



## Primus Power Corporation Wind Firming EnergyFarm™

### Project Description

Primus Power is deploying a 25MW/75MWh EnergyFarm™ in the Modesto Irrigation District (MID) in California' central valley that consists of an array of 250kW EnergyPods™; plug-and-play zinc-flow battery modules and power electronics systems housed inside ISO shipping containers. The modular design and operation will be field tested at Pacific Gas & Electric with support from Sandia National Laboratories and the Electric Power Research Institute. The 25MW EnergyFarm™ will support MID's efforts to balance increasing amounts of renewable generation and more efficiently manage its fleet of generating assets to meet peak loads. The system will likely be deployed incrementally in multiple substations and provide additional benefits such as local-area voltage stability and deferral of substation upgrades. EnergyFarms™ are scalable and rapidly deployable, and can be scaled to greater than 100MW/300MWh in increments of 250kW/750kWh.

### Goals/Objectives

- Develop a distributed, mobile energy storage module based on a zinc-flow battery technology that can be mass produced
- Reduce system capital costs and footprint
- Enhance application flexibility
- Validate module performance and functionality (greater than 70 percent efficiency)

### Key Milestones

- Beta EnergyCell testing (September 2013)
- EnergyPods™ 3<sup>rd</sup> Party Validation (June 2014)
- First production EnergyPods™ built (March 2015)
- Field commission first EnergyPod™ (August 2016)
- Field commission final EnergyPod™ (August 2018)

### Benefits

- Reduced power costs
- Accelerated adoption of renewable energy resources
- Reduced greenhouse gas emissions
- Advanced battery manufacturing established in the U.S.



### CONTACTS

#### Ronald Staubly

Project Manager  
National Energy Technology Laboratory  
3610 Collins Ferry Road  
Morgantown, WV 26507-0880  
304-285-4828  
Ronald.Staubly@netl.doe.gov

#### Tom Stepien

Principal Investigator  
Primus Power Corporation  
3967 Trust Way  
Hayward, CA 94545  
510-342-7602  
tom.stepien@primuspower.com

### PARTNERS

Modesto Irrigation District  
Applied Intellectual Capital Labs  
Pacific Gas & Electric  
Electric Power Research Institute  
Sandia National Laboratory

### PROJECT DURATION

1/1/2010–7/31/2016

### BUDGET

**Total Project Value**  
\$46,700,000

#### DOE/Non-DOE Share

\$14,000,000/\$32,700,000

### EQUIPMENT

Flow-Battery EnergyPods™  
Power Electronics/Inverter  
Transformers

### DEMONSTRATION STATES

California

CID: OE0000228

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

