Stakeholder Comments

Submitted by	Company	Date Submitted
Rachel Gold Rachel@largescalesolar.org 510-909-3196 Danielle Osborn Mills Danielle@largescalesolar.org 916-320-7584	Large-scale Solar Association (LSA)	June 22, 2016

The Large-scale Solar Association ("LSA") appreciates the efforts of the California Independent System Operator (CAISO) and its consultant team to complete the analysis of the benefits of a Regional System Operator ("RSO"), as required by SB 350. LSA understands the challenges associated with modeling such a complex set of scenarios and elements and greatly appreciates the openness of the CAISO and its consultants to respond to stakeholder questions and comments.

The assumptions and results of these studies are important, both as a tool to understand and assess the potential range of benefits from the formation of a RSO and because these assumptions and results may eventually be used elsewhere and thus could have a profound influence on other policies and decisions. It is with this perspective that LSA evaluated the preliminary analysis.

Overall, we agree with the preliminary general conclusions that benefits from formation of a RSO should accrue to California under a range of scenarios. However, we have serious concerns with several key assumptions, which are either unrealistic or impractical and impact the magnitude of benefits that can and should be expected from the RSO. In order to address these issues and ensure that the results present a reasonably likely range of benefits, *LSA requests several key assumptions and modeling issues be addressed prior to the final release, as specified below*.

We also are mindful of a number of unquantified benefits noted in the preliminary analysis. Further analysis and estimates of these areas is also important to inform general understanding of the range of expected benefits from the formation of the RSO.

1. Are any of the study results presented at the stakeholder workshop unclear, or in need of additional explanation in the study's final report?

RESOLVE Model Portfolios – Assumptions and Results

Transmission Assumptions

LSA's understanding is that the inputs included a number of transmission cost assumptions both within and outside of California but that the model only chose new transmission for Wyoming and New Mexico wind in Scenario 3. LSA has several concerns with these results.

1. The results are based on stale inputs of available transmission in California – skewing the perception of potential transmission needed to achieve the 50% RPS. The study uses CAISO's Energy Only Special study results as the basis for costs and the Full Capacity and Energy Only capacity assumptions. This study was based on available capacity on June 1, 2014. Since then, approximately 3,400 MW of additional renewable resources have come online within the CAISO, calling into question the level of available capacity assumed in the studies.

2. The study also presumes, based on the results of the Special Study, that approximately 3,500-8,200 MW of additional solar can be brought online without additional transmission. This assumption is untested, and LSA finds it to be generally unrealistic. While there may be some Energy Only renewable projects in California going forward, there are serious barriers and hurdles besides the transmission availability issue noted above that must be overcome, including:
   - Financing such projects, which may be challenging due to general operational and revenue uncertainty;
   - Addressing the increased congestion costs to both the projects themselves and existing resources in the area;
   - Desire of off-takers for Resource Adequacy value from these projects; and
   - The limited ability of Energy Only projects to provide ancillary services, which may well be needed and desirable from at least a portion of new projects in order reliably operate the system under higher RPS levels. Here we understand the study assumes renewables can provide these services, which LSA supports, but there appears to be a disconnect with that assumption and the likely necessary transmission to ensure those resources will be actually be able to provide those services.

These inputs appear to be driving the model to choose all available Energy Only projects over any new transmission. While this may appear optimal on paper, it is unrealistic, as it is likely that at least some additional in-state transmission and out-of-state transmission will be necessary and desirable by 2030. *LSA requests that CAISO run a sensitivity that assumes at least a portion of in-state projects will need deliverability and that reflects potential transmission needed for out-of-state projects to deliver to California.*

In addition LSA questions the selection of portfolios by E3's RESOLVE model. In particular, under nearly every scenario and sensitivity, the model appears to hold out of state solar at 500 MW and out of state solar RECs at 1000 MW.

We understand that Arizona was chosen as a proxy for out-of-state solar and that these MWs amounts were allocated in the study for out-of-state solar. It is unclear why or whether it was necessary to cap the amount of out-of-state solar in the portfolios. Because these choices impact both the total MW and limit where those supplies would be delivered, they fail to present a likely picture of where and in what amounts solar could be developed around the west. It is unclear whether this is because of a lack of designated solar resource areas included in the model inputs, or if the high solar cost assumptions used in the reference case translate into potentially unrealistic and constrained outputs for west-wide solar development out to 2030.

Finally, we note that because the study used a prior version of the RPS Calculator, it doesn't reflect recent California RPS trends, including over 622 MW of out-of-state wind and over 250 MW of out-of-state solar that were procured last year. *LSA's understanding is that these amounts are included in the total incremental resources and request that CAISO highlight how and where current procurement trends are included as part of the final report.*

Questions on the Low-Cost Solar Sensitivity – Assumptions and Results

LSA appreciates the inclusion of a low-cost solar sensitivity into the RESOLVE model by E3. We believe that the inclusion of this sensitivity offers a necessary look at the potential benefits of increased regionalization under a much more plausible solar costs. While we continue to have concerns with the approach to financing assumptions, which are now long overdue for an update, overall the low solar cost sensitivity provides a more realistic trajectory for use in this study.

However, this and other sensitivities were only run in the RESOLVE model and there is little detail about how this sensitivity may impact the overall results. *LSA requests that the CAISO run the low-cost solar sensitivity (with updated assumptions) in the Production Simulation Optimization (PSO) model in addition to the E3 RESOLVE model.*

Questions around the PSO Modeling Assumptions

LSA has several questions around the Brattle Group's assumption of renewables beyond the RPS under Scenarios 2 and 3. While we appreciate the inclusion of renewable procurement beyond RPSs, LSA would like to better understand the assumptions that led the Brattle Group to use wind as the only proxy for the full 5000 MW.

We assume again that the high solar costs modeled as part of the reference case for E3's RESOLVE model were folded into the Production Cost Simulations and Results, however we hypothesize that if the low solar costs modeled under the low solar cost sensitivity were used for the reference case, the analysis might show selection of more solar energy beyond the RPS along with the modeled wind. This particular assumption may or may not have a material impact on the results; however, we suspect that using the lower solar cost assumptions, as the basis for the PSO would produce more realistic portfolios in the 2030 scenarios.

2. Please organize comments on the study on the following topic areas:
- **a. The 50% renewable portfolios in 2030**
- **b. The assumed regional market footprint in 2020 and 2030**
- **c. The electricity system (production simulation) modeling**
- **d. The reliability benefits and integration of renewable energy resources**
- **e. The economic analysis**
- **f. The environmental and environmental justice analysis**

Comments on the 50% Renewable Portfolios in 2030
LSA appreciates the characterization of results during the workshop and reiteration that the portfolios resulting from the RESOLVE model are hypothetical, which drives a range of plausible benefits under regionalization out to 2030. *The final report should explicitly state that the specifics of each scenario have limited value due to their high level and hypothetical nature and, therefore, should not be the basis for future assumptions or inputs to analyses moving forward.*

It would be helpful for the final report to acknowledge that under most circumstances, an expanded regional market leads to economic and environmental benefits to California and to the west, without focusing on the relatively small differences between hypothetical scenarios.

To that end, LSA appreciates the note from E3 and the consultant teams explaining the model's selection of specific resource areas in the 2030 scenarios. In particular, the final report should highlight the trade-off between Westlands and Riverside East resource areas in Scenarios 2 and 3, where E3 has noted that: (1) the two areas are economically very similar; and (2) the selection of one resource area over another in either scenario is purely hypothetical in the model, and would be subject to a number of external factors (e.g., land use policies, economic incentives, transmission availability) in reality.

Comments on the Environmental Analysis and the Environmental Justice Analysis

LSA appreciates the careful framing of environmental impacts during the May 24-25 stakeholder meetings, and would like to reiterate the point we discussed during that meeting, which is that land use conversion will influence the environmental impacts of in-state energy development in reality. In particular, the Aspen model focuses specifically on the environmental *impacts* of energy build-out in one area versus another; however, it does not consider the current land use of a region, and the potential benefits that might occur if renewable energy development (particularly solar) takes place on disturbed lands or land converted from non-prime farmland to renewable energy generation. In such scenarios, dust mitigation, water consumption, greenhouse gas emissions, and other environmental factors could all be improved by the development of renewable energy.

Furthermore, LSA notes that the portfolios developed by the RESOLVE model and some of the implications of the solar cost assumptions carry over to the environmental analysis as well as the environmental justice analysis. *Thus, while the portfolios chosen are hypothetical, the final report should note the cascading effects of the modeling assumptions based on those choices in the overall assessment of benefits and impacts resulting from regional expansion.*

3. Other

LSA appreciates this opportunity to comment on the preliminary analysis and has no additional comments at this time.