

## Stakeholder Comments Template

Submitted by	Company	Date Submitted
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Please use this template to provide your comments on the presentation and discussion from the California Energy Storage Roadmap workshop held on September 4, 2014.

Submit comments to [EnergyStorage@caiso.com](mailto:EnergyStorage@caiso.com)

[Comments are due September 18, 2014 by 5:00pm](#)

Presentation materials and background information discussed during the September 4, 2014 workshop may be found at:

<http://www.caiso.com/informed/Pages/CleanGrid/EnergyStorageRoadmap.aspx>

**Please provide your comments regarding each of the storage barrier categories below that were discussed during the workshop. In particular, please direct your comments towards actions that need to be taken (and by whom) in order to further facilitate deployment of storage in California and provide feedback on the priority of the actions that are needed.**

### Financial and Ancillary Services Barriers

#### Recorded Workshop Findings:

Financial and ancillary service concerns were among the most significant to stakeholders. It was suggested that the financial barriers are largely a result of either costly requirements in other areas (e.g., requirements related to interconnection or metering) or lack of opportunities to monetize potential benefits, which could include contracts as well as market-based or tariff-based products and services.

Other concerns included the need to clarify which aspects of storage operation are subject to wholesale versus retail rates, lack of consistency in how storage is defined, and how storage can function in different types of “hybrid” arrangements, such as providing distribution level services while also participating in wholesale markets. Regarding bilateral contracting, it was suggested that the 10-20 year contracts for storage that are planned by the IOUs to meet the CPUC storage mandates provide relief but might be insufficient to provide long-term revenue certainty for high-capital cost pumped storage hydro projects. Stakeholders identified the need to align economic incentives so that utilities contracting for storage also value system benefits such as voltage support, black start, congestion, etc., as well as deferral of distribution or transmission infrastructure upgrades. Several stakeholders referred to the new CPUC proceeding on distribution resources plans (R.14-08-013, pursuant to AB 327) as a venue that will take up some of the issues important to storage and other distributed energy resources (DER).

### Comments:

A key purpose of the AB 2514 storage mandate is to drive down storage costs by increasing competition, decreasing battery and power conversion costs by increased manufacturing scale, breaking down barriers, and developing industry expertise.

The idea that the best storage technologies are costly is a myth and current costs should not be allowed to be a barrier to procurement under AB 2514 since AB 2514 is designed to help reduce costs.

It is not clear that the new CPUC proceeding on distribution resources plans (R.14-08-013, pursuant to AB 327) will effectively address the issues of distributed storage coordination with wholesale markets and the tariffs to support such coordination. Instead the current “More than Smart” proposals extend the complex and ineffective “command and control” approach to distributed storage with no current proposals for effective tariff reform to support decentralized operation of DER and storage on the distribution grid.

## **Interconnection Barriers**

### Recorded Workshop Findings:

The major barriers in the interconnection process relate to the complexity of these processes and the uncertainty that they create for developers. Stakeholders sought to clarify the different processes and match them to the needs of each type of system need. Currently, the disparate interconnection processes managed by the ISO and the utilities are difficult to understand; however, the distribution level interconnection processes are viewed as more complex and may be too involved and costly for small distributed resources. In particular the relationship between CPUC Rule 21 and the utilities’ Wholesale Distribution Access Tariff (WDAT) is unclear, and it is difficult for a proposed project to move from one process to the other as its business requirements change (e.g., the need for deliverability to qualify for resource adequacy) . Individual WDAT requirements are potentially costly, in the range of 30-35% of total project costs for small distributed resources. It was suggested that an interconnection process flowchart differentiating between interconnection levels, project configurations, and the

project's indented operating behavior based on the products and services it will provide would be helpful to developers.

Comments:

A primary goal of this storage roadmap should be to lay out a process in coordination with the distribution OIR and other proceeding to examine alternative distribution and retail tariffs and to make certain they work for storage as well as other resources and end customers.

A second goal of the storage roadmap should be to develop a plan for providing feeder, substation and transmission information and models in a form that is useful to allow qualified developers to work with the distribution operators to select good sites and the amount of storage that might be useful at each site.

With proper tariffs that dynamically prices charging and discharging of storage, storage can be trusted to solve grid constraints and deliverability problems rather than create problems. Tariffs can help the interconnect problem by encouraging storage investments in the right place and encouraging self-dispatch of storage in response to dynamic tariffs. Additionally, the interconnection process needs to reflect the fact that battery storage can be added incremental at a site given the actual operating experience of storage at a site. And many types of storage can be relocated should operational problems arise or if it is discovered that the storage has little value at a given site.

## **Market Rules and Regulatory Barriers**

Recorded Workshop Findings:

One of the major topics of the market rules discussion was the definition of hybrid storage resources. The discussion identified three main categories of "hybrid" functioning by a storage resource: (1) serving in part as a transmission asset and recovering part of its costs through the transmission access charge, and in part as a market participant and earning part of its costs through the market; (2) providing grid-related services to both the distribution and transmission systems; and (3) located behind the end-use customer meter and providing load-management services to the customer while also participating in the spot market. All of these models lack rules and provisions for how they can work and how they would be compensated. Parties identified a highly problematic uncertainty for project development is the lack of clarity regarding wholesale versus retail rate treatment for such things as auxiliary load, station power, and roundtrip efficiency. Additional clarity was requested relative to the definitions, configurations and uses of behind-the-end-use-customer meter storage and generation combinations. It was proposed that clear single line drawings of resource configurations and the associated metering required for high-priority use cases would be beneficial in helping to address both market rules and metering barriers. One specific issue raised was the need to revise the ISO's procedure for testing and certifying resources for ancillary services, because the existing approach designed for generators is not well suited for

storage. Stakeholders also asked for clarification regarding aggregation of resources under the ISO's NGR model.

Comments:

Again, retail and to a lesser extent wholesale tariffs for storage are broken and a primary goal of the storage roadmap should be to examine alternative wholesale and retail tariffs that make sense for all resources including storage and all customers.

At the core of this problem is confusion and uncertainty regarding future business and regulatory models for the California electricity sector. Alternative business and regulatory models need to be examined and decision made by the CPUC and possibly the legislature. While this is likely beyond the scope of a storage roadmap, the roadmap can certainly recommend such examination and decisions and condition the storage roadmap on such decisions about tariffs and business and regulatory models.

## **Metering and Telemetry Barriers**

Recorded Workshop Findings:

A distinction was made between metering for settlement purposes, and telemetry for operational needs and it was noted that these two concepts may be merging in the future as the quality of the metering data architecture improves. Some parties argued that there should only be one meter to capture the "net" behavior of any given facility, rather than trying to capture different "behind-the-meter" aspects of its behavior with multiple meters; the argument was that as behind-the-meter behavior details become more and more complex, trying to capture the details with more complex metering would be very costly without yielding sufficient improvements in accuracy. Other parties made the counter argument that the facility could be providing different services to different entities (e.g., ISO and distribution system), or under different compensation provisions (e.g., contract and market price), so multiple meters would be necessary to determine the appropriate compensation for each such service. High fixed costs for metering are a concern especially for smaller projects. Various suggestions for metering configurations were proposed, involving single meters, combinations of wholesale and retail meters, and more complex configurations. It was also suggested that the complexity in metering and telemetry was caused more by the underlying tariffs than by the actual measurement. Certification of integrated device metering was proposed as a potential cost reduction.

Comments:

The only feasible metering solution is "one meter to capture the "net" behavior of any given facility". And with the right decentralized business and regulatory model only one meter per facility is needed. The distribution operator and others can install plenty of inexpensive phasor measurement units (**PMU**) all over the distribution grid to give the distribution operator, the CAISO and others visibility into the distribution grid.

Telemetry from decentralized resources and loads should be unnecessary given PMUs. Revenue quality meters on each facility should be sufficient for settlement.

As mentioned above, the complexity in metering and telemetry is caused primarily by the underlying tariffs; a complexity that is best fixed by tariff and business and regulatory reform rather than expensive technology and complex and expensive metering requirements.

## **Modeling Barriers**

### Recorded Workshop Findings:

A standard modeling methodology for assessing the benefits and cost-effectiveness of storage and clarity on how it would be used in utility procurement evaluations would be very helpful, but complexity of the system may prevent this. Stochastic modeling and sensitivity to variable generation and load forecasts were proposed as important considerations in future modeling. Many of the utility stakeholders have done significant analysis and modeling of storage resources, but this work has been internal and unable to significantly contribute to the public understanding of the value of storage. Some parties pointed out the need for greater clarity around the different specific needs for improved modeling, so that modeling improvements could be focused on the needs. One significant need is for an accepted methodology for assessing the value(s) a storage device can provide, which will affect how it earns revenues. Others argued that it is not possible to accurately model the behavior of a storage facility operating so as to maximize its revenues from charging at low prices and discharging at high prices

### Comments:

Yes, accurate modeling for centralized dispatch not possible. Moreover centralized dispatch is often not compatible with customer uses of energy including distributed storage. Modeling for planning is still needed, but accuracy requirements are less.

## **Standards Barriers**

### Recorded Workshop Findings:

It was proposed that the most pressing need for storage standards was a unified, stringent fire protection codes, else fire-related issues could seriously damage perception of the industry. Some local municipal standards were mentioned, but it was agreed that no concerted effort has been made in the legislature. Different uses of storage and different storage technologies could require a variety of safety codes and standards. For instance, hesitance of alternative fuel vehicle automakers to become UL certified would be a case specific standards barrier. The difference between certification requirements for utility systems and independent power plants was also mentioned.

### Comments:

Yes, standards for safety need to be understood. What safety standards apply in California for storage? When is UL certification for stationary storage required or not? When UL certification is required, is it only for the power conversion system, or must the battery subsystems also be UL certified? Why should there be difference between utility certification requirements and 3<sup>rd</sup> party requirements?

## **Additional Barriers**

### Recorded Workshop Findings:

At the end of the stakeholder meeting, there was an open discussion of additional barriers. Five issues were suggested as potential barriers that have not yet been covered:

- Greenhouse gas impacts and policy
- Silo-ed proceedings at the CPUC on issues that pertain to demand and demand management: energy efficiency; demand response; storage; LTPP. It was suggested that the new CPUC proceeding on distribution resources plans (R.14-08-013) would be a venue to address issues that cut across these different distributed resource types.
- Difficult to participate in existing markets for non-generating resources
- Lack of an articulated need for market products and system flexibility from the CAISO and IOUs
- The roadmap should provide a vision based on consideration of alternative scenarios, to help set priorities among the issues and identify “least regrets” actions that will be needed across all scenarios.

### Comments:

Yes, the silo-ed proceedings at the CPUC are inhibiting progress and are a major barrier in achieving California’s policy goals for GHG reduction, renewables, distribution generation, storage, reliability, resiliency, lowest cost and innovation. While the distribution OIR will address some of these issues, the overall tariff, and business and regulatory model issues and proceedings are still silo-ed or not yet addressed at all. Clearly, the CPUC needs to address tariff and business and regulatory models in an integrated proceeding that then informs the distribution OIR, storage roadmap and other proceedings.

Yes, it is difficult (impossible) to participate in existing markets for non-generation resources. The roadmap needs to address this issue head-on without creating even more new products and markets.

Finally, the issue of storage duration needs to be addressed to inform current storage procurements. The CASIO has studied flexibility needs for ramping but not the need to smooth the duck curve and reduce the waste of renewables from over generation by renewables as well as the impacts on GHG. E3 ( [https://ethree.com/documents/E3\\_Storage\\_Valuation\\_Final\\_Phase\\_1.pdf](https://ethree.com/documents/E3_Storage_Valuation_Final_Phase_1.pdf) ) has done an analysis of these issues and recommends storage durations on the order of 6 hours or more, rather than the 3 hours the CAISO is currently advocating for FRAC-MOO, or the 4 hours duration required for generic resource adequacy.