MESA
Open Standards for Energy Storage

The MESA Standards Alliance

The MESA (Modular Energy Storage Architecture) Standards Alliance is an industry group whose mission is to accelerate the growth of the energy storage industry through the development of an open, non-proprietary set of specifications and standards for energy storage systems. MESA's component-based approach to energy storage gives electric utilities more choice, and allows battery, power converter, and software manufacturers to reach more customers and reduce costs. Nine organizations have joined together to form the MESA Standards Alliance and will guide the organization's development and strategy.

MESA Alliance Founding Members:

- *1Energy Systems Inc.*
- *Alstom Grid*
- *Pacific Northwest National Laboratory*
- *Parker Hannifin Corp.*
- *Puget Sound Energy*
- *Sacramento Municipal Utility District*
- *Seattle City Light*
- *Snohomish County PUD*
- *UniEnergy Technologies*

Key MESA Goals

- Standardize communications and connections, which will accelerate interoperability and scalability.
- Give electric utilities more choice by enabling multi-vendor, component-based ESS.
- Reduce project-specific engineering costs, enabling a more robust energy storage market.
- Enable technology suppliers to focus on their core competency, facilitating quality, safety, and cost-effectiveness.
- Reduce training costs and improve safety for field staff through standardized procedures for safety and efficiency.

Why MESA?

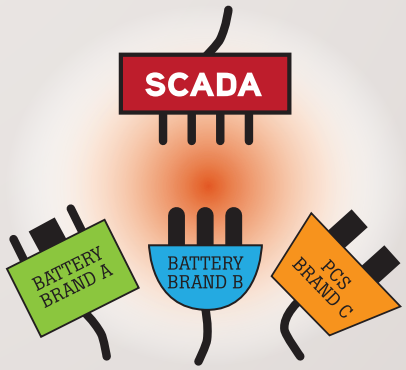
Grid-connected energy storage promises large potential benefits. And yet, before safe, affordable energy storage can deliver on its promise, electric utility customers and their suppliers must solve significant problems. Many of these problems boil down to lack of standardization.

Standards are required for any technology to be deployed at scale. The personal computer industry grew from few to millions of units per year, while dramatically improving price-performance, based on standards for its software and hardware components. Like other industries, the energy storage industry needs to organize for scale, based on a cohesive industry vision and technology standards.

MESA Standards clear barriers to growth in energy storage. By making standard connections between components possible, MESA frees utilities and vendors to focus on delivering more cost-effective electricity to more people.

Problems Limiting Energy Storage Today

Current utility-grade energy storage systems (ESS) are project-specific, one-off solutions, 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



Each proprietary plug requires its own custom socket.

utility's existing information and operations technology. Without established standards, components and systems offer their own proprietary connectors, and the process of plugging them together must be repeated for each new project.

Time, Money, Safety

Connecting the proprietary pieces can result in a motley collection of custom interfaces, or "kludges," designed to address vendor-specific hardware. Creating such systems is a complex process that comes with its own heavy baggage:

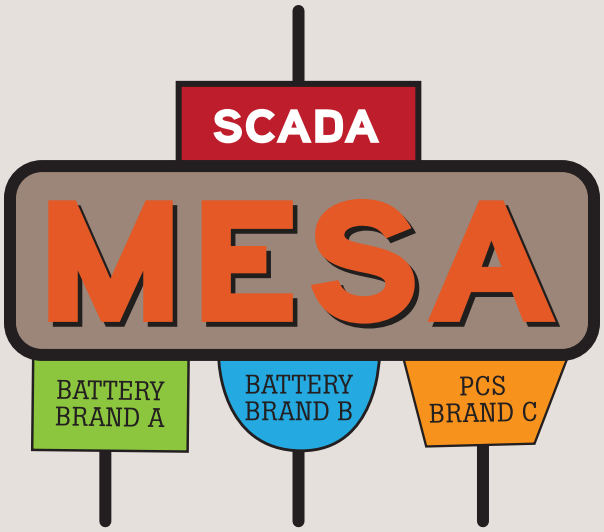
- High project costs, and decreased reliability and safety.
- Component vendors tempted to stretch their expertise and offer a complete ESS solution, losing focus on their own core competency. Instead of developing innovative, best-of-breed components—such as a better, cheaper battery—these vendors simply re-invent yet another proprietary wheel.
- One-off, proprietary solutions that are inflexible, not easily scaled, and have limited operational control. The utility customer becomes dependent on a single ESS supplier, with few options to upgrade, expand or re-purpose their energy storage investment.

Despite willing buyers (electric utilities) and willing sellers (battery, power converter, and software suppliers), market growth is limited. Significant opportunities – for example, the potential for broad deployment of standardized ESS configurations at many utility substations – are beyond the industry's reach in its current form.

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

The MESA Solution

Modular Energy Storage Architecture (MESA) is an open, non-proprietary set of specifications and standards developed by an industry consortium of electric utilities and technology suppliers. Through standardization, MESA accelerates interoperability, scalability, safety, quality, availability, and affordability in energy storage components and systems.



MESA offers plug-and-play connectivity to both vendors and utilities.

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