The U.S. Department of Energy launched the GMLC in November 2014. The consortium, a strategic partnership between DOE headquarters and the national laboratories, brings together leading experts and resources to collaborate on national grid modernization goals. The GMLC’s work is focused in **six technical areas** viewed as essential to modernization efforts:

* Devices and Integration
* Sensing and Measurement
* Systems Operations, Power Flow and Control
* Design and Planning
* Security and Resilience
* Institutional Support.

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

**REGIONAL PARTNERSHIPS**

The Pioneer Regional Partnerships are early-stage public/private collaborative projects that address specific near-term grid modernization issues important to that region and its stakeholders. The Grid Modernization Laboratory Consortium (GMLC) has initiated 11 partnerships that were composed with the following general attributes in mind:

1. Address a key state/regional grid modernization challenge that is currently visible and important to key local industry and government stakeholders.
2. Have collaboration from local stakeholders, utilities, and vendors to pursue a grid modernization outcome with links to the DOE Grid Modernization Initiative (GMI) objectives.
3. Generally address multiple technologies and policy options important for grid modernization.
4. Offer the potential to provide data and lessons-learned that will support and inform subsequent regional grid modernization activities AND ongoing GMLC Cross-Cut R&D.

Collectively, the portfolio of pioneer partnerships covers the main topics of the DOE Grid Modernization Initiative and has strong potential to accelerate state/local visibility and stakeholder networks to support the national effort. It also has good geographic diversity to link DOE efforts with the full range of regional differences in terms of grid design, regulatory environments and stakeholder priorities.

**CHALLENGE**

The heightened risk coastal cities like New Orleans (NOLA) encounter from hurricanes, tornados, floods, and other coastal disasters is never further than the memory of Hurricane Katrina. During such events, disruption of electric grid operations and extended power outages often exacerbate interruption of energy intensive infrastructures vital to recovery, including flood control operations, water supply and treatment, transportation, emergency response, and banking. Identifying approaches to effectively use local distributed generation and renewable energy resources as well as cost-effective grid resilience enhancements could help reduce the severity of power outage impacts and enhance community resiliency for many U.S. coastal communities subject to similar threats and risks.

**KEY OUTCOMES**

This project will support the framework and development of priority distribution upgrades and advanced microgrid pilot projects that can help bolster resiliency for NOLA and other coastal U.S. cities. The immediate outcome will be that NOLA, the local utility Entergy, and relevant stakeholders will have a set of risk-informed, cost-effective recommendations for grid resilience enhancement. NOLA, Entergy, and state and federal agencies can use these conceptual recommendations to rank energy infrastructure improvement options and set improvement implementation and funding priorities. An additional outcome of the project is that this effort will produce a template for other communities to use for increasing grid and community resilience. The project directly supports the renewable energy and energy efficiency options of DOE’s Office of Energy Efficiency and Renewable Energy, as well as the resiliency and energy security goals and missions of DOE’s Office of Energy Policy and Systems Analysis and its Office of Electricity.

**BENEFITS**

This project will provide detailed information and conceptual models that can help New Orleans and other coastal cities prepare for, prioritize, and execute grid resiliency projects. Data that will be available to stakeholders from the effort include:

* ***Infrastructure Impact Modeling and Analysis.*** Assessment of the magnitude, duration, and location of power outages and the associated consequences to infrastructure and community operations resulting from a range of extreme weather events.
* ***Resilient Power Distribution Modeling and Analysis***. Identification of grid performance and resilience goals (e.g., load requirements by location, time duration estimates for operation) that can inform development of an initial set of options for enhancing grid resilience.
* ***Integration of Distributed, Renewable, Energy Storage, and Energy Efficiency Options***. Evaluation of various options aimed at increasing energy resiliency through the addition of renewables, local generation, energy storage, and increased energy efficiency integration.
* ***Cost/Benefit Analysis.*** Appraisal of the costs and benefits of grid resilience enhancement options, including the impact to the dependent infrastructure during disaster scenarios.

The cross-functional team involved in this project provides depth and breadth of experience on grid resiliency issues. Researchers from Sandia National Laboratories and Los Alamos National Laboratory provide expertise in infrastructure modeling, energy systems resilience, power system modeling, renewable energy, grid modeling, and energy and water infrastructure. These lab experts are teamed with organizations that can provide on-the-ground input and leverage the project’s solutions: the City of New Orleans; local utility Entergy; the U.S. Army Corps of Engineers; and the Rockefeller Institute, which developed and led the 100 Resilient Cities initiative.

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