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Docket Number:	17-EPIC-01
Project Title:	Development of the California Energy Commission Electric Program Investment Charge 2018 â€“ 2020 Triennial Investment Plan
TN #:	215889
Document Title:	Pam Seidenman Comments: Advanced Microgrid Solutions EPIC Triennial Planning Comments
Description:	Comment 2
Filer:	System
Organization:	Pam Seidenman
Submitter Role:	Public
Submission Date:	2/10/2017 4:34:52 PM
Docketed Date:	2/10/2017

Comment Received From: Pam Seidenman
Submitted On: 2/10/2017
Docket Number: 17-EPIC-01

Advanced Microgrid Solutions EPIC Triennial Planning Comments

Additional submitted attachment is included below.

Stakeholder Input for the 2018 – 2020 EPIC Triennial Investment Plan

Advanced Microgrid Solutions: Comment 1

Category: Increase System Flexibility from Low-Carbon Resources

1. Please provide a brief description of the proposed initiative.

Identify and eliminate barriers that prevent advanced energy storage systems from providing multiple functions for multiple stakeholders: e.g. capacity, back up generation, demand response, Volt/VAR, reactive power, integration with solar and other clean energy sources, and other ancillary services.

2. What technical and/or market barriers would the proposed initiative help overcome? For scientific analysis and tools, what knowledge gaps would the proposed initiative help fill?

Advanced energy storage systems have the ability to provide multiple services for multiple stakeholders, at various points on the electric grid. This is particularly true for storage resources that are located behind a customer's meter. However, antiquated energy market rules and regulations often prevent storage from performing up to its full potential. The existing rules are based on a framework in which a single central resource performs a single function. Regulations, rules and policies need to be updated to not only allow, but encourage the multiple uses of new distributed energy resources, by specifying revenue opportunities for the functions that have yet to be monetized. EPIC is positioned to play a critical role by funding initiatives that enable storage to demonstrate the value of the many functions it can serve.

3. If this initiative is successful, either fully or partially, what would be the expected impact? Who are the primary users and/or beneficiaries?

Demonstration projects in this area would validate the ability of storage to provide these multiple functions and would provide data to inform regulators and the market in determining the value of performing these services. EPIC funds can accelerate commercialization and market transformation.

Ratepayers benefit because the cost of storage assets can be recouped in multiple ways. The grid benefits by preventing the construction of redundant systems and/or by avoiding expensive upgrades that would not be needed if storage were in place and allowed to provide multiple functions such as capacity, ancillary services, back up generation, demand response, Volt/VAR, reactive power, etc.

The ability of storage, especially when combined with renewables to provide critical backup power over many days, provides California with a means to recover from significant grid disruptions, such as earthquakes or other natural or man-made grid disruptions. We know that earthquakes will continue to occur and that climate change

has increased the number and severity of extreme weather events. The ability of communities and businesses to access critical power supply will have a significant impact on the ability of the state to recover from these disasters.

Finally, BTM storage promotes C&I customer awareness and engagement with their utility and their energy use, both of which are IOU goals. When ratepayers are aware of their use and more engaged, they are more likely to adopt energy saving activities.

4. Describe what quantitative or qualitative metrics or indicators would be used to evaluate the impacts of the proposed initiative:

a) Amount of storage (kW) providing multiple functions, categorized by the number of functions performed, ie, kW performing 2 functions, kW providing 3 functions, and so on.
b) Utility deferred and avoided costs due to various functions performed by advanced storage
c) Regulations adopted that permit revenue for multiple functions performed by storage
d) Amount of kW that can function in multiple modes: a) tied to grid and b) independent from the grid (islanded)
e) Number of entities that adopt renewables + storage as part of their backup power strategy
f) Reduced GHGs from avoiding generator use for backup power

5. Please provide a list of peer-reviewed references that support the responses for questions 3 and 4. Proposed initiatives that include peer-reviewed references will be given stronger consideration.

The Economics of Battery Energy Storage, Rocky Mountain Institute, describes the need for multiple stacked revenue streams to be available to compensate storage for the value it provides to end users, the grid, and the wholesale market.

Draft Phase II report of the 2015 Demand Response Potential Study, provided by the Lawrence Berkeley National Laboratory (LBNL) describes the many 'flavors' of demand response that storage can provide.

6. (For technologies only) What competitive advantages does the proposed technology solution have over current benchmark technologies? If the technology is beyond the prototype stage, what strategies do you suggest to bring to scale?

Advanced storage has the potential to the 'Swiss army knife' of tomorrow's grid. It can provide the many types of DR described by LBNL: shape, shift, shed and shimmy. No other type of DER has the flexibility that storage has to enable higher penetrations of solar and other renewables – without curtailment; and to provide dispachable capacity, backup generation, automated demand response, Volt/VAR, reactive power, and other ancillary services.

When added to energy efficiency and renewable energy systems, storage adds synergies that make the economics of the entire system better as well as increasing the ability of such a system to provide multiple benefits to multiple stakeholders.

Backup power: Diesel and gas generators are often used as backup power, but these sources emit GHGs and may be exhausted during a long (multi day or longer) grid disruption. Storage + renewables offers cities and counties the ability to provide emergency services with clean power options, increases the ability for individuals to shelter in place, and aids California's high-tech economy to recover after a significant grid disruption.

7. Category

Increase System Flexibility from Low-Carbon Resources