

NEW ORGANIZATION FOCUSES ON ENERGY STORAGE STANDARDS

The Modular Energy Storage Architecture (MESA) Standards Alliance (www.mesastandards.org) is a new industry trade association composed of a number of utilities and vendors.

MESA's mission is to accelerate the growth of the energy storage industry through the development of open, non-proprietary communication specifications (standards) for energy storage systems. Through standardization, MESA hopes to accelerate interoperability, scalability, safety, quality, and affordability in energy storage components and systems.

MESA's Founding Members are: Alstom, Doosan, LG Chem, Pacific Northwest National Laboratory, Parker, Puget Sound Energy, Seattle City Light, SMUD, Snohomish County Public Utility District, and UE Technologies.

Contributing Members are: Alevio, Amber Kinetics, Austin Energy, Blue Pillar, Duke Energy, Eaton, GreenCharge, Greenlots, IHI, NEC, Nextera Energy, Nuvation Engineering, Samsung, Siemens, Sinexcel, ViZn, and Win Inertia.

Strategic Partners are: Battery Innovation Center, National Electrical Manufacturers Association, and SunSpec Alliance.

WHY THE NEED?

Why is there a need for such an initiative? According to MESA, grid-connected energy storage promises large potential benefits. And yet, before safe and affordable energy storage can deliver on its promise, electric utilities and their suppliers must solve significant problems, many of which boil down to lack of standardization.

Standards are required for any technology to be deployed at scale. MESA believes that, like other industries, the energy storage industry needs to organize for scale, based on a cohesive industry vision and technology standards.

MESA's standards will be designed to clear barriers to growth in energy storage. By making standard connections between components possible, MESA hopes to free utilities and vendors to focus on delivering more cost-effective electricity to their customers.

Current utility-grade energy storage systems (ESS) are project-specific, one-off solutions, according to MESA, built using proprietary components that are not modular or interoperable. Connecting these proprietary systems with key utility control software, such as SCADA platforms, is cumbersome and time-consuming.

Before an ESS can function, the batteries, power converters, and software that make up the ESS must be intelligently

“plugged into” each other and the electrical system. Then the ESS as a whole must be intelligently plugged into the utility's existing information and operations technology.

Without established standards, components and systems end up with their own proprietary connectors, and the process of plugging them together must be repeated for each new project. Connecting the proprietary pieces can result in a motley collection of custom interfaces designed to address vendor-specific hardware. Creating such systems then becomes a complex process that comes with its own heavy baggage.

As MESA sees it, component vendors that are tempted to stretch their expertise and offer a complete ESS solution end up losing focus on their own core competencies. Instead of developing innovative, best-of-breed components (such as a better, cheaper battery), these vendors simply re-invent another proprietary wheel.

MESA believes that one-off, proprietary solutions end up being inflexible, not easily scalable, and having limited operational control. In addition, the utility customer becomes dependent on a single ESS supplier, with few options to upgrade, expand or re-purpose its energy storage investment.

Despite willing buyers (electric utilities) and willing sellers (battery, power converter, and software suppliers), energy storage market growth has tended to be limited. Significant opportunities (for example, the potential for broad deployment of standardized ESS configurations at many utility substations) are currently beyond the industry's reach.

To fully enable broad deployment of grid-connected storage and grow the market for all participants, standards are required to address these limitations.

MESA'S OBJECTIVES

MESA has six stated objectives (goals) that it is seeking to achieve.

- 1 - Standardize communication and connection, which will accelerate interoperability and scalability of energy storage systems.
- 2 - Give electric utilities more choices by enabling multi-vendor, component-based energy storage systems.
- 3 - Reduce project-specific engineering costs, enabling a more robust energy storage market.

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4 - Enable technology suppliers (from software developers to battery suppliers) to focus on their core competencies in producing quality, safe and cost-effective components.

5 - Reduce training costs and improve safety for field staff through standardized procedures for safety and efficiency.

6 - Expedite the development and industry deployment of storage-specific communication specifications, before submitting them to appropriate Standards Development Organizations (SDO).

MESA'S STANDARDS INITIATIVES

Currently, MESA is focused on developing two standards: MESA-Device specifications, and MESA-ESS.

MESA-Device Specifications: The MESA-Device Specifications/SunSpec Energy Storage Model consists of separate specifications for inverters, meters, and storage, which are designed to address how energy storage components within an energy storage system communicate with each other and other operational components. MESA-Device Specifications are built on the Modbus serial communications protocol.

The Energy Storage Workgroup, run by SunSpec Alliance (www.sunspec.org), with contributions from MESA members, has worked through 2015 and 2016 to produce an updated draft specification for the MESA-Device/SunSpec Energy Storage Specification. This specification was released in draft status for feedback and testing in July 2016.

MESA-ESS Specification: The MESA-ESS Specification provides a standard framework for utility-scale Energy Storage System (ESS) data exchanges. The draft specification addresses ESS configuration management, ESS operational states, and the applicable ESS functions from the IEEE 1815 (DNP3) profile for advanced DER functions.

MESA launched a technical working group in March 2015 to develop the MESA-ESS Specification, based on work by the

Electric Power Research Institute (EPRI) and the DNP User Group.

MESA released a draft of MESA-ESS in November 2016. "MESA-ESS enables electric utilities or grid operators to scale deployment of energy storage and manage energy storage assets and fleets of multi-vendor assets to meet specific needs and use cases with minimal custom engineering," said Mike Rowand, director of technology development at Duke Energy, and MESA's board chairperson. "As energy storage systems multiply on utilities systems, MESA's work will greatly reduce the complexity of managing these distributed assets."

The MESA-ESS Specification is designed to support the use of non-proprietary communication standards, promote interoperability, and minimize the amount of non-recurring engineering that is required to integrate an ESS into utility control systems using DNP3.

The draft specification was developed by a technical work group of MESA members, partners, and staff over the last 18 months based on the work by the DNP Users Group. This work will feed into a larger effort to update the existing DNP3 Application Note on distributed energy and storage, which is expected to be completed in 2017.

"MESA's work to standardize energy storage system communication requirements builds upon and complements previous efforts in this area," said Ron J. Farquharson, president for the DNP Users Group. "This is an important body of work for the Users Group to consider as we update the DNP3 Application Note. We appreciate MESA's efforts to jumpstart the process to improve communications for storage systems and we look forward to continuing the collaboration."

More information on the draft specification can be found at www.mesastandards.org. The Technical Work Group will be accepting public input throughout 2017, and subsequent drafts and updates will be posted on MESA's website. For more information about the DNP Users Group visit www.dnp.org.



ABOUT THE AUTHOR

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