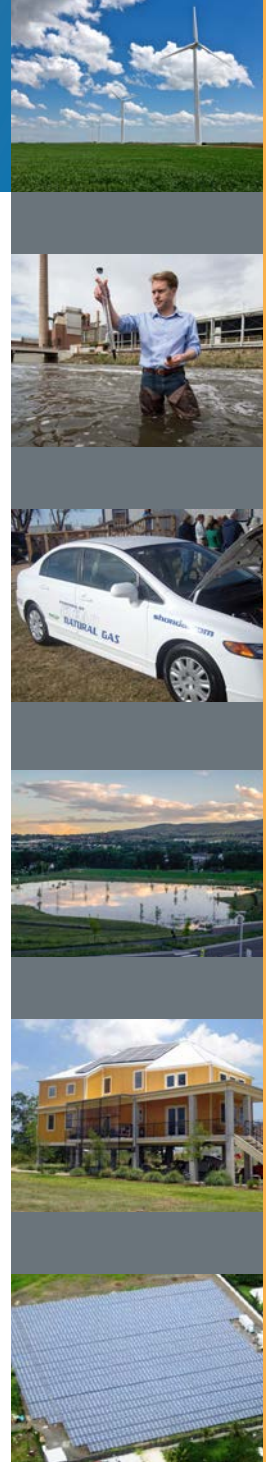


# NREL Experts Assist With Clean Energy Solutions for Resilience

The National Renewable Energy Laboratory (NREL) is a national leader in the application of energy efficient and renewable energy technologies, practices, and strategies to advance resilience. NREL provides expertise, tools, and innovation to private industry; federal, state, tribal, and local governments; nonprofit organizations; and communities on system resilience. NREL's resilience program offers a broad range of services including holistic community energy planning, onsite technical assistance, energy-efficient design and rebuilding strategies, and clear information for decision makers. Comprehensive clean energy solutions address the full spectrum of resilience.

## Areas of Expertise

- Sustainable whole-community energy planning
- Resilient, energy-efficient building design strategies
- Microgrid and infrastructure analysis, testing, control strategies, and design review
- Onsite technical support
- Site-level, regional, and community analyses and vulnerabilities assessments
- Energy and water information and education
- Policy, financing, and partnership development
- Broad-application tools
- International experience



## CLEAN ENERGY RESILIENCE PROGRAM

### PREVENTION AND PLANNING

*Reduce Impacts of Disasters*

- Improve resistance and resiliency
- Plan for secure, sustainable, and safe communities

### RESPONSE AND RECOVERY

*Respond Efficiently and Effectively*

- Provide clear and simple information
- Deploy on-site technology demonstrations

### REBUILDING

*Rebuild for Sustainability, Security, and Safety*

- Design affordable, disaster-resistant buildings
- Implement policies that support sustainability, security, and safety

## Leading-Edge Energy Solutions

Natural and man-made disasters have a devastating economic, social, and environmental impact on communities. NREL works directly with emergency managers, community leaders, and home and business owners to deliver tools and long-term energy solutions for resilience.

### Whole-Community Planning

NREL conducts whole-community energy planning that includes sustainable energy efficiency and renewable energy technologies and strategies to improve the safety, health, and resilience of the community. To lessen the adverse consequences of future disaster events, NREL assesses and designs resilient and sustainable energy systems and facilities.

### Economic Resilience

Through partnerships with local stakeholders, NREL helps communities plan for a healthy economy by developing new, sustainable, and economically viable businesses and employment opportunities.

Using comprehensive energy efficiency and renewable energy expertise, NREL offers long-term, whole-community solutions for a sustainable, energy-resilient infrastructure.

## Energy-Efficient Buildings

Projects are designed to implement resilient residential and commercial buildings solutions that effectively support the core needs of a sustainable community and reduce the amount of energy required by a grid system.

## Grid Analysis

NREL has extensive resources to help communities improve grid integration while realizing significant savings from fewer power outages, lower electricity costs, and reduced electricity waste, theft, and voltage variability. Solutions often include grid analyses for cyber security, micro-grid options to include renewable energy and energy storage systems, and demand-side management.

## Policy, Financing, and Partnership Development

By assessing potential policy and financial options for energy improvements, NREL provides data-driven, unbiased recommendations tailored to each community. The laboratory also helps establish optimal partnerships and fosters collaboration with key stakeholders.

## Education, Training, and Outreach

NREL leads strategic and tactical efforts to reach key stakeholders with relevant and effective information that helps generate community buy-in to further success.

## Client and Project Examples for Climate Change Resilience

### CEQ Climate Change Preparedness Pilot

The State of Colorado's Climate Change Preparedness pilot, led by NREL and sponsored by the White House Council on Environmental Quality (CEQ) and the U.S. Department of Energy, focuses on the effects of severe inland weather on a state-wide scale. In Colorado, climate change is anticipated to contribute to an increase in thunderstorms and lightning strikes, rising temperatures, heat waves, droughts, wildfires, windstorms, and intense rainfall events and flooding. Through Colorado's CEQ pilot, NREL has worked closely with the Colorado

Governor's Resiliency and Recovery Office, bringing together stakeholders from federal and local governments to identify shared vulnerabilities and interdependencies related to climate change. An online roadmap documents these efforts, identifying areas of replicability other states, communities, tribes, and agencies can utilize.

### Federal Regional Resilience Planning

As part of Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, NREL is supporting the General Services Administration and the Environmental Protection Agency's Region 8 with regional resilience planning. The project, which tests tools and methodologies developed at the laboratory, is designed to further resilience planning on a regional scale for federal agencies in coordination with state, local, and tribal governments.

### National Resilience Planning: Island Nations

Antigua and Barbuda, island nations in the Caribbean, serve as an example of resilience planning to increase local capacity, develop the workforce, further the economy, and become resilient to severe storms. Island nations are impacted by increased frequency and severity of hurricanes, wave inundation, flooding, shoreline erosion, and rising sea levels. Planning for resilient energy, water, transportation, and waste systems help the nation create economic stability and longer-term building capacity. Similarly, Asian countries, such as the Philippines, Myanmar, Malaysia, Laos, are working to address energy security and planning projects with climate change impacts in mind to become more resilient in the future.

### Tribal Resilience Planning

As seen with the Quinault Tribe on the Olympic Peninsula, many tribal nations are faced with the daunting task of relocating villages and communities due to climate change impacts. NREL provides technical support to tribes through holistic, resilient energy plans for infrastructure projects, helping build capacity and economic development.

## Reduce Impacts of Climate Change

- Improve resistance and resiliency
- Upgrade warning systems
- Plan and build for secure, sustainable, and safe communities
- Provide clear, simple information
- Dispatch available mobile/emergency power
- Design affordable, disaster-resistant buildings
- Provide community shelters
- Implement policies supporting sustainability, security, and safety
- Deploy on-site technology demonstrations

To find out how we can help your organization, contact Eliza Hotchkiss at 303-384-7309 or [eliza.hotchkiss@nrel.gov](mailto:eliza.hotchkiss@nrel.gov).

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