East Penn Manufacturing Co

Grid-Scale Energy Storage Demonstration Using UltraBattery™ Technology

Project Description

East Penn Manufacturing will design and construct an energy storage facility consisting of an array of UltraBattery™ modules integrated in a turnkey Battery Energy Storage System (BESS). In addition to the UltraBatteries™, the BESS will include a power conditioning system, a master programmable controller, and a battery monitoring system. The UltraBattery™ is a hybrid energy storage device that combines an asymmetric ultracapacitor and a lead-acid battery in one unit cell. By incorporating ultracapacitor technology within the battery, the UltraBattery™ is expected to provide the same benefits as lead-acid battery systems, including low initial cost, full recyclability, and increased cycle life.

To demonstrate modularity and portability, a self-contained, Containerized UltraBattery™ System will be designed and included as a subset of this project. The completed energy storage system will be designed to sell up to 3 MW of frequency regulation to Noble Americas Energy Solutions, a designated load serving entity within PJM. In addition to frequency regulation, the system will provide demand management services to Met-Ed during specified peak power periods. These services will provide up to 1MW for 1 to 4 hours to meet the requirements of PA Act 129. The UltraBattery™ is uniquely suited to these applications because it was designed for High Rate Partial State of Charge cycling. The system is sized to maintain the battery's state of charge between 70 percent and 30 percent for a maximum 40 percent depth of discharge for continuous regulation services.

Goals/Objectives

- Integrate advanced energy storage technology into an existing utility grid
- Demonstrate the economic and technical viability of an UltraBattery™ BESS for frequency regulation ancillary services and demand management
- Establish the cost of the UltraBattery™ and all of the controlling power electronics required for a utility grid management application

Key Milestones

- System installation/integration complete (April 2012)
- Commissioning complete (July2012)
- First year data collection/operation report (September 2013)
- Final Report (May 2015)

Benefits

- Retain Jobs
- Lower electricity costs
- Grid reliability improved
- Renewable resource integration
- Greenhouse gas emissions decreased

CONTACTS

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PARTNERS

Ecoult
PJM
Noble Americas Energy Solutions
Met-ED

PROJECT DURATION

02/01/2010–05/31/2015

BUDGET

Total Project Value
$5,087,269

DOE/Non-DOE Share
$2,543,523/$2,543,746

EQUIPMENT

UltraBatteries™
Power Conversion System
15 kV Switchgear
69Kv Bus and Fused Switch
Battery Cooling System

DEMONSTRATION STATES

Pennsylvania

CID: OE0000302

Managed by the National Energy Technology Laboratory for the Office of Electricity Delivery and Energy Reliability