

## CAISO Variable Operations and Maintenance Cost Review Meeting 1-8-19: Stakeholder Comments

Submitted by	Company	Date Submitted
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LS Power appreciates the opportunity to submit comments on Variable Operations and Maintenance Cost Review paper.

Energy storage resources, and specifically battery energy storage units, incur variable costs from operation and should be able to submit these costs to CAISO in order to ensure cost recovery when these projects are operated. It is inaccurate to place them on the list of “Plants without Variable Operations and Maintenance Costs” as they currently are in the Nexant report, and CAISO should move to quickly remedy this oversight as one of the next steps in the Variable Operations and Maintenance Cost Review stakeholder process.

Battery energy storage projects include long-lived components such as the buildings/enclosures, inverters and transformers that connect them to the grid, but the batteries themselves are replaceable and have finite cycle lives. Almost every battery experiences capacity fade (i.e. loses some capacity) and eventually needs to be replaced entirely or have components replaced as a function of how often and how heavily it is cycled, and this is a direct function of the MWh throughput that is charged and discharged. If CAISO’s grid optimization engine charges a battery, and then discharges it later at a spread that is not sufficient to cover this VOM cost from the accelerated replacement of the battery cells, then the battery owner is harmed economically. At this time there is no way to inform CAISO of the \$/MWh VOM cost of cycling a battery that is registered as a Non-Generator Resource (NGR), and this could and should be fixed easily.

This is an important input to CAISOs market engine, and will grow in importance as thousands of MW of energy storage resources are expected to be added to the grid in the coming years. We encourage CAISO to solicit the necessary expertise of the energy storage community and that of CAISO’s market engineers to address this necessary but missing input to the market right away.

LS Power appreciates the opportunity to provide these comments.