SIRFN Capability Summary
Brookhaven National Laboratory, Upton, NY, USA

Introduction

Brookhaven National Laboratory has laboratory facilities, existing and under construction, to conduct applied research and development on a wide range of Smart Grid applications. BNL's regional partner organizations will conduct research using the BNL site and micro-grid as a site for R&D and field testing. Likewise, BNL is working with regional partners to further prove out their R&D with field pilots and demonstrations. The key research areas are listed below:

- **Northeast Solar Energy Research Center (NSERC)**
    - **NSERC** will include a grid-connected 1MW solar research array for testing innovative new technologies for renewable energy integration, as well as micro-grid

- **SGRID³: Smarter Electric Grid Research, Innovation, Development, Demonstration, Deployment Center:**
    - **The Advanced Electrical Grid Innovation and Support (AEGIS) Center:** will provide a unified grid information center which focuses on both T&D information to provide unambiguous insight into the specific NE electric grid issues on multiple scales. This facility will include a computational center to focus on solving grid computation challenges.

Research is conducted on behalf of the U.S. Department of Energy, the U.S. Department of Defense, and other customers, often in collaboration with industry and academic partners.

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Grid-connected 1MW solar energy research array with reconfigurable architecture for field testing innovative new smart grid technologies

- Renewable Energy Integration
- Advanced Smart Grid Sensors
- Distribution Simulation and Automation
- Distributed Generation and Storage
- Advance Power Electronics
- Interoperability, Communications & Security
- Solar Technology & Grid-Related Standards & Codes
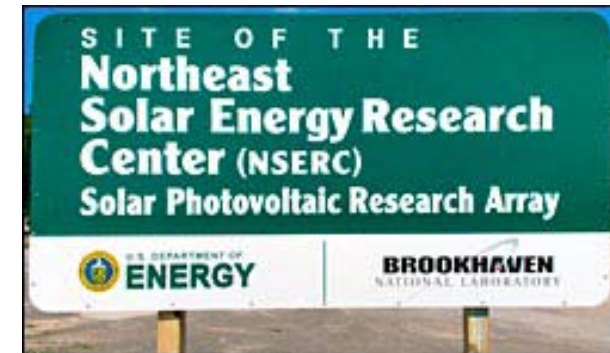
NSERC will provide unique capabilities for renewable energy and smart grid research:
- **1MW grid-connected solar research array**
- **Field testing under actual northeastern US conditions**
- **No UL listing or interconnect permits needed**
- **Instrumented smart micro-grid test bed**
- **Access to data from eastern interconnection**

With the vision of model-forward, SGRID³ will provide the facility and focus on the Northeast electric grid with modeling and simulation using actual power systems in real time operation

- Integrated System Models
- Historical and real time data and measurements
- Geographically-based information
- Component Models
- Simulations of natural and unnatural events
- Developing and testing advanced micro-grid management strategies

SGRID³ via its Advanced Electrical Grid Innovation and Support (AEGIS) Center will facilitate the development of new capabilities to allow utilities to monitor and model their grids in real time – a capability that currently does not exist.

• Develop knowledge that will guide future utility investments in the electrical transmission and distribution systems in the Northeast.

• Provide computing capability for grid studies with simulation focused on natural and unnatural events