

# Consequence-Based Approach for Considering Community Grid Resiliency Investments



*This decision framework guides city, utility, and regulatory stakeholders through a process to evaluate costs and benefits of a more resilient grid in their cities.*

## CHALLENGE

Interactions with member cities of the 100 Resilient Cities organization and electric utilities have identified a disconnect between the way local governments and the electric utility industry plan for resilience. Local governments typically focus on enabling their citizens to withstand and recover from challenges like floods, disease outbreaks, or food shortages. In contrast, electric utilities focus on improving reliability metrics and developing strategies for cost recovery.

Community stakeholders may not include grid resilience in their planning efforts because they lack the capability to analyze the connection between grid resilience and negative consequences to their communities. Yet, because a resilient grid enables multiple infrastructures to be more resilient themselves, emerging technologies and distributed grid approaches can greatly improve community resilience.

Multiple decisionmakers, such as local governments, electric utilities, and state regulators, could more confidently support grid resilience investments if the costs and benefits to each party were clearly defined and calculated. This project is developing such a framework that can be applied to a variety of situations, such as a large coastal city working with a vertically integrated, investor-owned utility, or a small mountain town working with its municipal utility.

## At-A-Glance

### PROJECT LEAD

- Robert Jeffers  
Sandia National Laboratories  
[Rjjeffe@sandia.gov](mailto:Rjjeffe@sandia.gov)

### PARTNERS

- Sandia National laboratories
- CPS Energy, San Antonio
- The City of San Antonio
- University of Texas at San Antonio
- National Grid
- The City of Buffalo, NY
- Synapse Energy
- The 100 Resilient Cities Organization

### BUDGET

DOE: \$1.5M  
Industry: \$450K

### DURATION

October 2017 – June 2021

### TECHNICAL AREA

Institutional Support

Lead: Chuck Goldman

Lawrence Berkeley National  
Laboratory

[CAGoldman@lbl.gov](mailto:CAGoldman@lbl.gov)

## APPROACH

This project investigates how communities could improve their resiliency through coordinated grid investments and how utilities of various configurations could plan for and benefit from resilience.

The team is developing detailed case studies for two cities: San Antonio, Texas and Buffalo, New York. The case studies will demonstrate a decision framework based on previously proven processes, with input from a Stakeholder Advisory Group, as shown in the figure.

The project team is working with the 100 Resilient Cities organization and the Stakeholder Advisory Group to develop the technical and regulatory components and advise on how communities could implement resilience planning with utilities nationwide. The team will work with utilities to design region-specific methods and metrics that could support resilient grid systems.

The project will judge a set of targeted grid investments on how well they would improve the resilience metrics for each of the two cities. The focus will be on benefits of effective integrated resource planning and integration of resilience metrics, advanced control systems to improve resilience, and inverter-dominated islanding with energy storage. The team will also consider alternative regulatory structures and utility business models that could encourage community-level grid resilience planning and identify metrics showing how utilities and communities benefit from resilience investments.

Having gone through this multi-stakeholder decision process, the project partners could decide to adopt the outcomes of this exercise in their cities, doing their own validation and implementation.

## EXPECTED OUTCOMES

The resulting case studies involving multiple stakeholders will demonstrate how cities can incorporate regional differences in costs, benefits, and resilience challenges, with the goal of designing their own grid resilience plans.

Beyond San Antonio and Buffalo, the validated decision process and region-specific metrics are tools that encourage the broader adoption of resilience planning via partnerships among utilities, communities, and regulators.

## LAB TEAM



As part of the U.S. Department of Energy's Grid Modernization Initiative, the GMLC is a strategic partnership between DOE Headquarters and the national laboratories, bringing 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 Testing | Sensing and Measurements | Systems Operations and Control  
Design and Planning | Security and Resilience | Institutional Support