Multi-Objective Energy Storage Labs

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Sandia Energy Storage System Labs

Energy Storage Test Pad (ESTP)

Energy Storage Controls and Analytics Lab (ESCAL)
Energy Storage Test Pad
Albuquerque, NM

From SNL Grid

1500 kVA 12470Δ/480Y Volt Transformer

Main CB 2500a

480Y/277 Volt Switchgear

225a

1600a MTR

1600a MTR

1600a MTR

400a MTR

600a MTR

30a

1PH1 200a Panel

750kW - 1MW Energy Storage Hookup

1MW Resistive Load Bank

1MVAR Reactive Load Bank

UET Flow Battery 250kW/1MWh

DETL Microgrid Tie

TVSS

(M) = Motor Operated

MTR = High Level PQ Metering
ENERGY STORAGE CONTROLS AND ANALYTICS LAB (ESCAL)
XNET is an isolated Sandia network connecting many labs.
Energy Storage Technology Evaluation

- Dynamic Model Development
- Technology Performance evaluation and comparison
Energy Management and Dispatch Controls

- Optimized economic dispatch algorithm development for grid tied and islanded systems
- Resilient and Stacked application development
- Validation through real time power hardware-in-the-loop and field validation
Topology Evaluation

- Central (Big) vs Distributed (Multi-Small)
Topology Evaluation

- Central (Big) vs Distributed (Multi-Small)
- Series vs Parallel UPS

Critical Load
Topology Evaluation

- Central (Big) vs Distributed (Multi-Small)
- Series vs Parallel UPS
Remote Data Gathering

- Performance Evaluation such as degradation of technologies for various applications
- Optimize dispatch over time
- Future: Machine Learning algorithm
Thank you to DOE/OE Dr. Imre Gyuk for supporting this and other projects advancing the industrial and commercial acceptance of energy storage.