnection-study process.
 - Clarify that compliance at locations before the POI are the option of the developer, as long as compensation to the POI is verified.
 - Allow asynchronous generators the option to meet the power-factor requirements applicable to either synchronous or asynchronous generators.
- **Clarify/modify compliance options on the PTO side of the POI**
 - Consider investments at the PTO substation or beyond in the regular interconnection-study process, for individual projects or on a collective basis.
 - Clarify that the TPP will consider PTO investments in situations where some resources with a common POI are required to meet the standards but others are not.

- **Modify the Provision Payment opportunity-cost payment provisions**, to: (1) base opportunity-cost compensation when resources are dispatched outside the required range on Power Purchase Agreement (PPA) payments; and (2) provide that the payments are made directly to the generators, instead of their Scheduling Coordinators (SCs).
- **Clarify that solar resources that are operating at low or zero levels do not have any obligation to provide reactive support beyond the proposed requirements**, even under the proposed new Exceptional Dispatch provisions.

Effective Date

LSA fully supports the CAISO proposal to begin the new requirements with Cluster 9. It is important to generators that CAISO provides clear and definitive start and end times to its old and new policies, so that no projects are left in limbo between two standards.

The CAISO should further clarify that: (1) the effective date would be April 30, 2016 (Cluster 9 application window close); and (2) the new requirements would also apply to any Independent Study Process (ISP) or Fast Track (FT) Interconnection Requests (IRs) submitted after that date.

The CAISO should not impose the new requirements on earlier-queued projects where GIAs were not tendered or “substantially negotiated” before the rules are effective, or where the project has not yet been awarded a PPA, as suggested by the SDG&E. By the time the GIA is tendered or substantially negotiated, the developer may have already bid the project. The project could be short-listed, or the PPA could be under negotiation, even if a PPA has not yet been awarded or executed. Changing requirements mid-stream would be extremely disruptive to the development process.

Moreover, there are serious process issues with imposing requirements retroactively, and the CAISO has not demonstrated the urgent need to justify such retroactive applicability. The CAISO’s response to SDG&E on the most recent call indicates that the CAISO does not anticipate such needs.

Any concerns that there might not be enough generation subject to the new requirements to meet CAISO needs should be addressed through incentives for voluntary compliance and not expansion of mandatory standard applicability. With capability payments to cover incremental compliance costs, additional reactive capability could be provided by: (1) existing or new generators subject to requirements that could provide more than the minimum capability; or (2) existing generators that were not required to meet requirements but would be willing to do so. The CAISO has ruled out these options in response to LSA’s suggestions, another indication that additional capability is not needed.

Option to meet the new standards at alternative locations

LSA’s comments on the Straw Proposal requested details on how generators could join together to comply with the new requirements, since that document included that ability without describing such details. The Proposal provides some clarifications; LSA appreciates them but, with all due respect, requests additional information, as described below.

- **Options on the generator side of the POI:** The CAISO should revise the Proposal to:

- **Incorporate collective compliance options into the regular interconnection-study process.** The Proposal says that the CAISO might identify such opportunities before the POI if it “observes” that several generators in a cluster study have the same POI. The CAISO should clearly know whether such generators in the same cluster have the same POI, so such options should be considered in all studies as appropriate.
- **Clarify that compliance at locations before the POI are the option of the developer.** The Proposal states that generators can meet the standards at locations behind the POI as long as there is compensation to the POI. The CAISO clarified on the most recent stakeholder call that this option will be available to developers, subject only to verification that the required support will be provided at the POI, i.e., case-by-case CAISO/PTO approval is not required. LSA asks that this important point be included in the next proposal version.
- **Allow asynchronous generators the option to meet the power-factor requirements applicable to either synchronous or asynchronous generators.** There was a fairly extensive discussion on the last conference call between LSA, CalWEA, and the CAISO about the continuing difference between the different (though “equivalent”) power-factor requirements for synchronous and asynchronous generators. The synchronous generator standard has a wider power-factor range (more stringent requirement), but the requirement can be met at the generator terminals, with no compensation to the POI required.

LSA agrees that the asynchronous-generator power-factor requirement would probably be easier for most asynchronous generators to meet; however, some might find the synchronous-generator requirement more optimal. Allowing asynchronous generators the option to meet either requirement would address some difficulties that asynchronous generators may encounter in complying with the new standards, e.g., the much-discussed situation with projects having long gen-ties (harder to compensate to the POI), which are more common for asynchronous generators (more likely to locate in remote areas). Asynchronous generators should not have to meet higher effective standards than synchronous generators would at the same location.

- **Options on the PTO side of the POI:** The CAISO should revise the Proposal to:

- **Consider investments at the PTO substation or beyond in the regular interconnection-study process, for individual projects or on a collective basis.** CalWEA asked the CAISO on the most recent conference call if generators could have the option to fund equipment on the PTO side of the interconnection (e.g., at the PTO substation) to allow the generator to meet the requirements.

The equipment would be under CAISO/PTO control and could be operated whenever those entities deem necessary (not only when needed for the specific generator to meet the requirements). While there could be impediments (e.g., lack of room at the substation), this option would also help generators with long gen-ties (see above). The CAISO said on the call that it would consider including this option, where the arrangement can be worked out between the developer and the PTO.

SDG&E suggested that developers indicate their interest in such arrangements at the interconnection Scoping Meeting (or otherwise as early as possible in the study process), so the arrangement can be examined and assessed in the interconnection studies and included in the GIA. However, LSA believes that this option should instead be a regular consideration in the interconnection-study process, and not considered only if the developer states an interest. These studies should identify the most cost-effective interconnection methods, and it should be possible to include this analysis without impacting the study timelines.

- **Clarify that the TPP will consider PTO investments in situations where some resources with a common POI are required to meet the standards but others are not.** On the most recent conference call, the CAISO said that it also might consider PTO investment beyond the POI in the TPP or curtail generators without reactive capability in such situations. The CAISO should consider these situations routinely in the TPP and, where PTO-level investments would be cost-effective or otherwise desirable, approve such investments.

Provision Payment design and process

LSA requests that the CAISO reconsider its position in the Proposal that it will continue to base Provision Payments under the tariff on Locational Marginal Prices (LMPs), where a unit is dispatched to provide reactive power/voltage support outside the required range and must reduce real-power production to comply. Instead, Provision Payments should be based on PPA compensation, and the compensation should be paid directly to the generators, instead of their SCs.

CAISO Tariff Section 11.10.14 states that Voltage Support Provision Payments would be the “opportunity costs” of limiting MWh output to enable reactive power production in response to a CAISO instruction. This opportunity cost is based on market Energy prices, specifically:

$$\text{Opportunity Cost} = (\text{Energy that would have cleared market}) \times [(\text{Resource-Specific Settlement Interval LMP}) - (\text{higher of Energy Bid or Default Energy Bid})]$$

Contrary to SCE’s contention on the most recent conference call, this is an issue that could impact most existing asynchronous generators (and those currently in the queue) and not just those entering the queue in the future. As the CAISO has pointed out, about 70-75% of asynchronous generation capacity has been subject to power-factor requirements under the current study-based approach, and those units could have to curtail real-power output to provide VARs if dispatched outside the required power-factor range

However, the tariff formula does not reflect the realities of how asynchronous generators are paid. As LSA has explained, since variable generation costs are virtually zero, the opportunity cost of foregone real-power output is mainly lost PPA payments and is not related to the LMP. Most PPAs for asynchronous generators contain per-MWh payments only, so fixed costs as well as variable costs are recovered in energy payments; thus, the generator will under-recover its fixed costs if the energy is not produced.

The CAISO has expressed concerns about “interpreting” PPAs, to which it is not a party. As LSA has suggested, the CAISO could delegate this task to Potomac Economics (Potomac), as part of the latter’s scope of work in determining Default Energy Bids (DEBs).

Determining DEBs presumably requires Potomac to routinely interpret others' contracts, such as natural gas take-or-pay arrangements, as well as analyzing other complex data on conventional-generation operations (e.g., Multi-Stage Generator transitions). Most PPAs contain very simple per-MWh payment structures that will require very little "interpretation" from Potomac experts. Effectively, this would simply be an additional DEB determination by Potomac, and not a very difficult one at that.

The CAISO responded to this suggestion on the latest conference call by suggesting that asynchronous generators simply bid their PPA prices into the market, and that they address payment issues with their SCs. This was clearly not a feasible suggestion, since (as the CAISO is well aware): (1) virtually all PPAs for asynchronous generation require the Buyer to be the SC and allow that entity to schedule/bid the project in any manner it chooses, i.e., the generators do not have any influence over such bids; and (2) this is not a negotiable provision.

Exceptional Dispatch payments for solar projects

The Proposal would create a new Exceptional Dispatch (ED) category – "Reactive Power Exceptional Dispatch" (RPED) – with a Provision Payment for opportunity costs to "resources with special operating characteristics and unusual cases" that "could provide valuable reactive power support" but do not receive compensation under the current Provision Payment structure. Resources that could qualify include those listed below, if they don't clear the market optimization (i.e., are not producing real power) but are needed for reactive support:

- Thermal units with a clutch that can operate in synchronous condenser mode;
- Small thermal units without clutches that can operate in synchronous condenser mode;
- Solar arrays at night "or under cloud cover;" or
- Wind turbines operating "at or below max output."
- Pumped storage projects that pump water to provide the service (added on the call).

These resources would not have an "opportunity cost" to provide voltage support/reactive power under the current Provision Payment mechanism, since they do not clear the energy market, but they may still have costs when providing this service to the CAISO. The RPED Provision Payments would cover: (1) Real-power costs incurred, at the applicable LMP; (2) minimum-load costs (including fuel, variable O&M, or other applicable opportunity costs); and/or (3) start-up costs where the resource is started in response to the RPED.

LSA requests that the CAISO clarify that solar resources operating at low or zero levels do not have any obligation to provide reactive support beyond the proposed requirements. The proposed standard requires reactive capability at ± 0.95 when the resource is at maximum output, but the VAR output/absorption requirement declines when the resource is producing at lower levels, presumably to zero if the output is zero. Compliance beyond the requirements should be voluntary.