

Exceptional service in the national interest



Sandia FY17 Analysis and Controls Efforts

Ray Byrne

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Energy Storage Analytics

Equitable Regulatory Environment Thrust Area

- Goals: Lower barriers to widespread deployment of energy storage by identifying new and existing value streams, quantifying the impact of policy on deployment, and developing new control strategies
- Objectives:
 - Project case studies
 - Tools for storage valuation
 - Identify new value streams
 - Control strategies to maximize revenue/grid benefit
 - Assess policy impact on storage
 - Develop policy recommendations
 - Standards activities (PNNL/SNL Energy Storage Protocols)



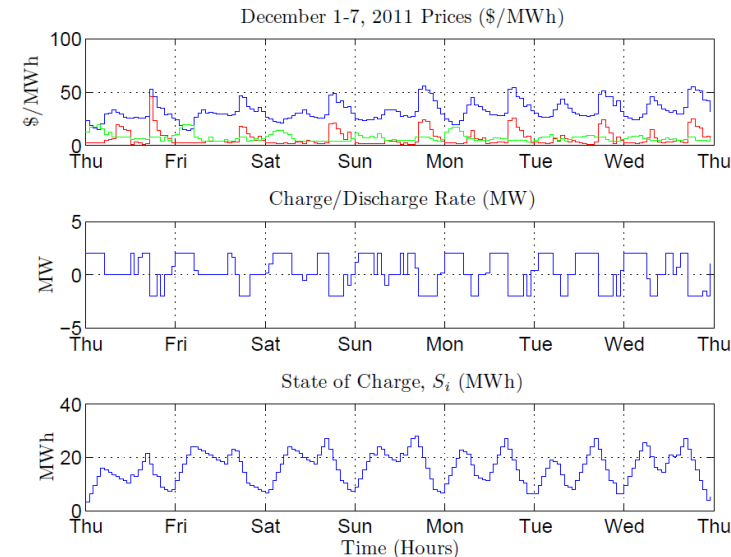
Demonstration Project Support

- Electric Market Authority (EMA) of Singapore
 - Analysis of peak shaving sizing
- Sterling Municipal Light Department, MA
 - Analysis of ISO-NE revenue streams, 2017 IEEE PES GM paper, two webinars
- Cape & Vineyard, MA
 - Analysis of ISO-NE revenue streams
- Green Mountain Power, VT
 - Analysis of ISO-NE revenue streams
- Los Alamos, NM
 - Analysis of benefits with respect to PNM Tariff
- Taos, NM
 - Preliminary analysis of peak shaving benefits
- Joint Base Andrews
 - Analysis for WGL Energy proposal
- German Secondary Control Reserve (SCR) market analysis
 - Analysis of SCR benefit, paper accepted in 2018 IEEE T&D Conference
- Oahu Energy Storage Study
 - Paper submitted to *Journal of Energy Storage*



Storage Valuation R&D

- Analysis of MISO market
 - Results presented at the 2017 IEEE PES GM
- Behind the meter applications
 - Results presented at the 2017 EES North America and paper at 2017 IEEE North American Power Symposium (NAPS)
- Revenue optimization with nonlinear energy storage model
 - Poster at peer review
- Open source energy storage valuation, sizing, and placement tool
 - Limited functionality prototype – DOE demonstration later this month



Energy Storage Controls R&D

- BPA damping control project
 - Successful May/June 2017 testing at BPA
 - R&D 100 Award Finalist
 - 2017 Sandia Employee Recognition Award Winner (team category)
- Networked/distributed control of energy storage
 - Power system stability with time delays, presented at the 2017 IEEE North American Power Symposium (NAPS), paper submitted to the American Controls Conference
 - Control of distributed storage, 2017 EESAT paper
 - Optimal control of distributed energy resources (energy storage, PV, micro-turbines, CHP, etc.), stochastic optimization and forecasting
- Energy management systems
 - IEEE Access journal paper

