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Submitted by email to RPS_Integration_Studies-33Percent@caiso.com

Comments of the Large-Scale Solar Association (LSA) on CAISO 33% RPS Integration Study: Production Simulation Model

LSA is pleased to submit these comments on the ISO's 33% RPS Integration Study: Production Simulation Model. Each member of LSA has a particular interest in how solar production profiles are being considered in this model as well as a general interest in how the full model can inform California policy objectives to appropriately tailor the development of integration resources to actual integration requirements as well as minimizing production costs and carbon emissions. LSA appreciates the efforts that the ISO has undertaken to date to clarify model assumptions and inputs.

LSA has reviewed the ISO's updated values for the load-following and regulation requirements being used as inputs to the production simulation. First, LSA strongly urges the ISO *not* to model the seasonal maximum values for each hour and the residual load-following values based on those seasonal maximum values, but rather only to model the actual hourly values and to recalculate the residual load-following values based on those actual hourly values. The seasonal maximum values create distortions in the results that make them difficult to compare to the other assumptions. Notably, they represent a level of reserves consistent with significantly higher than 33% renewable energy and also do not align the hourly reserve requirements with the underlying renewable production profiles (except for the 24 hours that correspond to the seasonal maximum requirement).

LSA recognizes that the ISO and parties want to understand the impacts of higher load-following and regulation requirements to "stress test" the production model. However, to obtain an alternative set of hourly values to further test the model, it would be better to use a different wind/solar base-year to generate new integration requirements consistent with the production profiles actually being modeled. Or the ISO could attempt some sub-hourly production simulations similar to those conducted for its 20% RPS integration study. Alternatively, if the purpose is to evaluate the integration requirements from further forward in time than hour-ahead, e.g., day-ahead, then the Step 1 model could be run based on day-ahead forecast errors and the production simulation used to examine the costs of possible additional unit commitment and additional reserves as seen from the day-ahead timeframe. Either approach would be more consistent with actual market and system operations than using the seasonal maximum values. If the ISO uses the latter for purposes of simply illustrating the impact on integration requirements of higher load-following and regulation requirements, then it needs to be clear about how to interpret the Step 1 modeling assumptions, including the distortions noted above.

While the ISO has requested comments on the production simulation model inputs, LSA will also take this opportunity to request that the output data of the production simulation model is presented in particular detail and formats that will assist external parties in evaluating both the ISO's Phase 1 and, later, the Phase 2 modeling results. Similarly to the ISO's recent report on simulation of the 20% RPS, this data would be presented for each scenario being modeled, including the benchmarking scenarios. This data includes:

- Net load for each hour (8760), divided into wind and solar components, in each California location in the model and aggregated for the WECC other than California (inputs to the production simulation model, but useful for evaluating the net load ramps that are driving some of the results)
- Energy shadow prices for each hour (8760) in each location in the model
- Energy revenues by category of resource for each hour (8760) in each California location in the model and aggregated for the WECC other than California
- CO2 emissions by category of resource for each hour (8760) in each location in the model
- Energy exports from California for each hour (8760) to rest of WECC
- Number of starts and capacity factors for dispatchable resources by resource type including identifying whether the unit was included for RA or integration purposes (California, WECC other than California; at least monthly)

The purpose of providing the results in this level of hourly and locational detail is to support better long-term decisionmaking by developers of renewable resources and non-generation resources. In particular, good benchmarks are needed for consideration of alternative solar resource designs, including incorporation of storage capability. Solar developers will also be able to update the input assumptions over time as more information is obtained on resource performance. Moreover, these types of resources also need better information on the likely future impacts of the types of market design decisions that the ISO, FERC and other entities are considering, such as removal of the PIRP financial settlement rules and assignment of ancillary service requirements to variable energy resources. While the production simulation model has limitations in this regard, its results will be indicative of future outcomes and highly useful to market participants.

Thank you,

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Association