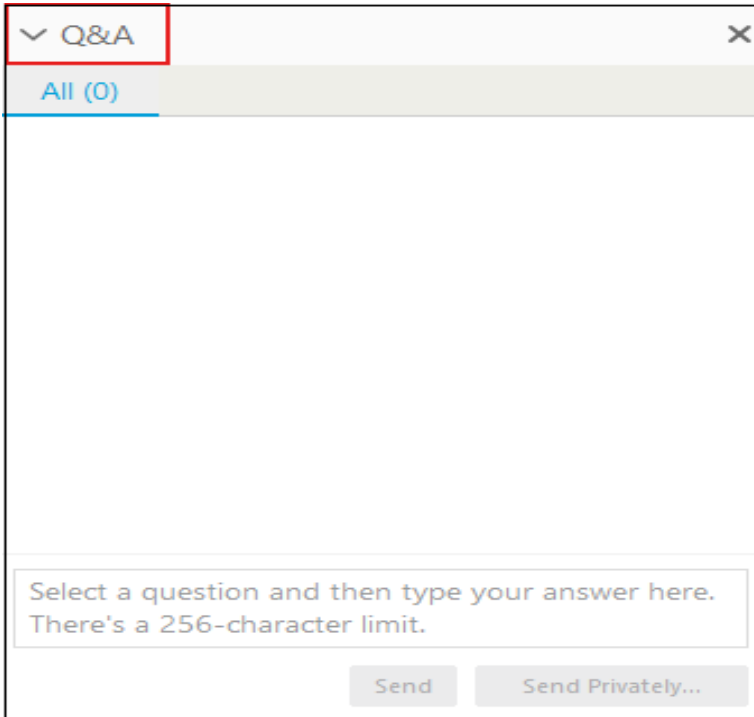


Welcome

- PowerPoint and webinar recording will be available on the HUD Exchange
- Participants in 'listen only' mode

Questions

- Please submit your content related questions via the Q&A box
- Please submit your technical questions via the Q&A box
- Please include the slide number when applicable to the question
- Send to Host, Presenter and Panelists

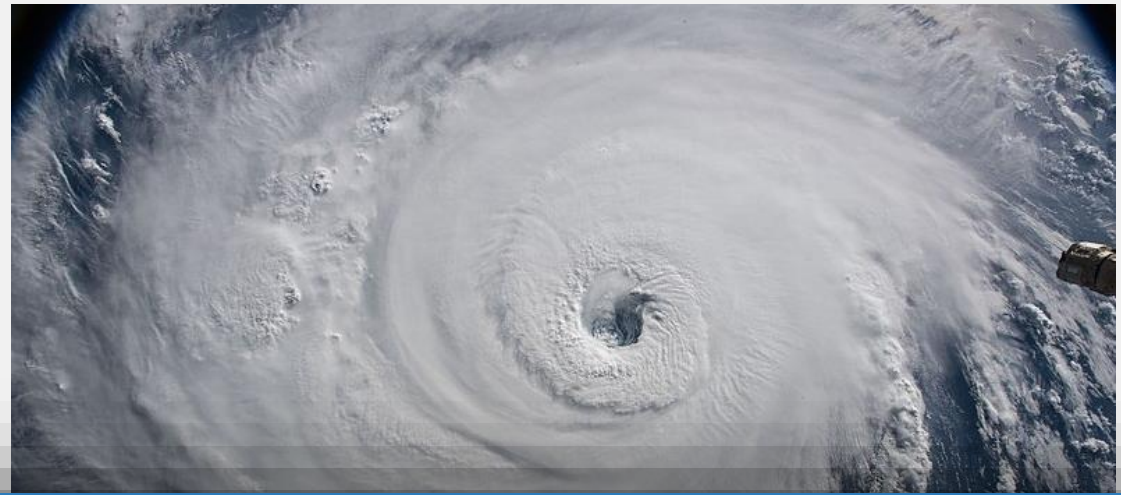
A screenshot of a Q&A interface. At the top, there is a tab labeled 'Q&A' with a downward arrow and a close button (X) in the top right corner. Below the tab, the text 'All (0)' is displayed. The main area is a large, empty text box for submitting questions. At the bottom, there is a smaller text box with the instruction 'Select a question and then type your answer here. There's a 256-character limit.' Below this instruction are two buttons: 'Send' and 'Send Privately...'.

Q&A

All (0)

Select a question and then type your answer here.
There's a 256-character limit.

Send Send Privately...



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Energy Infrastructure Resilience and Mitigation

June 25, 2020



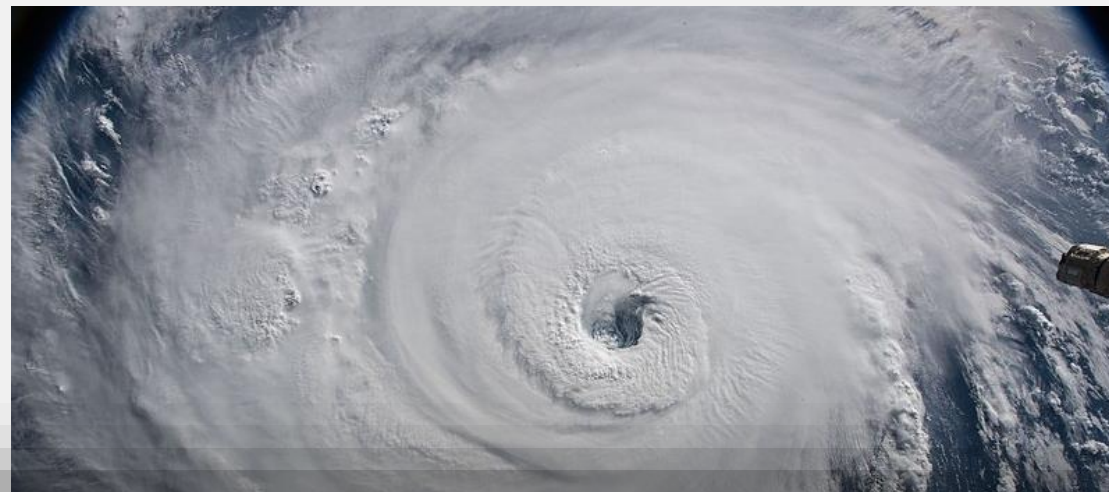
Introductions

- Brandi Martin, U.S. Department of Energy, Office of Cybersecurity, Energy Security, and Emergency Response
- Johanna Zetterberg, U.S. Department of Energy, Office of Electricity
- Kenya Stump, Commonwealth of Kentucky, Office of Energy Policy
- Jen Carpenter, U.S. Department of Housing and Urban Development
- Roosevelt Grant, U.S. Department of Homeland Security, Federal Emergency Management Agency

Agenda

- Background: CDBG-MIT Purpose and Goals
- Why focus on Energy?
- OE and CESER introduction
- Project Examples
- Guest Speaker - Kentucky State Energy Office
- Summary
- Resources
- Q&A





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Background: CDBG-MIT Purpose and Goals

Jennifer H. Carpenter, HUD

June 25, 2020



CDBG-MIT Purpose:

The CDBG Program provides Grantees funds to develop viable communities by providing **decent housing** and a **suitable living environment**, and by **expanding economic opportunities**, principally for low- and moderate-income persons.

HUD's Federal Register Notice:

1. Meet the definition of a mitigation activity;
2. Address current and future risks as identified in the grantee's mitigation needs assessment of most impacted and distressed (MID) areas;
3. Be CDBG-eligible activities or otherwise eligible pursuant to a waiver or alternative requirement; and
4. Meet a national objective, including additional criteria for mitigation activities and covered projects.

- CDBG-MIT funds may be used to:
- Support infrastructure projects, housing activities, public services, economic development, disaster preparedness, and planning efforts.
- Increase resilience and reduce or eliminate risk, per HUD's definition of mitigation.
- 50% of CDBG-MIT funds must also be used to benefit low-to-moderate income (LMI) persons.

Maximizing CDBG-MIT

To maximize the impact of all available funds, grantees should coordinate and align these CDBG–MIT funds with other mitigation projects funded by FEMA, the U.S. Army Corps of Engineers (USACE), the U.S. Forest Service, and other agencies as appropriate.

According to the CDBG-MIT Notice, grantees must:

1. Advance long-term resilience to current and future hazards;
2. Align its CDBG–MIT programs or projects with other planned federal, state, regional, or local capital improvements; and
3. Promote community-level and regional planning for current and future disaster recovery efforts and additional mitigation investments.

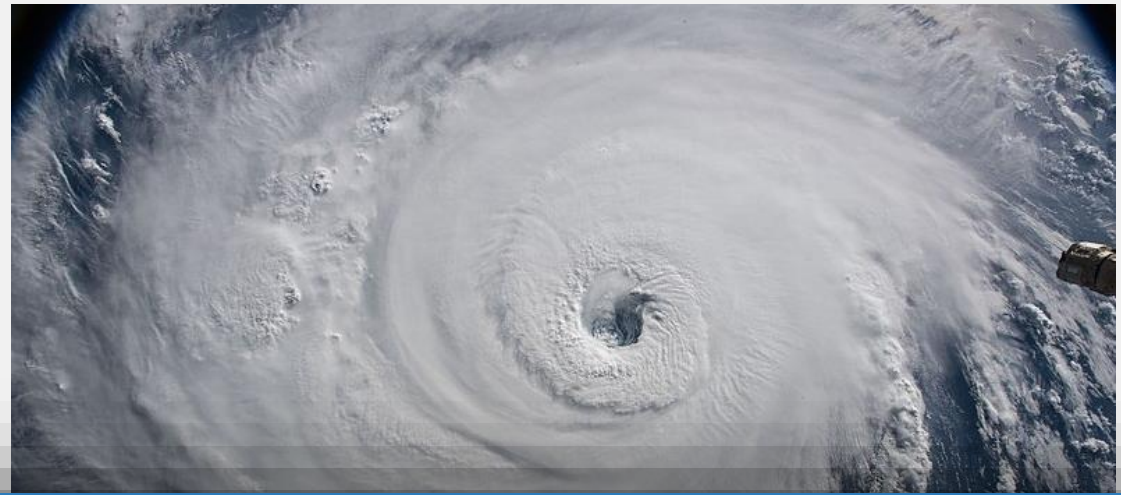
Maximizing CDBG-MIT, Energy Lifeline

- The Mitigation Needs Assessment must quantitatively assess the significant potential impacts and risks of hazards affecting the following seven critical service areas, or community lifelines: such as Energy (Power & Fuel)
- Energy Efficiency Infrastructure: Typical infrastructure mitigation programs may include regional investments in risk reduction for all-hazards (e.g. flood, fire, wind) to develop disaster-resistant infrastructure including Energy infrastructure to address specific, identified risks.
- Covered Projects only: For purposes of this section of the notice, an infrastructure project is defined as an activity or group of related activities that develop the physical assets that are designed to provide or support services to the general public in the following sectors, including Energy production and generation, including from fossil, renewable, nuclear, and hydro sources; electricity transmission.

CDBG-MIT Notice Prohibition

Prohibiting assistance to private utilities (84 FR 45868)

- Funds made available under this notice may not be used to assist privately-owned utilities. A CDBG-MIT grantee that prioritizes a mitigation project where assistance to a privately-owned utility is necessary, may request a waiver of this prohibition.



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Energy Infrastructure Resilience and Mitigation

Johanna Zetterberg & Brandi Martin

Office of Electricity

Office of Cybersecurity, Energy Security and Emergency Response (CESER)

June 25, 2020

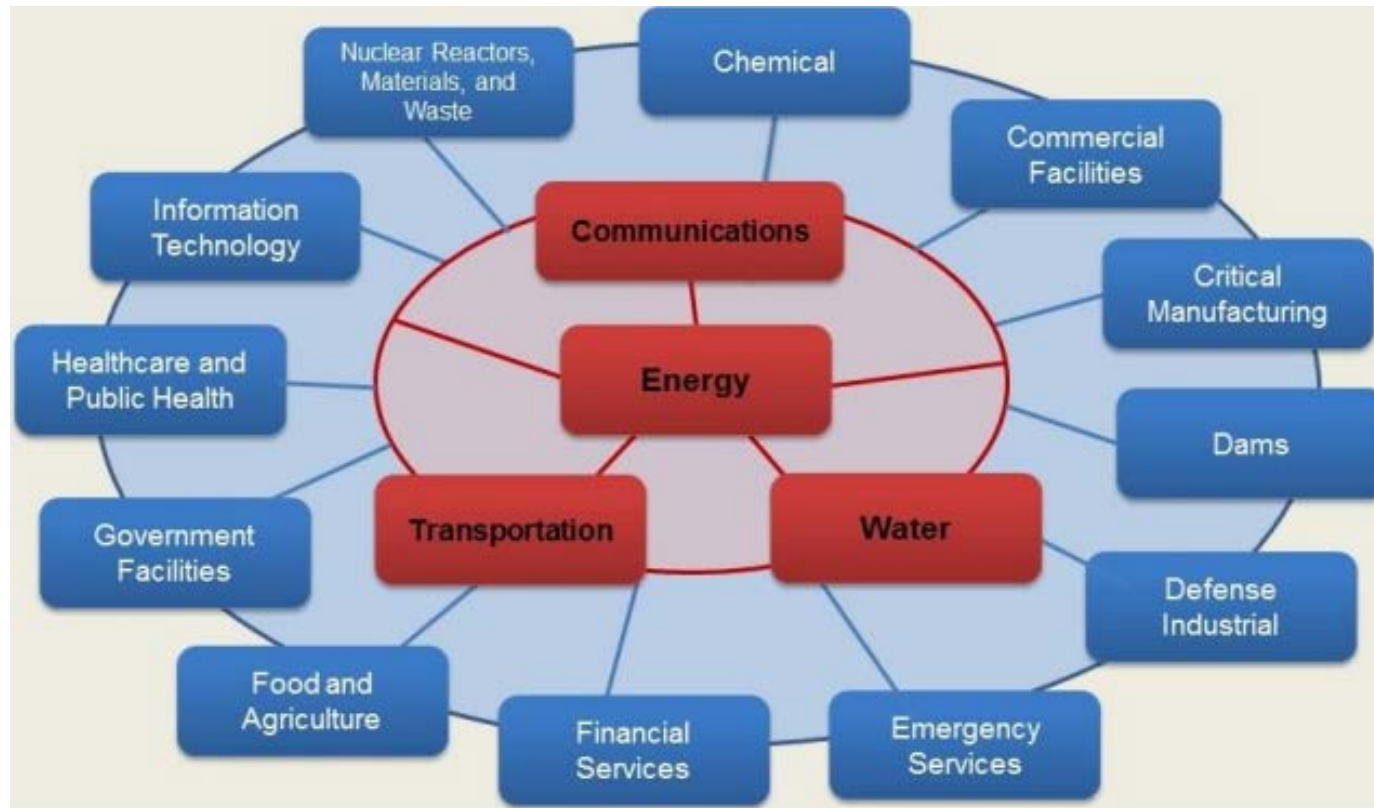


Energy

It powers our lives and the economy



Critical Infrastructure Interdependencies



Presidential Policy Directive 21 identifies the Energy Sector as uniquely critical because it provides an “enabling function” across all critical infrastructure sectors.

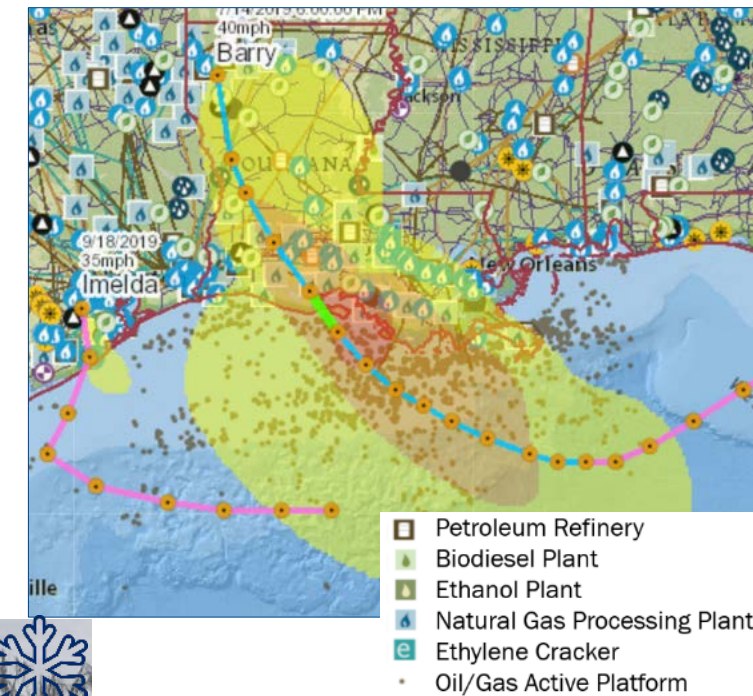
Energy Infrastructure

Electricity	Petroleum	Natural Gas
<ul style="list-style-type: none"> • Generation <ul style="list-style-type: none"> – Fossil fuel power plants <ul style="list-style-type: none"> Coal Gas Oil – Nuclear power plants* – Hydroelectric dams* – Renewable energy • Transmission <ul style="list-style-type: none"> – Substations – Lines – Control centers • Distribution <ul style="list-style-type: none"> – Substations – Lines – Control centers • Control Systems • Electricity Markets 	<ul style="list-style-type: none"> • Crude Oil <ul style="list-style-type: none"> – Onshore fields – Offshore fields – Terminals – Transport (pipelines)* – Storage • Petroleum Processing Facilities <ul style="list-style-type: none"> – Refineries – Terminals – Transport (pipelines)* – Storage – Control Systems – Petroleum Markets 	<ul style="list-style-type: none"> • Production <ul style="list-style-type: none"> – Onshore fields – Offshore fields • Processing • Transport (pipelines)* • Distribution (pipelines)* • Storage • Liquefied Natural Gas Facilities • Control Systems • Gas Markets

Energy Infrastructure – Risks & Hazards



Critical energy infrastructure in the path of 2019's Hurricane Barry over Louisiana and Texas



Tennessee, Photo by Ricky Shelton



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Our Missions

Cybersecurity, Energy Security, and Emergency Response (CESER) leads the Department of Energy's emergency preparedness and coordinated response to disruptions to the energy sector, including physical and cyber-attacks, natural disasters, and man-made events.

A secure and resilient power grid is vital to national security, economic security, and the services Americans rely upon. Working closely with its private and public partners, the **Office of Electricity** leads the Department's efforts to ensure the nation's most critical energy infrastructure is secure and able to recover rapidly from disruptions.



Our Missions in Action – Selected Efforts

Office of Electricity

- Disaster Recovery Support
- North American Energy Resiliency Model (NAERM)
- Bulk-Power System Executive Order
- Defense Critical Electric Infrastructure

CESER

- Energy Security Planning
- Emergency Response
- Cybersecurity Tools, Resources and R&D
- Risks & Hazards to the Energy Sector

Sector Engagement Partners



State
Energy
Officials



Public Utility
Commissioners

Governors

Emergency
Managers



State
Legislators

Municipal
Utilities



Project: Infrastructure Hardening

Strengthen infrastructure to better withstand forces

Transmission

- Structures upgraded to galvanized steel lattice or concrete



NREL/ DOE

Distribution

- Upgrading wooden poles to concrete or steel and adding structural supports
- Burying or undergrounding utility lines



Seattle

<https://powerlines.seattle.gov/tag/underground-cables/>



NREL/ DOE

Energy Infrastructure Critical to National Defense and Security

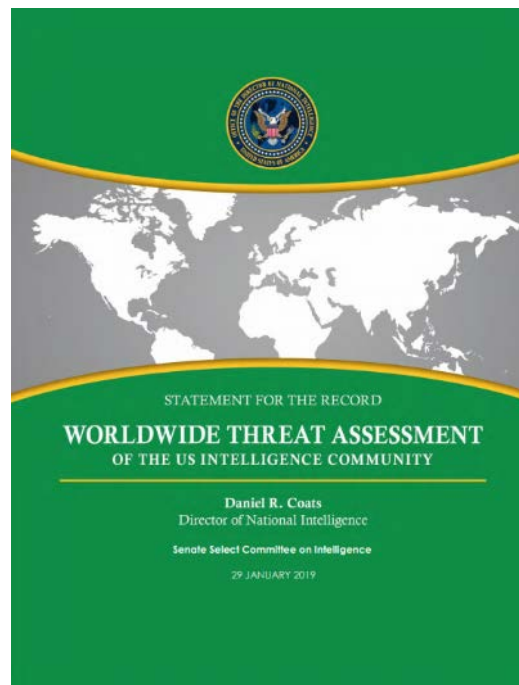
BEYOND THE FENCE LINE:

Strengthening Military
Capabilities Through
Energy Resilience
Partnerships



In order to scale the deployment of energy resilience projects to secure critical missions, DoD will have to continue and expand partnerships with states, communities, regulators, utilities and others.

Association of Defense Communities



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Back-up Power Options

Generators



Batteries

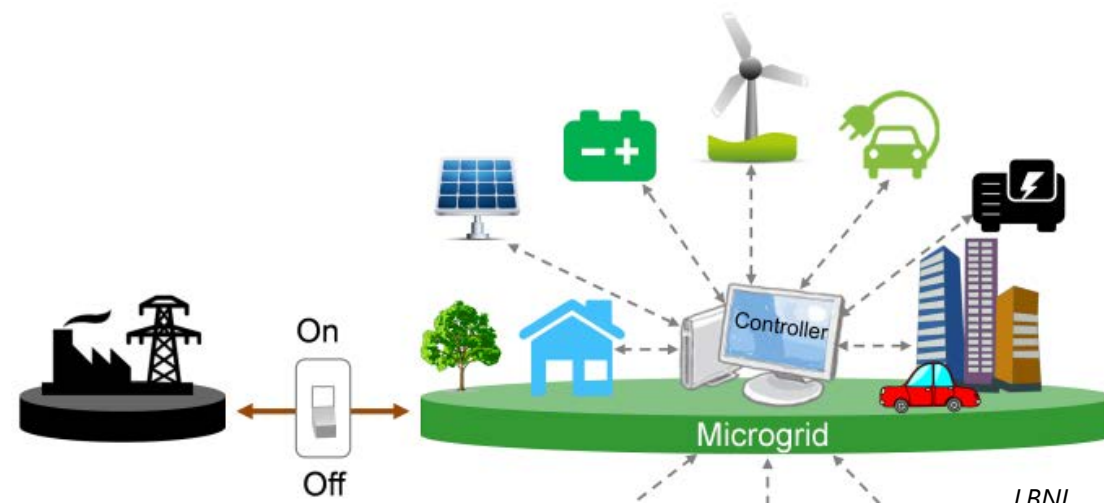


Photo by Warren Gretz, NREL 09740



Photo by Rosanna Arias

Microgrids



— LBNL —

Project Example: Low-income Back-up Power



- Solar + Battery Storage apartment project
- 2/3 of Maycroft residents earn 30% of or below the area median income
- 3 days of backup power for critical loads
- Reduced utility burden



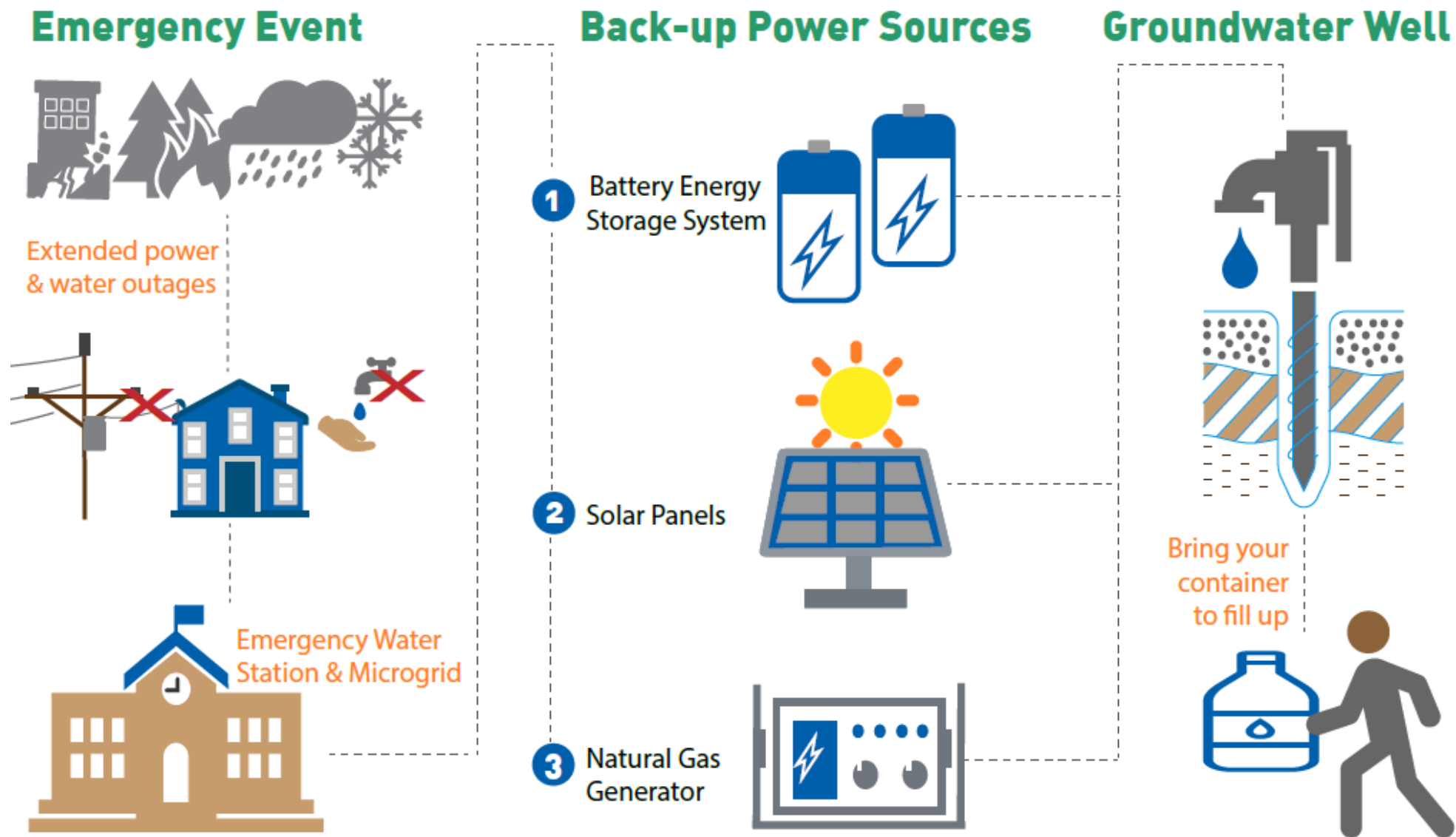
Project Example: County Microgrid



Location: Montgomery County, MD

- Fire & rescue, police, and department of transportation HQ
- \$16 million microgrid
- 25 year Power Purchase Agreement (PPA)
- 2 MW solar canopy
- 7.4 million kWh Combined Heat Power (CHP)
- Battery storage
- Cybersecurity and system controls for predictive management and optimization

Project Example: Utility Microgrid Shelter



Emergency Water Station & Microgrid

Project Example: Access to Fuel



Left: Automatic Transfer Switch

Right: Automatic Transfer Switch



30 KW Generator

Fueling
Facility
Generation
Grant

Michigan joint program with MI State
Police and Public Service Commission



Fuel NY Portable Emergency Generator Program
Program Opportunity Notice (PON) 2924

Kentucky Perspective on Hazard Mitigation and Energy Resilience

KENTUCKY OFFICE OF ENERGY POLICY



Office of Energy Policy's Mission

To support the utilization of Kentucky's energy resources for the betterment of the Commonwealth while protecting and improving our environment.



Office Goals

Be the customer-driven recognized State Energy Policy Authority.

Enhance the economic opportunities and benefits to Kentucky citizens and industry through expansion of current markets and the development of market opportunities for Kentucky.

Effectively implement federal and state energy programs to leverage federal State Energy Program funding and other funding sources by identifying and working with partners who can deliver cost-effective and credible energy programs that reduce energy costs, enhance resilience, and increase emergency preparedness.











Enhance the energy resilience and security of the Commonwealth by identifying opportunities to increase our ability to respond effectively to an energy disruption and to recover quickly and to maintain the uninterrupted supply of energy resource to the Commonwealth at affordable prices.





Kentucky's Energy Sector Risk Profile

Annualized Property Loss Due and Frequency of Occurrence to Natural Hazards, 2009 – 2019

		HAZARD FREQUENCY – Annualized	PROPERTY LOSS – Annualized (\$Million per year)
Drought		2	\$0
Earthquake (≥ 3.5 M)		0	\$0
Extreme Heat		6	\$0
Flood		72	\$18
Hurricane		0	\$0
Landslide		0	\$0
Thunderstorm & Lightning		131	\$8
Tornado (≥ EF2)		18	\$20
Wildfire		1	\$0
Winter Storm & Extreme Cold		34	\$33
Other		7	\$0

Data Source: NOAA and USGS

Kentucky's Energy Infrastructure

42,909 miles of natural gas, hazardous liquids, and hydrocarbon gas liquids pipelines

20 active natural gas storage areas, 28 compressor stations, and 3 processing plants

Two oil refineries with a combined processing capacity of about 283,000 barrels per calendar day. Four biofuel plants. One ethylene cracker

Twenty-one petroleum product terminals

Over 2,500 fuel distributors including ~240 Propane distributors

Over 10,000 miles of electric transmission lines

Over 1,700 electric substations

56 operating power plants

- 51% of capacity is coal
- 42% of capacity is natural gas
- 6% of capacity is hydroelectric
- <1% of capacity is biomass and solar combined)

Two wholesale regional power markets plus the Tennessee Valley Authority

https://www.energy.gov/sites/prod/files/2016/09/f33/KY_Energy%20Sector%20Risk%20Profile.pdf



Traditional Energy Sector Mitigation Measures

Back-up Power Supplies

Utility Undergrounding

Utility pole replacement

Vegetation Management

Flood proofing critical infrastructure

- Raising Structures
- Securing tanks
- Building berms or flood walls



Emerging Energy Sector Mitigation Solutions

Distributed Energy Resources

Microgrid\Community Enclaves or Resilience Hubs

Energy efficiency codes for resilience (Building for resilience)

- Affordable housing renovations

Smart Grid Improvements

- Advanced Metering Infrastructure
- Increased SCADA penetration
- Automatic Switching of circuits and circuit reconfiguration
- Dual feeds into critical facilities, redundant systems

Regional re-fueling centers

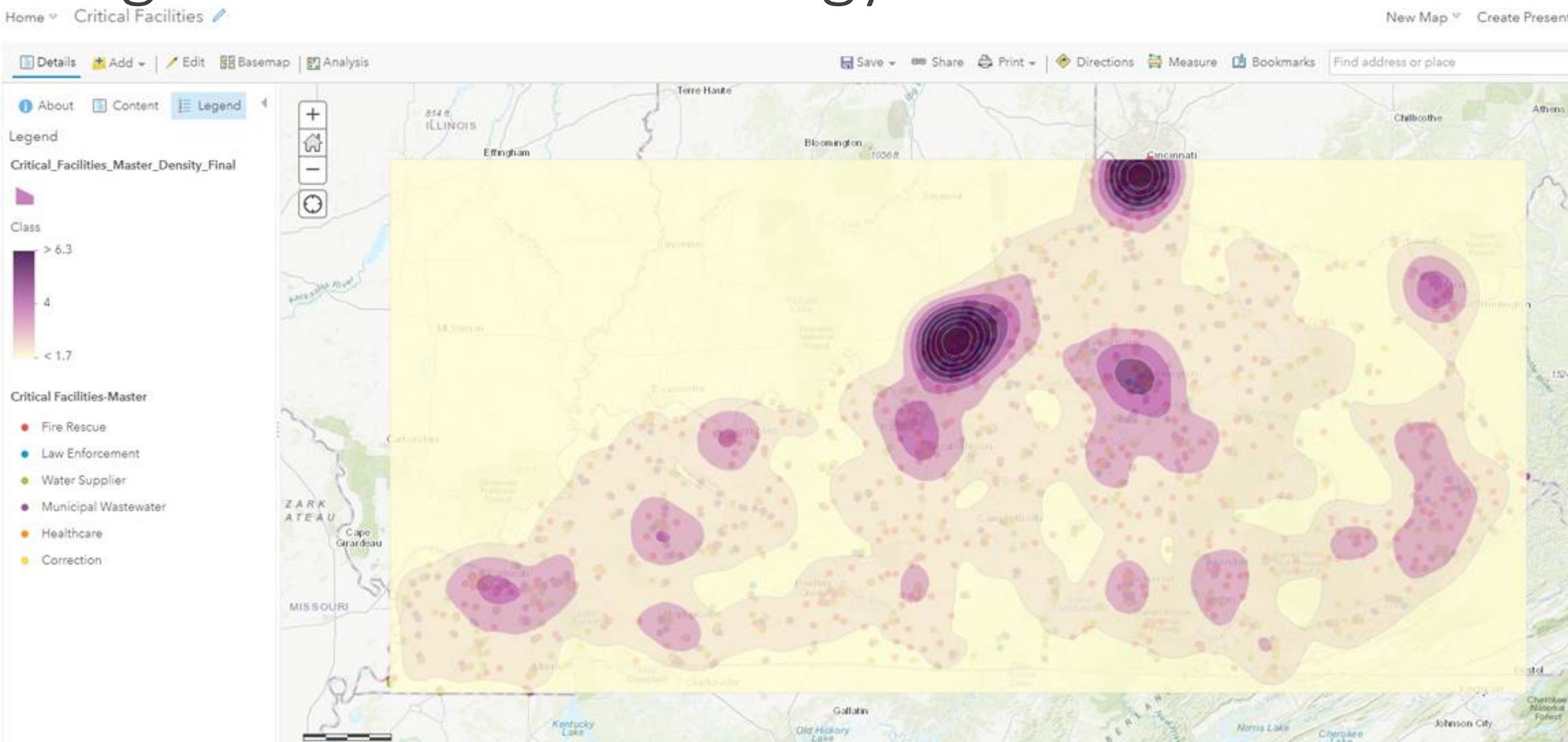
Fuel diversification





Kentucky Energy Resilience Project Examples

Begin with a vision... Energy Resilient Hubs



Ft. Knox Emergency Microgrid

"If we can lessen the load demand on the community, that's huge. You have people that are living in very remote areas in this part of Kentucky who need to have their power come back up quickly because they may be elderly, they may be indigent; they may not have the ability to do much for themselves very well. We're pretty self-sufficient here.

"If I can disconnect from power and power the installation by itself and reduce that demand on the LG&E system, and let other people draw that power and be able to repair faster, that's huge for us and the community."

Maj. Gen. John Evans, Jr., commanding general of U.S. Army Cadet Command and Fort Knox

https://www.army.mil/article/228877/fort_knox_conducts_second_successful_installation_wide_energy_resilience_test



PEER In Kentucky: Certifying Resilience

Green Building Certification Inc (GBCI) Performance Excellence in Electricity Renewal (PEER) Certifications

PEER is a new tool to measure and improve power system performance in municipal districts, commercial and industrial complexes, and developed campuses such as military installations.

<https://gbc.org/how-kentucky-improving-resiliency-and-reliability-peer-video>

Kentucky's Certifications:

- [Nolin Rural Electric Cooperative](#)
- [City of Glasgow](#)
- Ft. Knox



Building for Resilience

Structural Insulated Panels:

- Kentucky Habitat for Humanity Structural Insulated Panel Training and Veteran Housing Project
- COAP, Inc: *“To provide sustainable, affordable, safe, energy efficient, and dry housing to moderate, low, and very low income Harlan, Bell, and Leslie Counties of Kentucky families and individuals.”*

Building for Resilience with Concrete: Insulated Concrete Forms training with the National Ready Mix Concrete Association

Energy Star Certification of affordable housing unit with Housing Development Alliance and energy efficiency and construction job training for those in addiction recovery

Starting January 1, 2019, any new P-12 school built to accommodate more than 50 students will be **required to provide a storm shelter large enough for all of the school’s occupants.**



Morgan County Storm Shelter built with ICF



West Liberty, Kentucky

March 2, 2012 EF3 tornado ripped through the community.

Goal: To rebuild itself with a 21st century, lower-cost, sustainable infrastructure, and develop a path to create job-producing business opportunities, increasing the tax base and attract new residents to West Liberty.

Energy Efficiency Education Dashboard

- **Appalachian Regional Commission Grant**

LEED Certification

Affordable Sustainable Housing



Energy Savings Performance Contracting and PACE Financing

Local government's through ESPC can improve energy efficiency and resilience through performance contracting

PACE financing allows commercial facilities to complete efficiency projects including those that increase resilience and pay for it via additional property tax assessment



[Ivy Knoll Senior Retirement Community](#), located in the City of Covington, made significant building improvements to systems that were outdated or extremely energy inefficient.

Senior living facilities are critical areas of need in the COVID-19 response. These energy efficiency measure ensure these facilities remain operational and meet the comfort needs of residents.



Norton Healthcare Audubon Hospital

Hospitals are critical facilities for the COVID-19 response. These energy efficiency measures ensure these facilities remain financially healthy, operational and meet the comfort needs of patients and staff.



Energy Efficiency enabled the facility to **add essential capacity**, save utility costs, and improve operations.

Building automation enables efficiency.

A hybrid energy plant to combine gas air cooled chillers with thermal storage.

All of these measures makes Norton Healthcare more resilient.



Smart Grid

USDA Electric Loan Program

This Rural Development investment will be used to connect 2,260 consumers, and build and improve 103 miles of line. This loan includes **\$4,517,800 in smart grid technologies**. Owen Electric is headquartered in Owenton, Kentucky and provides service to 61,596 consumers over 4,565 miles of line in nine counties in northern Kentucky and one county in southeastern Indiana.

Fast Facts

~For 2018, 10% of distribution circuits in Kentucky have Voltage Optimization

~For 2018, 40% of meters in Kentucky are considered Advanced Metering Infrastructure

Source: EIA form 861

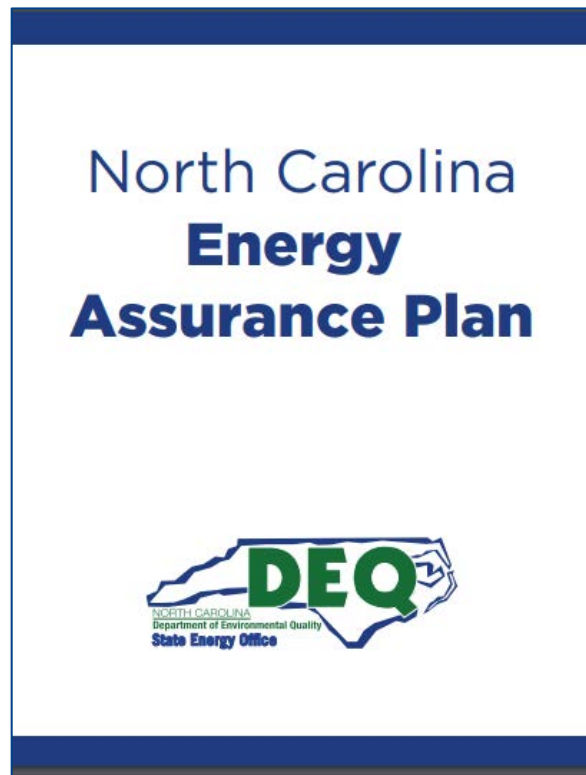


The Resilience Funding Puzzle

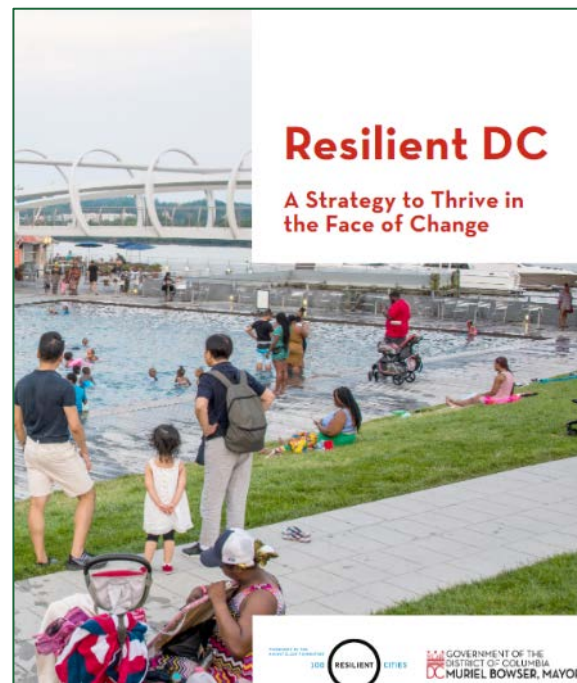


State Energy Resources

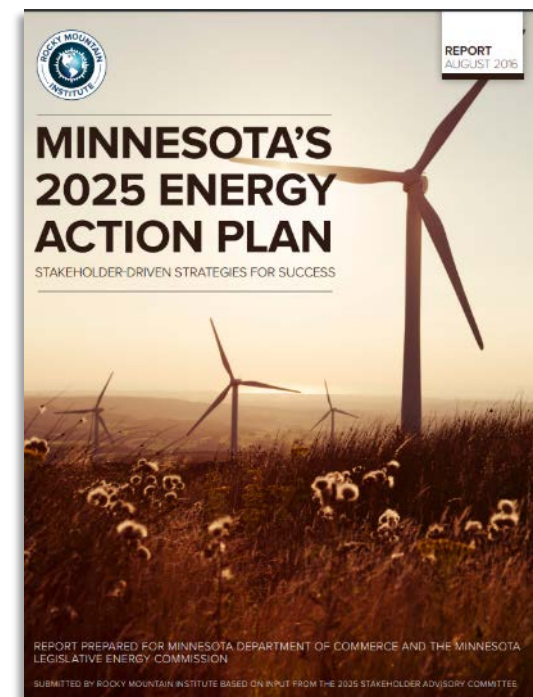
State Energy Security & Assurance Plans



Resilience Plans



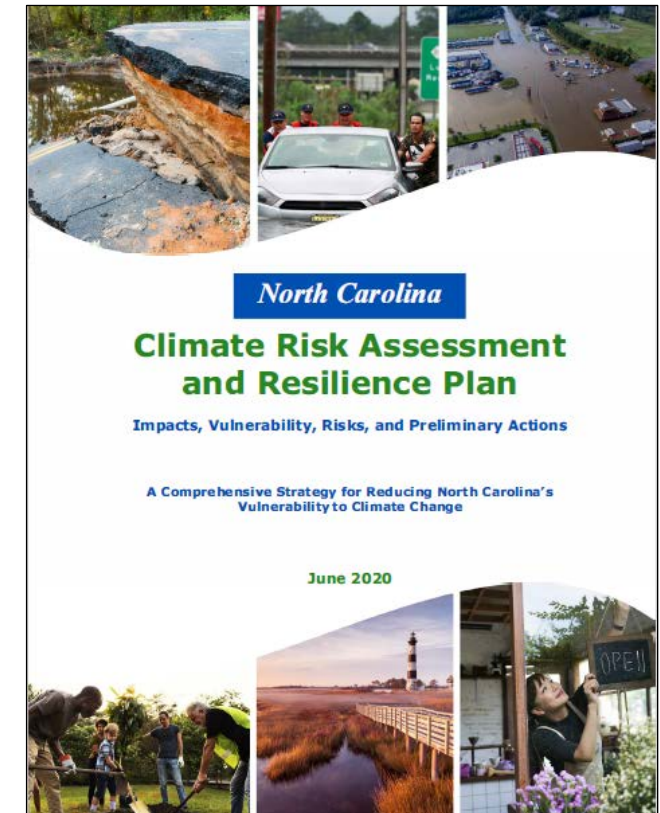
State Comprehensive Energy Plans



Example Approach: North Carolina

Table 5L-1. Exposure of assets and services related to the energy sector

	Extreme Heat	Flooding (River and Land)	Water Shortage (Drought)	Storm Intensity	Changed Seasons	Landslides	Saltwater Intrusion	Storm Surge	Tidal Flooding	Wildfire	Dam Failure
Assets, Services											
Power Generation											
Nuclear and Hydrocarbon Power Plants		*	*	*			*	*			*
Renewable Energy Generating Facilities		*			*	*				*	
Hydroelectric Power Plants		*	*	*				*			*
Electric Power Delivery											
Transmission and Distribution Grid	*	*		*		*	*	*	*	*	*
Substations and Other Support Systems		*		*		*		*	*	*	
Fuel Supply Chain											
Natural Gas Pipelines		*		*		*		*			
Petroleum / Gasoline Pipelines		*		*		*		*	*	*	
Petroleum Storage and Bulk Terminals		*		*	*			*	*		
Gasoline Distribution and Fueling Stations		*		*	*	*		*	*		
Ports, rail and roads	*	*		*		*		*	*		

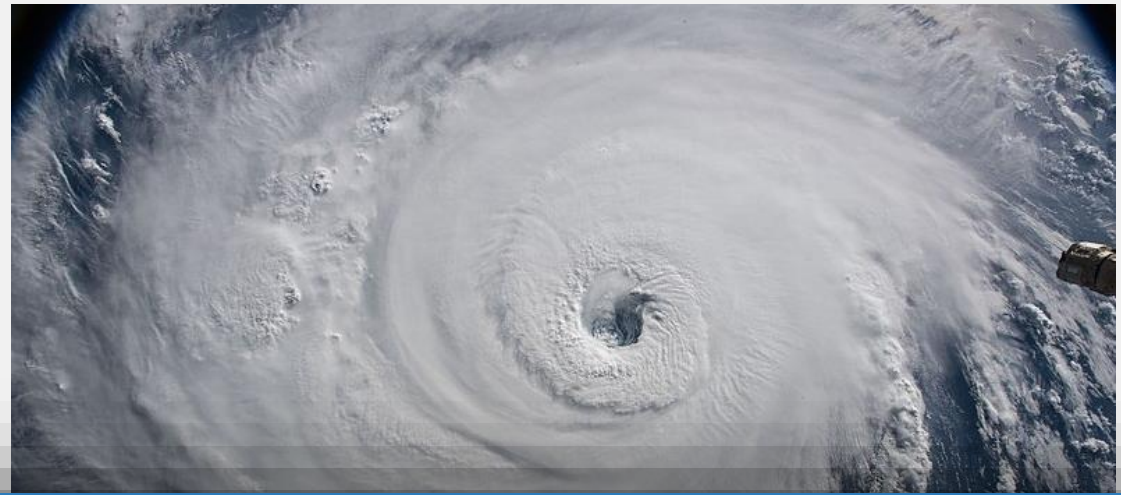


- Define resilience goals
- Quantify resilience targets
- Evaluate and propose improvements
- Cross- sector impacts

Considerations / Action items

Has your jurisdiction:

- ✓ Determined what energy infrastructure is critical to mitigating disaster risks and reducing future losses?
- ✓ Conducted a vulnerability/risk assessment of critical energy infrastructure including impacts if vulnerabilities are left unaddressed?
- ✓ Developed energy resilience strategies?



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Summary and Resources

Roosevelt Grant, FEMA

June 25, 2020



Value of Energy Resilience in Action Plans: Meeting CDBG-MIT's Goals

- ❖ **HUD Goal 1:** Support data-informed investments, focusing on repetitive loss of property and critical infrastructure
 - ✓ **Example:** Various energy infrastructure resilience projects (solar+storage)
- ❖ **HUD Goal 2:** Build capacity to comprehensively analyze disaster risks and update hazard mitigation plans
 - ✓ **Example:** Kentucky Energy Sector Profile, (CESER) Energy security planning, Cybersecurity Tools (R&D)
- ❖ **HUD Goal 3:** Support the adoption of policies that reflect local and regional priorities that will have long-lasting effects on community risk reduction, including risk reduction to community lifelines and decreasing future disaster costs
 - ✓ **Example:** Best Practices Montgomery, MD (microgrids), Kentucky (use of LEED certifications and Affordable Sustainable Housing)
- ❖ **HUD Goal 4:** Maximize the impact of funds by encouraging leverage, private/ public partnerships, and coordination w/other federal dollars
 - ✓ **Example:** Energy Sector Engagement Partners (NEMA and ESCC), Resilience Funding Puzzle, USDA Electric Loan Program



FEMA Resources

- FEMA Hazard Mitigation Plan Resources website:
<https://www.fema.gov/hazard-mitigation-planning-resources>
- FEMA State Mitigation Planning Resources website:
<https://www.fema.gov/state-mitigation-planning-resources>
- FEMA State Mitigation Planning Key Topics Bulletins:
<https://www.fema.gov/media-library/assets/documents/115780>
- FEMA Local Mitigation Planning Resources website:
<https://www.fema.gov/local-mitigation-planning-resources>
- FEMA National Response Framework:
<https://www.fema.gov/media-library/assets/documents/117791>

DOE and State resources

- Energy Transitions Initiative <https://www.energy.gov/eere/about-us/energy-transitions-initiative>
- DOE's Low-Income Energy Affordability Data (LEAD) tool
<https://openei.org/doe-opendata/dataset/celica-data>
- EIA State Energy Portal
<https://www.eia.gov/beta/states/>
- Solar + Storage sizing tool
<https://solarresilient.org/>
- NREL Resilience Roadmap
<https://www.nrel.gov/resilience-planning-roadmap/>
- State Energy Risk Profiles (updates coming soon)
<https://www.energy.gov/ceser/state-and-regional-energy-risk-assessment-initiative#STATE>
- National Association of State Energy Officials (NASEO) Energy Assurance Planning
<https://www.naseo.org/energyassurance>
- National Association of Regulatory Utility Commissioners (NARUC) Critical Infrastructure resources
<https://www.naruc.org/cpi-1/critical-infrastructure-cybersecurity-and-resilience/critical-infrastructure/>
- National Governors Association (NGA) Energy resources
<https://www.nga.org/energy-resource-center/>

HUD CDBG-MIT Resources

- **Community Development Block Grant Mitigation Program:**
<https://www.hudexchange.info/programs/cdbg-mit/>
- **HUD CDBG-Mitigation Notice:**
<https://files.hudexchange.info/resources/documents/FR-6109-N-02-CDBG-Mitigation-Notice.pdf>
- **HUD CDBG-Mitigation 2019 Webinar series:**
<https://www.hudexchange.info/news/cdbg-mit-webinar-series/>

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www.energy.gov/oe

Questions?

HUD CDBG-MIT Guidance Questions

HUD Policy Unit

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