



November 12, 2014

Solar Grid Storage LLC appreciates the opportunity to comment on the Energy Storage Roadmap's Draft Configurations and Actions Matrix. We look forward to supporting this ongoing effort to coordinate the inclusion of innovative new technologies into California's energy infrastructure.

About Solar Grid Storage

Solar Grid Storage LLC is a leading battery project development and finance firm. It develops energy storage systems that enable high-penetration distributed generation of solar and other renewable energy sources. Solar Grid Storage solutions enhance renewable energy project returns by offering ancillary services to ISO markets. Solar Grid Storage can provide uninterruptible power services to system hosts. Aggregating these revenues allows Solar Grid Storage to finance the cost of installing the energy storage system, thereby reducing critical component costs and the ultimate cost of solar energy. Furthermore, its systems can assist in project siting by addressing utility concerns regarding renewable power intermittency.

About PowerFactor™ Storage Product

Solar Grid Storage has successfully deployed a commercial energy storage product, known as PowerFactor™, in three states along the East Coast to unlock the value of distributed PV and address concerns about grid reliability. The PowerFactor is designed and sized specifically to fit within a solar facility's interconnection. Unlike traditional solar energy systems that require a standard inverter to convert solar energy from direct current (DC) to alternating current (AC) for the host customer's use and for transmission to the grid, the PowerFactor replaces the standard inverter completely and provides such functionality. Under a standard net energy metering arrangement, a customer can supply excess electricity generated by the PV panels to the local utility and credit the value against its future electricity bills from the utility. The PowerFactor can also provide ancillary services to the grid like frequency regulation service whereby the grid operator pulls electricity generated from solar energy via the battery and sheds electricity to the battery when needed to stabilize the grid. Integration of the PowerFactor into the solar facility puts the host customer in a position to be able to provide regulation services in the same way as other power plants.

Feedback on Matrix Impact Scoring

At the outset, Solar Grid Storage emphasizes that non-exporting systems behind the meter will likely play a more dominant role in the growing energy storage landscape more than systems exporting in aggregate.¹ Specifically, energy storage systems such as PowerFactor engaged in frequency regulation

¹ For the sake of clarity, the PowerFactor system may export in real-time briefly, but we would characterize it and similar systems in the Matrix category of non-exporting when the ISO ensures the amount of energy drawn from the grid is zero on an hourly basis when netted against the amount of energy that is discharged back onto the grid within that same hour, such as in the PJM region.



or other ancillary services will, in almost all measurement scenarios, be net importers of electricity due to roundtrip inverter efficiency losses. As such, Solar Grid Storage encourages the below changes to the matrix impact rankings.

Suggested Changes Matrix Impact Ranking for: *Behind the Meter – Customer-sited with Single Meter*

Facilitate clarification by IOUs of operational constraints

The Matrix score for non-exporting systems should be changed from 1 to 3, equal to the score for exporting systems. Solar Grid Storage systems will virtually always be a non-importer due to small round-trip efficiency losses associated with frequency regulation. Any operational constraints should be identified and addressed with a comparable level of attention as exporting systems.

Clarify role of storage in deferring / eliminating transmission / distribution upgrades

Deploying energy storage with generation like solar will uniquely benefit the grid by co-locating generation with load, while also providing access for ancillary services capabilities. The matrix score of 1 for non-exporting should be increased to 3, as one of the primary benefits of a product offered by Solar Grid Storage is the ability to marry these technologies with minimal burdens on the grid. Moreover, such a system design will actually provide a net benefit to the grid considering grid services and back-up power capabilities for ratepayers.

Streamline rules for aggregations of distributed storage to participate in CAISO markets

As previously noted, most systems will be non-exporting due to roundtrip losses associated with ancillary services like frequency regulation. The aggregation of smaller systems is critical to the further deployment of energy storage, particularly at the residential level. As such, the Matrix score of 1 should be increased to 3 because onerous aggregation restrictions add significant non-hardware costs. We continue to refine our automated software controls for storage devices, but greater clarity and flexibility in aggregation rules will further reduce non-hardware compliance costs.

PJM permits aggregation of smaller systems to meet its minimum 100-kW system size for demand response participation. But PJM prohibits aggregating sub-100 kW systems with other assets that may individually meet the threshold. For example, a 150-kW system may not be combined with a 50-kW system to bid 200 kW of demand response, resulting in lost demand response capability. We suggest an aggregation method by which small systems at a minimum size of 5 kW may be aggregated in any combination to reach the threshold bid, thereby promoting flexibility and efficiency across assets.

Clarify existing tariffs for BTM storage devices paired with NEM generators



The Matrix score of 2 for non-exporting should be increased to 3 for a comparable scoring with an exporting BTM system. It is critical that rules and regulations concerning energy storage devices paired with NEM generators be clarified under both scenarios.

Define multiple uses of storage and develop needed rules

Solar Grid Storage strongly agrees with the 3 score for both non-exporting and exporting BTM systems. Such a system design and access point provides significant benefits and savings to the grid, while simultaneously empowering consumers with great resiliency through emergency back-up power and demand charge management. Furthermore, it is imperative that the Roadmap acknowledge the unique value of multi-use storage device designs by ensuring that future rules and regulations are streamlined to avoid contradictory and/or conflicting requirements on project developers. Rules and regulations should strive to incentivize ongoing innovation in multi-use design.

Clarify requirements and rules for participation

Scores for exporting and non-exporting systems should be increased from 2 to 3. See immediately preceding comment. Given some stakeholders' concerns about distributed energy storage systems paired with NEM-eligible generation, it is critical that clear rules are established that do not unnecessarily burden new innovative technologies that yield significant benefits to the grid operator and ratepayers.

Conclusion

We encourage the California ISO to look to PJM as an instructive model to adopt pro-active policies that further enable emerging storage technologies to participate in the market. The PJM market is working well for distributed and behind-the-meter systems, and the California's ISO Roadmap process is a significant opportunity to ensure seamless policy design for robust markets coast to coast.

Sincerely,

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Solar Grid Storage LLC