Regional Partnership Projects

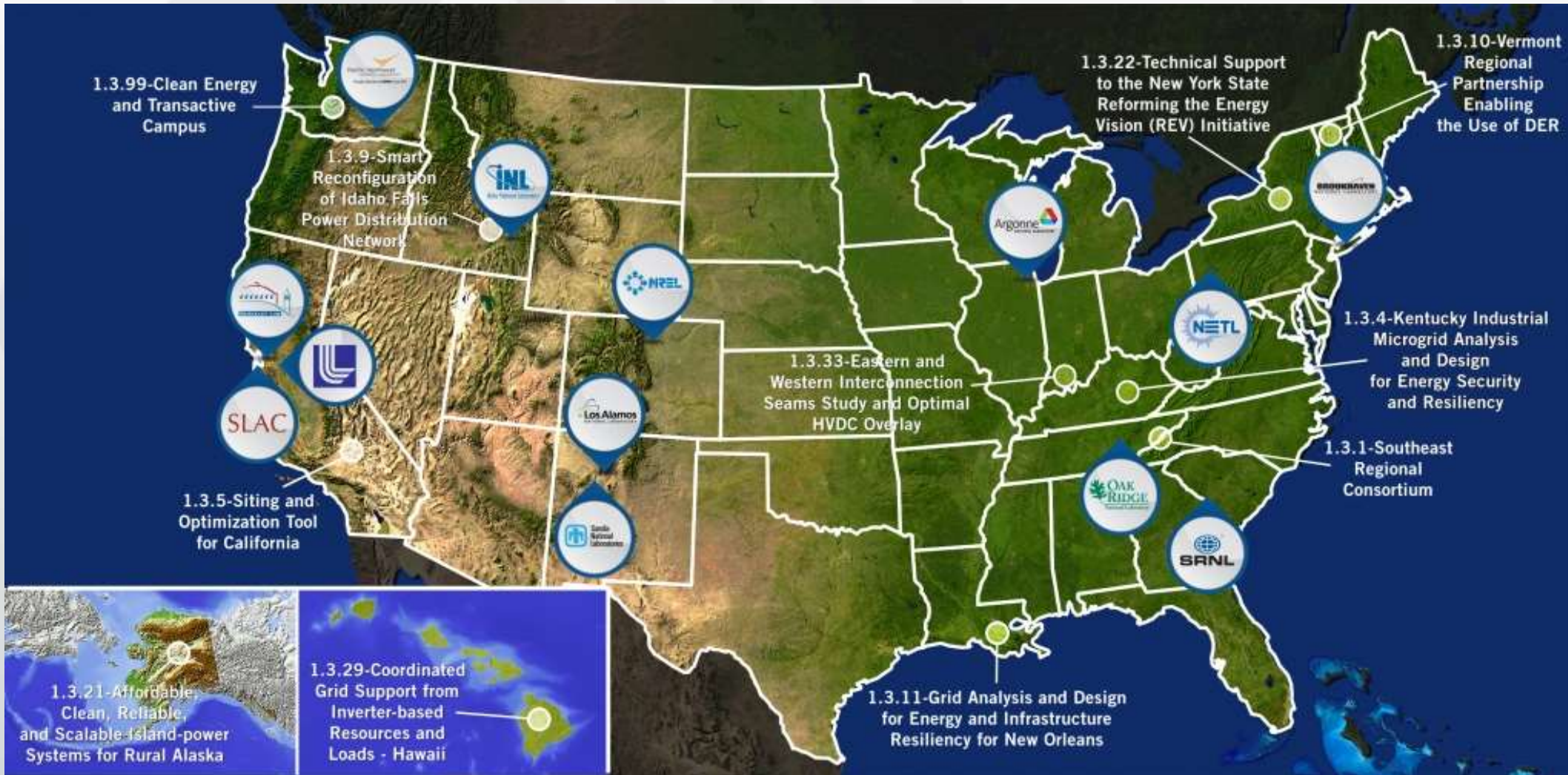| Devices and Integrated Systems | Sensing and Measurement | System Operations and Control | Design and Planning Tools | Security and Resilience | Institutional Support |

Strategic Regional Partnerships

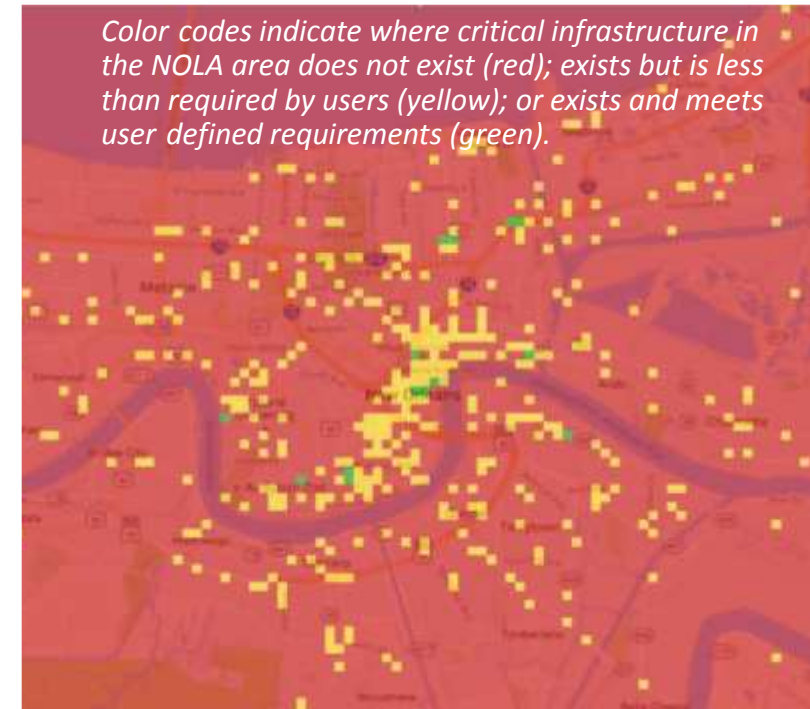# Grid Analysis and Design for Energy and Infrastructure Resiliency for New Orleans

Propose key electrical distribution system upgrades and advanced microgrid pilot projects that can help bolster community-level storm resilience for NOLA and other coastal U.S. cities.

Outcomes

- Improved understanding of how infrastructure and community resilience are dependent on grid performance

- Risk-informed cost-effective recommendations for grid enhancements that improve NOLA community resilience to storms

- Broke down communication barriers between stakeholders and facilitated new discussions leading to more resilient communities and energy systems

Color codes indicate where critical infrastructure in the NOLA area does not exist (red); exists but is less than required by users (yellow); or exists and meets user defined requirements (green).

Labs: LANL, SNL

Partners: City of New Orleans, Rockefeller Institute, Entergy New Orleans, US Army Corps of Engineers

Pacific Northwest Transactive Campus

Deliver regional grid flexibility, resilience and improved local energy performance through transactive coordination experiments at scales. Key attributes include automation of multi-building controls and engagement of a wide range of DERs and nontraditional building loads across institutions in different regions.

Outcomes

- Developed, tested, and validated a distributed control scheme that provide automated controls to enhance grid reliability and flexibility, and improve building operations

- Designed an open source platform that integrates these controls with market clearing and other transactive control strategies

- Conducted detailed simulation of buildings to verify the performance of this distributed control approach

Lab: PNNL

Partners: Washington State University, University of Washington, Case Western Reserve University, University of Toledo

Smart Reconfiguration of Idaho Falls Power Distribution Network for Enhanced Quality of Service

Tested advanced controls for enhancing the quality of power service, demonstrated with the Idaho Falls Power distribution network.

Outcomes

- Successfully tested advanced controls for automatic distribution reconfiguration following outages.

- Demonstrated the value provided by local hydroelectric power generation to support distribution system operations

- Determined the need for additional sensing and measurement requirements to support advanced control systems

- Completed a detailed analysis of communication system options to enable this control approach

Image credit Idaho Falls Power
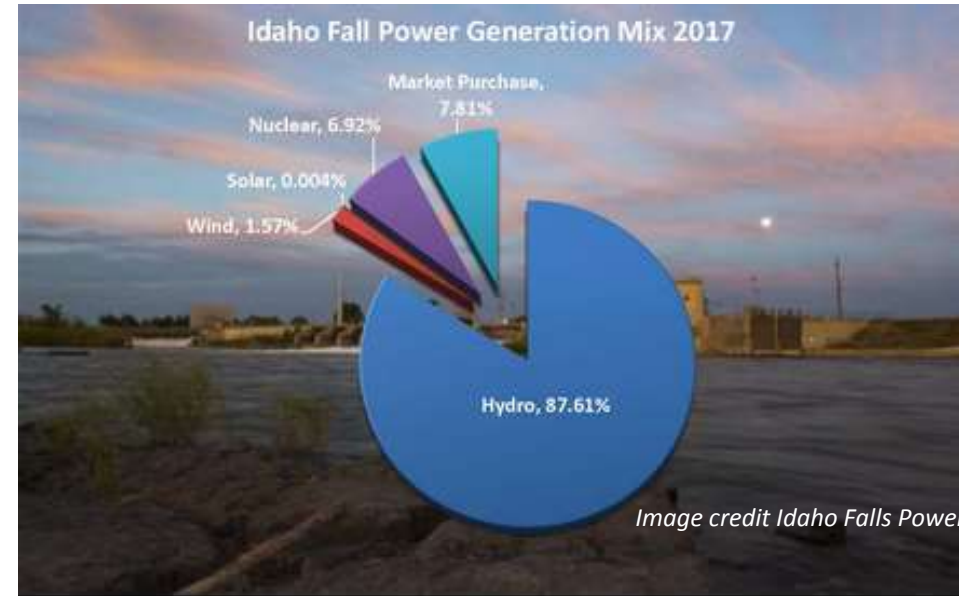
Labs: INL, PNNL

Partners: Idaho Falls Power, Schweitzer Engineering Laboratories, Washington State University

# Vermont Regional Partnership Enabling the Use of Distributed Energy Resources

Assist utilities in the state of Vermont in reducing impacts from high penetrations of distributed energy resources while maintaining and enhancing grid performance and reliability.

Outcomes

- Developed analytical methods to optimally site and integrate solar and energy storage technologies into the distribution network

- Developed improved control schemes to reduce adverse system impacts associated with intermittent generation

- Developed improved forecasting methods to enable the efficient harnessing of intermittent generation

Electrical feeders in Green Mountain Power territory; high DER penetration shown in red.
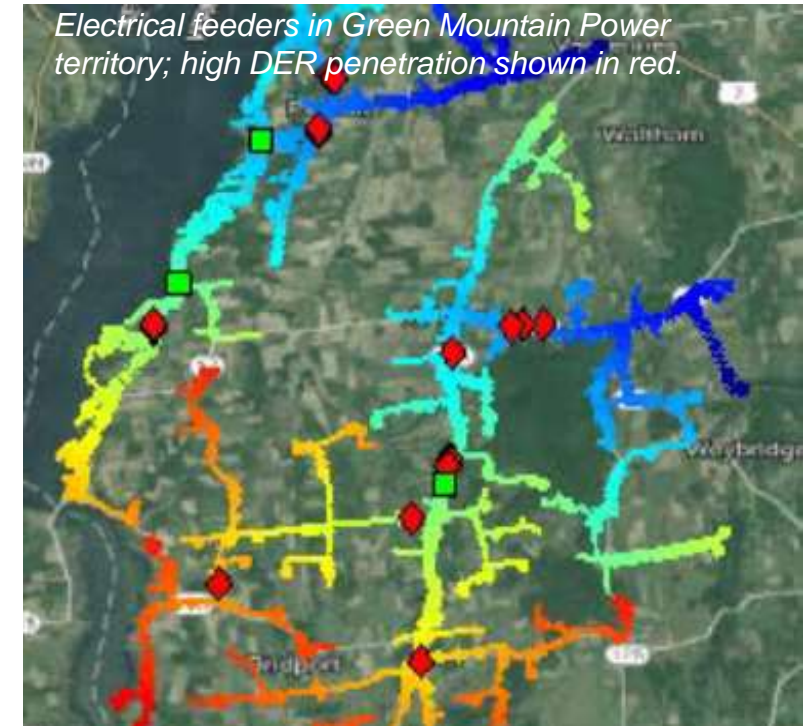
Labs: NREL, SNL

Partners: Green Mountain Power, Vermont Electric Cooperative, Vermont Electric Company, University of Vermont, Georgia Institute of Technology

Alaska Microgrid Partnership

Reduce cost of energy for isolated communities by establishing information sharing resources for replacing imported fuels with local energy resources, energy efficiency, and optimized energy usage.

Outcomes

- Transitioned processes and methods for sharing and archiving lessons learned and design information to the Alaskan Energy Authority and the University of Alaska

- Built Alaska Energy Data Gateway (website/repository) to allow stakeholders to collect and store information needed to implement innovative power systems

- Led technical and economic analyses for the communities of Chefornak and Shungnak as examples of the pathway for assessing system feasibility

- Developed numerous support documents and technical assessments to help communities implement their own development pathway

Shungnak Power Plant with Solar.
Image credit Alaska Center for Energy and Power

Labs: LBNL, NREL, PNNL, SNL

Partners: Renewable Energy Alaska Project, Alaska Center for Energy and Power, Intelligent Energy Systems, Institute for Social & Economic Research

Southeast Regional Consortium

Enable faster restoration of power by enhancing the responsiveness of distributed energy resources. Successfully implemented through a consortium of regional stakeholders in the Southeast.

Outcomes

- Developed secure wireless networks to allow rapid fault detection and recovery

- Successfully tested a new control and communication framework for managing microgrids

- Determined the feasibility of fast and robust data networking

Downtown Chattanooga Tennessee

Labs: ORNL, SNL

Partners: University of North Carolina–Charlotte, Santee Cooper, Duke University, Clemson University, Southern Company, Tennessee Valley Authority

Distributed Inverter-Based Resources in Hawaii

Investigate, develop, and validate ways that distributed PV and energy storage can support grid frequency stability without negatively affecting the connected distribution systems.

Outcomes

- Developed first-ever island-wide platform incorporating transmission and distribution dynamics on sub-line-cycle time scale

- Technical report used as justification for Hawaiian Electric Companies to file modified DER interconnection requirements with public utility commissions

- Obtained agreement from IEEE P1547 Working Group to allow sub-second frequency response from DER

PV systems installed in Hawaii. Image courtesy SolarCity.

Labs: NREL, SNL

Partners: Hawaiian Electric Companies (HECO), Enphase Energy, Fronius USA, Forum on Grid Integration Issues, Energy Excelerator