September 23, 2013

Via email

California Energy Commission
Docket Office, MS-4
1516 Ninth Street
Sacramento, CA 95819-5512
docket@energy.ca.gov

RE: Electricity Infrastructure Issues Docket #13-IEP-1D

To Whom It May Concern:

The Large-Scale Solar Association ("LSA") is comprised of leading owners and developers of utility-scale solar projects. LSA is pleased to submit the comments below in response to the Integrated Energy Policy Report ("IEPR") workshop held September 9, 2013, regarding Southern California Reliability in the absence of the San Onofre Nuclear Generating Station ("SONGS").

The Preliminary Reliability Plan for the LA Basin and San Diego prepared for the September 9th Joint Workshop identifies the need for reactive power support in the LA Basin and San Diego area to replace the support previously provided by SONGS. However, the Plan states that such voltage support "can only be supplied by conventional generation, combined heat and power, or specialized equipment such as synchronous condensers that operate like large electrical motors." The Plan further specifically states that solar photovoltaic ("PV") systems do not provide this characteristic.

LSA would like to clarify that larger scale PV power plants connected directly to the CAISO grid can and do provide reactive support and voltage control on the grid today. Modern inverters can provide reactive power in multiple control modes, depending on system need. Large Generator Interconnection Agreements executed with the CAISO after July 3, 2010 mandate that asynchronous generating plants, such as inverter based PV systems connecting to the CAISO grid, provide such reactive support and controls.[1] This requirement includes sufficient dynamic voltage support as the CAISO and Participating Transmission Owner ("PTO") determine is necessary in the technical interconnection studies. While this capability may be provided by stand-alone equipment, such as fixed or switch capacitors and reactors, more commonly it is provided through sophisticated integrated controls at both the plant level and on the individual PV inverters and supplemented integrated controls on switched equipment as needed. This capability provides the automatic voltage regulation capability needed by the system for the type of events of concern in Southern California today. Given the sophistication of modern inverter technology, it is possible to provide reactive power to the power grid from inverter based PV power plants even when the active power is zero (such as at night time).

[1] CAISO Tariff Appendices CC and EE (Large Generation Interconnection Agreement), Appendix H.

Currently, the coordination and control of PV reactive power from modern inverter technology is not accurately being showcased during interconnection studies. This is primarily due to the fact that the CAISO has been using generic models for inverters, which do not sufficiently capture the latest inverter technology and capabilities. Therefore, the simulation of modern inverter technology and its reactive power capability is not being demonstrated accurately from a modeling perspective. WECC approved user written models, which accurately represent latest inverter technology and reactive power production capabilities should be engaged in performing all technical studies (ex. dynamic simulations). User written models can easily be WECC certified and deployed for CAISO interconnection studies. Such simulations would then demonstrate the ability of PV inverters dynamic reactive power capabilities.

While the CAISO tariff sets the reactive support requirement for asynchronous generators at the point where the power enters the CAISO grid, the power factor range for conventional generators is measured at the terminals of the generating unit. Therefore, while the specific power factor design criteria in the interconnection agreement may vary slightly for synchronous and asynchronous generating facilities, the key point is that PV power plants are quite capable of providing reactive voltage when it benefits the power system and many of them are already doing so.

Furthermore, while PV power plants connected to the high voltage CAISO facilities do provide such services, those connected to the lower voltage distribution system may be required to provide reactive power, but generally are not allowed to control voltage in response to grid voltage deviations. This inability is not a technology barrier within the power plant, but rather a limitation imposed on the plant by industry standards and current utility tariffs.[2]

In summary, LSA urges the agencies and stakeholders to embrace rather than discount the capability of fully deliverable, transmission-connected PV power plants to provide the reactive support necessary to sustain reliability in southern California in the absence of SONGS. To the extent they can provide equivalent reactive support and the cost of "preferred resources" is competitive with or lower than the cost of conventional generation, LSA proposes that "preferred resources" could provide a greater than 50% share of the needs for replacement of SONGS while not increasing the carbon footprint that would otherwise be higher with conventional generation.

Sincerely,

Shannon Eddy
Executive Director

[2] IEEE Standard 1547 and UL 1741 do not allow distribution connected PV plants to control reactive power to maintain a voltage schedule. IEEE Standard 1547 states: " 4.1.1 Voltage regulation -
The Distributed Resource ("DR") shall not actively regulate the voltage at the Point of Common Coupling ("PCC"). The DR shall not cause the Area Electric Power System ("EPS") service voltage at other Local EPSs to go outside the requirements of ANSI C84.1-1995, Range A." A DR is defined as: Sources of electric power that are not directly connected to a bulk power transmission system. DR includes both generators and energy storage technologies. This standard prohibits the DR from regulating system voltage. However, this is a case where the external rules drive this limitation rather than technology limitations of PV power plants.