

Stakeholder Comments Template

Subject: Reactive Power and Financial Compensation

Submitted by	Company	Date Submitted
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This template has been created for submission of stakeholder comments on the Issue Paper for the Reactive Power Requirements and Financial Compensation initiative that was posted on **June 5th, 2014**. Upon completion of this template please submit it to initiativecomments@caiso.com. Submissions are requested by close of business on **June 11, 2015**.

Introduction

The Large-scale Solar Association (LSA) appreciates the opportunity to comment on the CAISO's May 22nd, 2015 document, Reactive Power Requirements & Financial Compensation – Issue Paper (Paper), and the discussion of the Proposal on a May 28th stakeholder conference call. The Paper is the first document in this initiative, which combines proposed reactive power requirements for asynchronous generators most recently described in the March 5th document, Reactive Power Requirements for Asynchronous Resources – Issue Paper & Straw Proposal (Proposal), with the CAISO's initial concepts regarding financial compensation for reactive power to all generators.

As LSA stated in its comments on the Proposal, LSA supports the CAISO's effort to review interconnection standards and assure adequate system performance as major changes occur in the generation-fleet composition. It is in the interest of all CAISO grid users to ensure that the CAISO has access to additional grid-management tools and capabilities to accommodate those changes. LSA does not object to reasonable standards and agrees that technical improvements in recent years has improved the ability of asynchronous generators to meet such standards and lowered the costs to do so.

However, as FERC ruled on the CAISO previous proposals, the CAISO should still have to demonstrate the need for any new requirements, and limit new requirements to those needed to meet those demonstrated needs. Those new requirements should also be fair, clear, achievable, and provide for the least-cost means of achieving the desired objectives.

It should be noted that some of LSA's specific comments below are the same as those submitted earlier on the Proposal. They are re-submitted here because they are relevant also to the contents of the Paper and the discussion on the subsequent stakeholder conference call.

1. Please provide feedback on the reactive power technical requirements.

LSA has several concerns about the content and process of the Proposal that may impede its ability to support it. Those concerns are listed below and then explained further. Specifically, the CAISO should do the following:

- Revise any standards adopted in this initiative to better conform to NERC/WECC rules, including those related to dynamic response speed and any standards eventually adopted;
- Retain the current study-based approach (which appears to be meeting CAISO reliability needs), and simply expand it to consider dynamic reactive capability needs. Address through the annual Transmission Planning Process the rare situations where needs become apparent that were not identified in interconnection studies.
- Explicitly state that the interconnection-study methodology will be revised to consider situations where the CAISO's needs could be more economically and/or efficiently met beyond the POI through grid-level investments;
- Clarify opportunities for generators to meet requirements collectively behind the POI;
- Resolve unexplained differences between the current synchronous generator requirements and the propose asynchronous generator requirements; and
- Include flexibility to fairly address situations where compliance would be difficult and/or costly.

NERC/WECC conformance

The Paper states that dynamic response “should be similar to a synchronous resource, i.e., within a cycle, to support the system during transient response events.” This provision would be more consistent with NERC rules without the phrase “i.e., within a cycle.”

That phrase does not accurately reflect current dynamic response requirements for synchronous resources. There are a variety of Automatic Voltage Response (AVR) designs for synchronous resources, and they have different response capabilities to support transient events. Also, synchronous resources with power system stabilizers (PSSs) will have a faster response than generators without PSSs.

Moreover, the CAISO's definition of “within a cycle” is not clear. For example, does that timing include an event recognition time, rise time and voltage settling time?

In addition, the Paper (at p.15) also misstates the findings of NERC's Integration of Variable Energy Resource Task Force's (Task Force's) 2012 reliability assessment as recommending that NERC “consider revisions to reliability standards to ensure that all generators provide reactive support and maintain voltage schedules.” Instead, the pages cited by the CAISO recommend that NERC “clarify that interconnection standards for reactive power must cover specifications for minimum static and reactive power requirements at full power and at partial power, and how terminal voltage should affect the power factor or reactive range requirement.” This Task Force recommendation to NERC is for increased clarity and transparency, not for which resources should be subject to reactive power requirements.

Finally, the CAISO should also recognize NERC/WECC efforts toward more uniform standards across the West and nationally in the future, and it should not preempt adoption of such standards. The applicable rules should not be more stringent than applicable standards eventually adopted by NERC/WECC, unless the CAISO can show that its stronger requirements are needed for the CAISO Controlled Grid.

Retention of the current study-based approach

The CAISO proposals do not meet the FERC requirement that the CAISO demonstrate that the interconnection-study approach mandated by FERC Order 661-A is inadequate to meet its needs. While the current interconnection-study approach may not consider all possible future scenarios, as the CAISO contends, the Proposal indicates that it already requires about 75% of asynchronous generation to meet the proposed reactive power requirement.

If 75% of asynchronous and 100% of synchronous generation can meet such requirements, then the overwhelming majority (between 75 and 100%) of generation production on the system would have such capability at virtually any time, even when renewable-energy production is high. The Proposal does not explain or demonstrate why this widespread capability under the current methodology is or would be insufficient to meet CAISO needs.

In addition, neither the Proposal nor the Paper explains the need for the proposed dynamic voltage response requirements. As noted in LSA's earlier comments, inverter technology has improved such that it may be easier to provide voltage support generally at the generator terminals (though additional equipment may be needed to comply at the POI); however, provision of dynamic voltage support can require installation of very expensive dynamic reactive equipment (i.e., Statcom, SVC, etc).

If such a standard is needed, the CAISO should be able to use the same kind of "limited" study-based approach that seems to be working well for power-factor requirements, as discussed above. The Paper actually does propose to use this study-based approach to determine whether the entire reactive power range (instead of the proposed standard +/- 0.985 lead/lag range) must be dynamic, even though that approach would presumably also not "consider all possible future scenarios." If a study-based approach is good enough for this purpose, it should also be sufficient to determine whether dynamic voltage response is needed at all.

Collective standards compliance beyond the POI

The CAISO should explicitly provide for identification of situations where its needs could be more economically and/or efficiently met beyond the POI through grid-level investments (e.g., shunt capacitors, Static VAR Compensators (SVCs), or synchronous condensers) instead of individual generator requirements, including criteria for that determination.

With respect to generator-interconnection studies, LSA supports the CAISO's stated intention on the stakeholder conference call to incorporate consideration of grid-level approaches in the study methodology, so generators could fund such investments collectively if they are effective and more economical than having each generator meet the requirements separately. This study enhancement should be made more explicit in the next version of the CAISO's proposals.

If the current effective study-based approach is retained (as LSA recommends above), these grid-level approaches could also be used in the annual Transmission Planning Process (TPP) to address the very limited situations where interconnection studies do not require individual generators to meet reactive power requirements (or, as noted above, dynamic response requirements) and a need is found later in that area for such capability.

The unique example in the Proposal and Paper of the SONGS closure impact on Imperial Valley generation shows how rare this after-the-fact needs identification can be. Imposition of a blanket requirement on all generators to address such extremely unusual occurrences is simply not justified.

Opportunities behind the POI for generators to meet requirements collectively

The CAISO should also explicitly state in the next proposal version – as discussed on the stakeholder conference call – that generators can collectively meet the requirement at or before the POI as long as the requirement can be met for any of the generators whenever it is operating.

Differences between current synchronous generation requirements and proposed asynchronous generation requirements

These current synchronous generator requirements and the proposed asynchronous generator requirements differ in both the power-factor standards and the location where they must be met, as shown below.

<i>REQUIREMENT</i>	<i>SYNCHRONOUS</i>	<i>PROPOSED ASYNCHRONOUS</i>
Power-factor requirement	0.95/0.9 lead/lag	0.95 lead/lag
Location	Generator terminals	Point of Interconnection (POI)

The Proposal and Paper state that asynchronous generators could meet the requirements at other locations before the POI, with the consent of the CAISO and Participating Transmission Owner (PTO). However: (1) the criteria that would be used to grant that consent are not specified; and (2) the power factor must include compensation to the POI.

In response to questions on the stakeholder conference call (and the earlier call about the Proposal) about the different approaches, the CAISO stated the following:

- The CAISO thought it would be “easier” for asynchronous generators to meet the requirements at the POI.
- There might not be “too much difference” between 0.95/0.90 power factor at the generator terminals and 0.95/0.95 power factor at the POI.

If the difference is given for the benefit of the generator, and there is not much difference between the standards, why not use the same one for both? In other words, why not allow all generators to meet either a 0.95/0.90 standard at the generator terminals (for solar projects, at the inverter terminals) or 0.95/0.95 at the POI? In particular, meeting the standard at the POI could require additional equipment that would raise compliance costs (and, therefore, payments under the proposed cost-based compensation structure).

The CAISO should any reason why the same the same standards should not apply to both generator types. LSA understands that the PJM standard is 0.95/0.95 at the generator terminals for all generator types, and that would be a much simpler approach.

Flexibility where meeting the standard might be very difficult or complicated

Exceptions or special arrangements should be allowed, for example, for situations where:

- The POI is remote from the generator site (much more common for asynchronous generators than synchronous generators);
- Several generating projects could meet the requirement collectively, as described on the conference call;
- Some generators on shared gen-ties are subject to the requirements while others are not;
- Generators are interconnecting to busses where there is already a regulation device installed (i.e. either distribution interconnections or a device such as an SVC); or
- A generating project cannot effectively control the transmission voltage, e.g., a small generator connecting to a stiff high-voltage system (i.e., where the project is small compared to the short-circuit MVA of the system).

2. Please provide feedback on the financial compensation for reactive power.

LSA is extremely pleased to see the CAISO has made financial compensation a central issue in this initiative, and that it is addressing that issue concurrent with establishment of technical requirements in a manner that will apply to all generation providing the service. As LSA said in its comments on the Proposal, this issue is especially important for solar generators.

PPAs for synchronous generators typically include capacity payments that may not be impaired by any reduction in real-power production required to provide reactive power. Most PPAs for asynchronous generators, on the other hand, provide payments based only on production and also contain minimum production levels (and sometimes Net Qualifying Capacity (NQC) guarantees) that must be met through real-power production.

In addition, financial compensation – even cost-based compensation – can incent the approximately 25% of asynchronous generation that has not been required to meet the +/- 0.95 power factor requirements to date to install such capability, using the provisions recently approved through BPM PRR 825 (allowing up to 10% oversizing of inverter capability). Financial compensation could make it cost-effective for such generators to voluntarily comply with the standards. (This incentive would apply also to any generators not required to meet the standards in the future, if the CAISO accepts LSA's recommendation to retain the study-based approach.)

LSA supports the conceptual framework laid out in the Paper, with capability payments to cover fixed compliance costs and provision payments to cover variable costs. As noted above, LSA strongly supports payment to both existing and new resources, since both will be providing substantially similar service.

There are three main issues that the CAISO will have to address in developing the details of this payment structure: (1) payment recipient; (2) capability payment structure; and (3) provision payment structure.

Payment recipient

The payment issue will be complicated, in part, because of the structure of most Power Purchase Agreements (PPAs). The Load-Serving Entity (LSE) buyer is the Scheduling Coordinator (SC) for most generation resources (especially asynchronous resources); if the generator is entitled to a cost-based payment but the LSE SC receives that payment, there is no provision in current PPAs to pass that payment through to the generator. (This is different from Availability Payments and Charges under the RA Standard Capacity Product (SCP) framework, which most PPAs do pass through to the generator.)

Thus, for the payment to reach the intended generator recipient, either current PPAs must be amended (and future PPAs modified) to provide for the pass-through, or the CAISO must pay the generators directly and not the SC.

Capability payment structure

LSA does not have a preference at this time between the Enhanced AEP or Safe Harbor methodology for determining capability payments. The acceptability of either will depend on details that are not yet available, and LSA looks forward to exploring those with the CAISO and other stakeholders.

Provision payment structure

Determining the variable costs to provide reactive power services will likely be more difficult than determining the fixed costs, especially where real-power output must be curtailed to enable reactive-power provision.

For most asynchronous generators, the variable “cost” is mainly lost PPA payments. As noted above, most PPAs for asynchronous generators contain per-MWh payments only, so fixed costs as well as variable costs are recovered in energy payments, so the entire amount of the PPA payment is lost. If the generator is already receiving coverage of fixed costs for reactive power equipment directly through capability payments, however, that cost could be deducted from the variable-cost PPA payment, and the provision payment could then just reflect the remaining PPA payment.

LSA suggests using the existing arrangement with Potomac Economics for establishing Default Energy Bids (DEBs) to establish the proper provision payment level for each project, based on PPA-based opportunity costs as well as any direct costs incurred.