

SUNPOWER

May 17, 2009

Mr. Mason Willrich, Chairman, Board of Governors
Mr. Yakout Mansour, President and Chief Executive Officer
California Independent System Operator
151 Blue Ravine Road
Folsom, CA 95630

RE: Interconnection Requirements Reform for Renewable Resources (May 18 Agenda Item # 5)

Dear Sirs,

SunPower Corporation (SunPower) is a San Jose based vertically integrated photovoltaic (PV) solar energy company. In the U.S., SunPower is a leading manufacturer of residential and commercial rooftop systems. SunPower PV systems comprise the world's largest installed base largest utility-scale (grid-connected) PV power plants; including the largest operating PV plant in the U.S. SunPower is an aggressive participant in the market to supply utility scale PV solar systems to meet California's Renewable Portfolio Standard (RPS). As such we have projects requesting interconnection in the CAISO's large generator interconnection queue and thus have a significant stake in the outcome of the above-referenced agenda item, which would impact our requirements for interconnection going forward.

SunPower is fully supportive of the CAISO's goal in this process, which is to ensure reliability as significant amounts of new variable energy resources (VERs) come online. The staff proposal described in Keith Casey's May 10, 2010 memo to the Board (Requirements Proposal), if approved by the Board and FERC, would change both the tariff and the pro forma large generator interconnection agreement (LGIA) applicable to all projects tendered LGIAs after the date of Board approval.

Unfortunately, the Requirements Proposal has been hastily prepared and, if adopted, will create significant commercial uncertainty that could result in a failure of meeting CAISO's goals and jeopardizing the viability of renewable energy projects that have near-term CODs. Consequently, and as further supported below, SunPower respectfully requests that you defer approval of the Requirements Proposal to allow for resolution of ambiguities in the proposal to be resolved and provide meaningful exemptions if project developers cannot obtain equipment in a competitive fashion certain components of CAISO's recommendation and allow a limited exemption from the new requirements for certain projects for which commercial viability would be jeopardized.

SUNPOWER

Specifically, SunPower requests the Requirements Proposal be referred back to staff to address the following

- 1. Provide a meaningful exemption from specific requirements for Projects with near-term CODs that (1) have a fixed-price PPA and would impose a significant, unrecoverable cost to the Project, or (2) can demonstrate that equipment to meet a specific requirement is not commercially available from 3 or more vendors.*
- 2. Further exploration of the reactive power and voltage control requirements on variable energy resources, so that (1) the reactive power requirements have been demonstrated as needed in the area of the interconnection and (2) the voltage control requirements can be achieved by asynchronous generators in a cost effective manner.*
- 3. Defer adoption of the requirement for ramp rate limit and control requirement until such time as the need for generator-specific ramp controls are explored in the 33% RPS integration study and market mechanisms to procure necessary ramping energy have been further developed.*

SunPower is a member of the Large Solar Association (LSA). LSA actively participated throughout the accelerated stakeholder process and SunPower supports its recommendations. SunPower is compelled to provide these separate recommendations in light of the Staff Recommendation impact on projects SunPower is developing. In particular, SunPower is developing projects with signed purchased power agreements (PPAs) with near-term CODs that are also seeking support under the requirements of the American Recovery and Reinvestment Act (ARRA). These projects must move forward this year and the Requirements Proposal and could affect the viability of these projects to the detriment of SunPower and to California's RPS and carbon-reduction goals.

SunPower emphasizes that it wants to develop Projects that meet the needs of the CAISO to incorporate larger amounts VERs in a reliable manner. For example, SunPower supports incorporation of Low Voltage Ride Through (LVRT) requirements and requirements on active power control that allow for controlled startups and shutdowns, consistent with fuel availability.

In the balance of this letter, SunPower supports our recommendation with (1) comments on the stakeholder process itself, (2) support for why a limited exemption is needed for near-term COD projects, and (3) technical comments on why the reactive power, voltage control, and ramp rate limitation requirements be deferred or, at the very minimum, subject to further stakeholder review.

The Stakeholder Process Was Run Too Fast, Leading to Ambiguous Requirements, Conflicts of Interest, and Potential Unanticipated Consequences

The CAISO process leading to the Staff Recommendations was conducted simply too quickly and in a manner inappropriate for setting generator technical requirements. CAISO should be wary of the unintended consequences of adopting requirements that are the outcome of such a rushed process. Although SunPower and LSA have attempted to remain constructive in this process, SunPower calls out the following significant process deficiencies.

- This stakeholder process has been run from its start to Board recommendation in less than three months. Inappropriate shortcuts have been taken along the way. As an example, at the last stakeholder teleconference proceedings, the latest draft for the requirements was posted the night prior to the meeting, with no notification given to the attendees. At every turn, extremely short comment periods were allowed.
- At the current junctures, CAISO has presented materials without *any* opportunity for stakeholder comment. Specifically, Board materials include a “comment” by CAISO staff’s “expert consultant”, GE Energy Applications and Systems Engineering, and letters provided by GE and three other inverter manufacturers. CAISO’s expert consultant has not participated in this proceeding before, let alone have its findings been circulated for comment. This last-minute inclusion of significant information is unfair and requires to Board to rely on information has not been fully vetted by the stakeholders.
- The fact that CAISO staff has used an inverter manufacture as its “expert” creates a conflict of interest that should be rectified. CAISO’s expert has a vested interest in the adoption of requirements, some of which (such as dynamic VAR support and ramp rate controls) may confer undue competitive advantage as a result of hastily set requirements and accelerated adoption schedule.
- The CAISO’s requirements are overriding or superseding standards that are normally set by NERC, WECC, and IEEE. CAISO’s disregard for those standards setting bodies must be acknowledged and should also be a cause for concern.

An Exemption for Certain Requirements is Needed for Projects with Near-Term CODs and Fixed-Price PPAs

The Staff Recommendations are applicable to all projects that are tendered LGIAs after the date of the Board decision. The only exemption allowed is for the Order 661-A Low Voltage Ride Through (LVRT) standard for projects that can show they have incompatible equipment purchased as of the date of the Board decision. The Staff Recommendation identifies a “transition period” but this label is a misnomer: except for projects with tendered or signed LGIAs or that can demonstrate the LVRT exemption, project developers must start procuring equipment immediately to meet their CODs. CAISO staff point out that they believe commercial concerns have been addressed as the equipment to meet the CAISO requirements is or will soon be commercial available. Although the late-posted vendor letters in the Board packet claim that inverter technology is available, SunPower notes that the

SUNPOWER

letters do not uniformly commit to commercially available products¹ and none warrant performance to CAISO's standards. In the current market, industry standards, such as IEEE 1547, provide a basis for product specification and testing that can be warranted by the manufacturer and verified by the customer. CAISO's requirements in the area of reactive power control, voltage control, droop response, and active power control are insufficiently specified and lack any testing and compliance procedures. Because there is no testing standard for these requirements, there will be no way to validate the inverter manufacturer claims, and therefore any warranties or guarantees by the inverter manufacturers will be difficult to implement or enforce.

SunPower has built more grid-connected PV systems than any other developer and our experience is that new technological capabilities need to be first field tested and validated prior to adopting mandatory performance requirements. Therefore, a meaningful interim period is necessary for all requirements while the implementation is validated. Based SunPower's extensive experience in the inverter and electrical equipment market, SunPower's view is that there is a significant potential risk this technology will not be competitively available for projects with CODs before 12/31/2012. To the extent the market is not sufficiently competitive, prices will be impacted, and projects that have fixed price PPAs will be negatively impacted, jeopardizing viability.

Even if a competitive market for inverters can be created overnight, the reactive power requirements in these standards have cost impacts that cannot be passed through for project owners that have fixed price PPA. These reactive power costs can be significant, potentially as much as several percent of the total project costs. This is large enough to jeopardize viability of a project if a cost pass through mechanism is not available.

SunPower recommends the ability of generators to seek exemptions for specific requirements with CODs on or before 12/31/2012, because doing so would mitigate CAISO's concerns that allowing projects to go forward without meeting these standards would jeopardize reliability. As CAISO staff point out, the current Interconnection Request Queue shows approximately 20,000 MW of projects in the Serial Queue and Transition Cluster. SunPower's requested exemption would apply only to projects that have a near-term COD and could demonstrate that compliance with the Requirements would impose a significant, unrecoverable cost. The current generation queue, if limited to projects to which would have the greatest disproportionate impact (asynchronous solar generators with CODs on or before 12/31/2012), the total shows only 7 projects comprising 2,236 MWs.² Given that SunPower's recommended exemption would include a requirement to demonstrate a fixed-price³ PPA, the requested exemption would be manageable from a reliability and administrative point of view.

¹ Not all vendors commit to provide voltage control to meet CAISO requirements.

² Projects with queue nos 146, 147, 124, 239, 68, 337, and 304. If wind generation is added, some of which is asynchronous, the total pool rises to 37 projects with 8,876 MWs.

³ Fixed price in this context would include a demonstration that the PPA does not allow for a pass through to the buyer for recover of seller incremental costs to comply with the adopted generator performance requirements.

The Reactive Power, Voltage Control, and Ramp Rate Limitation Requirements be Deferred or at Least Subject to Further Review

SunPower and LSA have participated throughout the accelerated stakeholder process and have attempted to make constructive comments at every juncture. However, SunPower reiterates some of the most significant technical deficiencies of the staff proposals.

- On the reactive power requirement, staff has provided insufficient reasoning as to why this requirement should be imposed without regard for any consideration of the need in the area where the generator interconnects. FERC Order 661-A required it for wind generators and this principle should be kept as LVRT is applied to all generators. Otherwise needless costs will be imposed on the marketplace without any discernable reliability benefit.
- The automatic voltage control requirement still possesses significant ambiguities. Although staff state that the reactive power factor requirements may be met with static VAR support (e.g., switched capacitor banks), the application of automatic voltage regulation requirements on asynchronous generators may effectively require dynamic VAR support, which is much more expensive to provide and may not be available from a competitive set of manufacturers. We agree with DRA that voltage control requirements were designed to be applicable to synchronous generators and need further refinement before they can be applied to asynchronous generators. The cost implications of requiring dynamic VAR support are very significant and at the very least require further stakeholder dialog before adoption by CAISO.
- CAISO staff proposal for upward ramp-rate controls during normal operations has no such precedent and is being proposed without any analysis of the relative cost of providing such functionality to its benefits, which include improved reliability and possible reduced procurement costs. SunPower recognizes the need to operate to a set point and to have reasonable controls during a startup, such as a staged startup after a post-contingency event. SunPower does not object to the requirement to generally control output within the 5 MW proposed bandwidth and subject to available fuel. However, providing ramp controls during normal operation requires more advanced controls that are not commercially available in the marketplace today and should be tested before wide scale deployment. In parallel, CAISO can complete its analysis of a 33% RPS, which among other things will indicate the need for ramping resources to serve a portfolio that includes a diversified solar resource. Studies conducted for other markets show significant reductions in variability from regional diversity of solar projects. Only after further testing and study can the CAISO marry its understating of its needs for ramping energy with its understanding of the most efficient means of providing ramp controls during normal operations.

Conclusion

SunPower strongly supports CAISO's efforts integrate renewables to meet a 33% RPS in a manner that maintains reliability. SunPower has extensive knowledge on of the current state of the market for the types of equipment referred to in this proposal and as such we respectfully requests that the Requirements Proposal be referred back to staff to incorporate the changes recommend in this letter. Additional time for further staff analysis on the issues raised in this letter and to seek further input from stakeholders will make this proposal a more acceptable and better functioning program.

Respectfully,



Greg Blue
Director, Government Affairs
Utility and Power Plants, North America

Cc: CAISO Board of Governors
Karen Edson, Vice President of External Affairs, CAISO
Grant Rosenblum, Manager of Renewable Integration, CAISO