



Virtual Workshop: Enhancing Community Energy Resilience through FEMA BRIC

August 24-26, 2021
12:30-5:30 PM ET

Hosted by the National Association of State Energy Officials (NASEO), National Emergency Management Association (NEMA), and Business Council for Sustainable Energy (BCSE)

Virtual Meeting 101

- Please keep yourself muted during all presentations
- For any tech sessions chat Shemika Spencer or email sspencer@naseo.org
- There will be time for Q&A after each presentation.
 - Type any questions in the chat box or raise hand to be unmuted
 - You can send a message to the entire group or privately message one person



Day 2: Key Relationships for Accessing BRIC Funds for Local Energy Resilience

Wednesday, August 25th, 2021

12:30-5:30 PM ET



Day 2 Agenda

Session Times	Session Description
12:30-1:00 PM ET	Keynote and Opening Remarks for Day 2
1:00-1:30 PM ET	Electric Cooperative Perspectives on Hazard Mitigation and Resilience
1:30-2:30 PM ET	Key Relationships: Local Engagement and Strategic Prioritization
2:30-3:15 PM ET	BRIC, BCA, ESPC, SHMO, CHP, CTP, DER, SAIDI—Oh my! Overcoming Language and Organizational Barriers within the Energy-Emergency Management Nexus
3:15-3:30 PM ET	Break
3:30-4:00 PM ET	Equitable Energy Risk Assessment and Management
4:00-4:30 PM ET	Break
4:30-5:30 PM ET	Addressing the State and Local Cost Share: Public-Private Partnership Opportunities with Eligible Funding
5:30 PM ET	Closing Remarks and Preview of Day 3



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Slide 20	An Iowa Perspective on Mitigation Projects for Rural Cooperatives Tim Marienau , Chief Executive Officer, Prairie Energy
Slide 31	Florida Keys Electric Cooperative (FKEC) and FEMA's HMGP Case Studies Ray Rhash , Rate and Budget Analyst, Florida Keys Electric Cooperative
Slide 40	Energy System Planning and Building Community Resilience in North Carolina Sushma Masemore , Deputy Assistant Secretary for Environment, State Energy Director, North Carolina Department of Environment and Natural Resources
Slide 61	South Texas Coastal Bend Regional Resilience Partnership Dr. Katya Wowk , Director of Texas OneGulf, Senior Associate for Strategic Planning & Policy, Harte Research Institute for Gulf of Mexico Studies
Slide 75	Overcoming Barriers in the Energy/Emergency Management Nexus: Opportunities Paul Holloway , Emergency Planning and Energy Analyst, Massachusetts Department of Energy Resources
Slide 91	Michael Wilson , Senior Account Executive, Performance Infrastructure, Johnson Controls
Slide 95	Addressing the State and Local Cost Share: Public-Private Partnership Opportunities with Eligible Funding Mark Fowler , Director, Government Relations, Ameresco



Welcome, Opening Remarks, and Keynote for Day Two

Speakers:

Moderator – **Kelley Smith Burk**, Director, Office of Energy, Florida Department of Agriculture and Consumer Services; Chair, NASEO Board of Directors

Katherine Fox, Assistant Administrator for Mitigation, Federal Emergency Management Agency



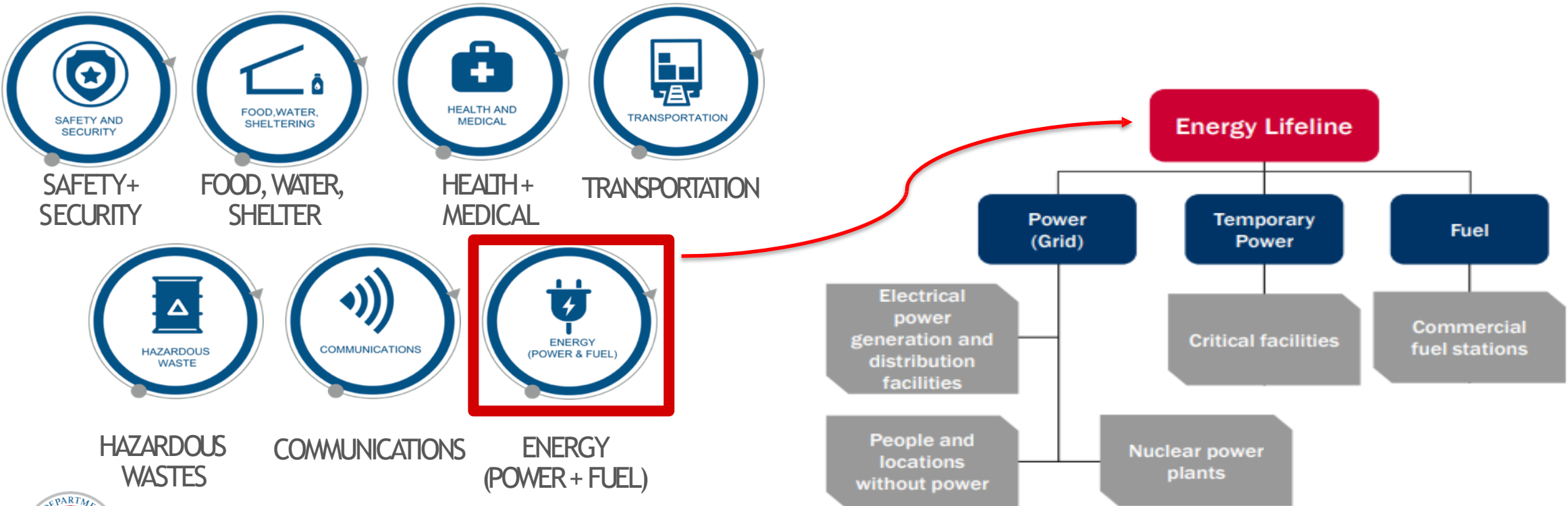
An aerial photograph of a coastal town, likely in New England, featuring a harbor with numerous sailboats, a church with a tall steeple, and a dense forest of green trees. The image is overlaid with a semi-transparent blue filter.

Keynote for Day 2: Key Relationships for Accessing BRIC Funds for Local Energy Resilience

Katherine Fox, Assistant Administrator for Mitigation | August 25, 2021

Energy Resilience and Emergency Management

Lifelines are critical services in communities. The goals and objectives of FEMA's Strategic Plan promote reducing risk to lifelines to quickly stabilize a community after disaster by preventing cascading impacts.



FEMA Provides Energy Resilience Opportunities for Local Communities

Disaster Cycle Grant Programs



Public Assistance (PA) 406 Mitigation
FEMA’s Public Assistance (PA) Division supports communities’ recovery from major disasters by providing mitigation funding opportunities to restore and strengthen public infrastructure. HMA works to enhance coordination with PA.



Hazard Mitigation Grant Program (HMGP)
Implements long-term hazard mitigation measures after a major disaster declaration



HMGP Post-Fire
Helps communities implement hazard mitigation measures after wildfire disasters

Annual Cycle Grant Programs



Flood Mitigation Assistance (FMA)
Reduces or eliminates the risk of repetitive flood damage to buildings and structures insured under the National Flood Insurance Program (NFIP)



Building Resilient Infrastructure and Communities (BRIC)
Supports the undertaking of new and innovative infrastructure projects reducing the risks faced from disasters and natural hazards

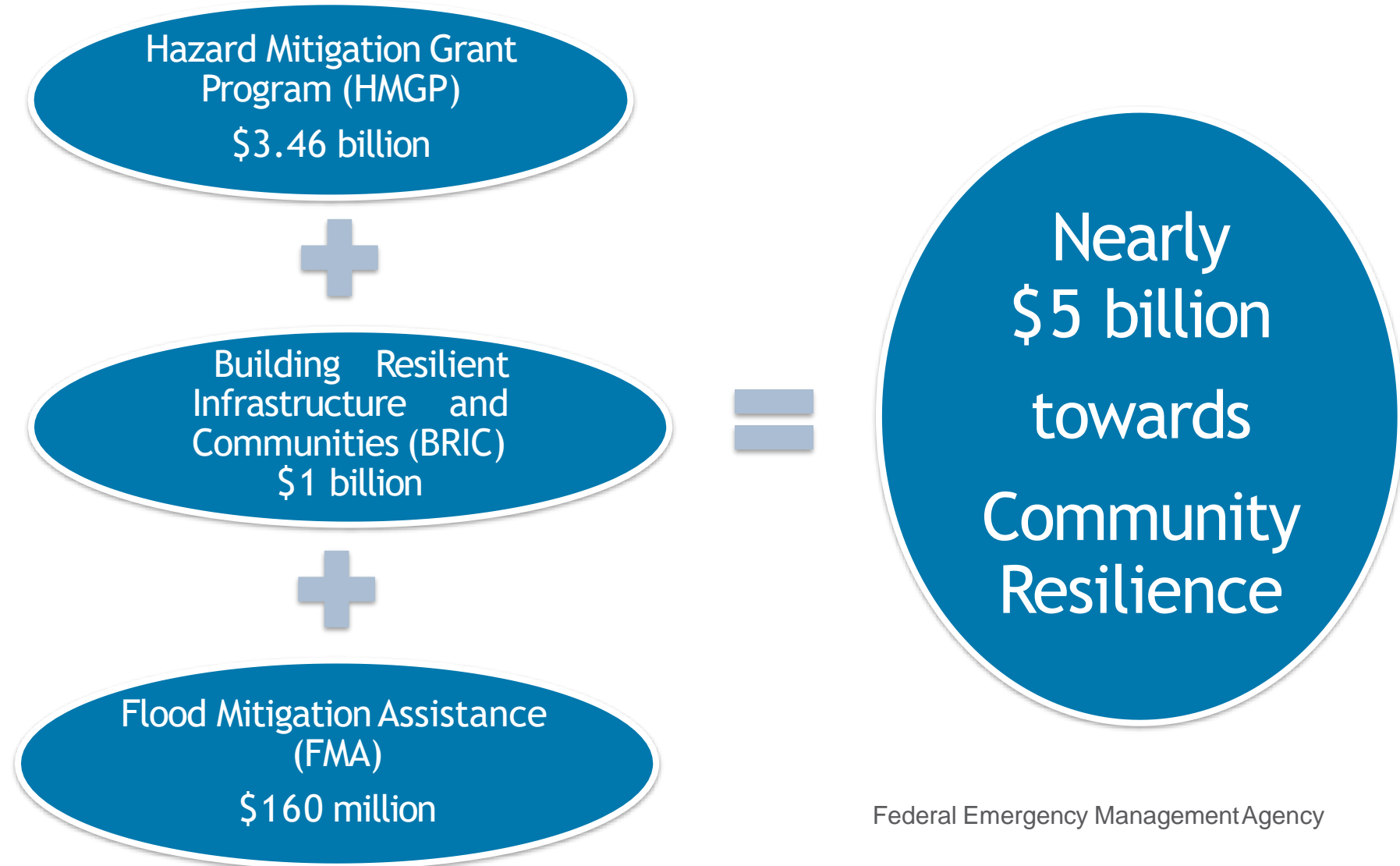


Pre-Disaster Mitigation (PDM)
Replaced by BRIC and funded pre-disaster hazard mitigation activities awarded in FY19 and earlier



FEMA

Available Hazard Mitigation Grants



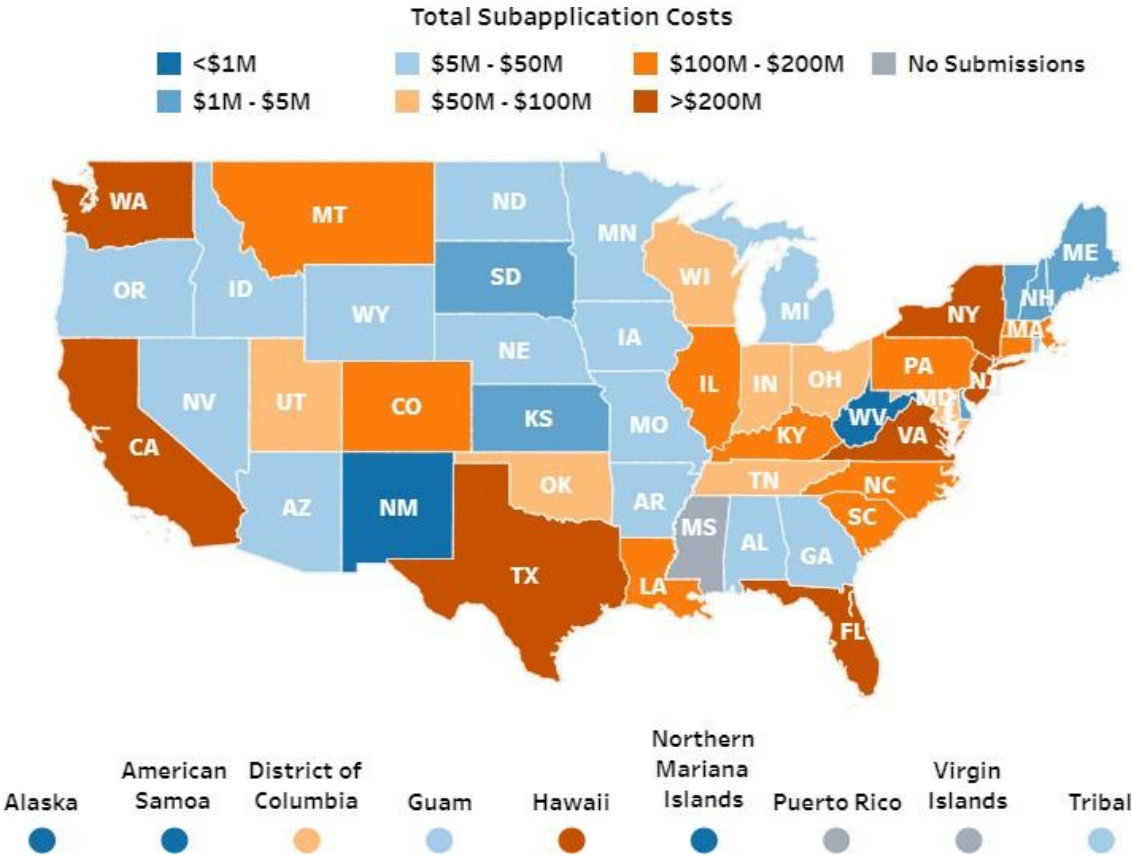


BRIC Program Priorities

- Mitigate the risk to public infrastructure
- Incentivize resilient investments in disadvantaged communities, as referenced in EO 14008 (Tackling the Climate Crisis at Home and Abroad)
- Mitigate risk to one or more community lifelines
- Incorporate nature-based solutions
- Enhance climate resilience and adaptation
- Incentivize the adoption and enforcement of the latest published editions of building codes

BRIC encourages mitigation projects that meet multiple program priorities

Fiscal Year (FY) 2020 BRIC Submissions Summary



Top Five Project Types by Federal Share Requested:

1. Flood control (\$1.3 billion)
2. Utility and infrastructure protection (\$771 million)
3. Saferoom/shelter (\$184 million)
4. Retrofit (\$176 million)
5. Mitigation reconstruction (\$164 million)

Top Five Project Types by Number of Subapplications:

1. Flood control (163)
2. Plan update (127)
3. **Utility and infrastructure protection (120)**
4. Engineering, environmental, feasibility and/or Benefit-Cost Analysis (99)
5. Generator (72)



Examples of Energy Projects Selected for BRIC

These are example projects that have been selected for further review for FY20 BRIC funding. FEMA is currently working with applicants to finalize all required reviews before making an award.

The Paskenta Project | Tehama County, Calif.

Benefits:

- Constructs a renewable energy microgrid to serve a cluster of buildings; New Greenway corridor developed; beautifies community
- Will provide reliable power to the Tribe's government office buildings where emergency incidents are managed, a fueling station, a water treatment facility, housing options, and a new community center

Saint Elizabeth's Hospital Campus and DC Emergency Communications Microgrid Project | Washington, DC

Benefits:

- New hospital in planned community with new energy microgrid
- Will provide reliable access to healthcare and emergency services
- Will reduce greenhouse gas emissions and aligns to climate, energy, and sustainability goals

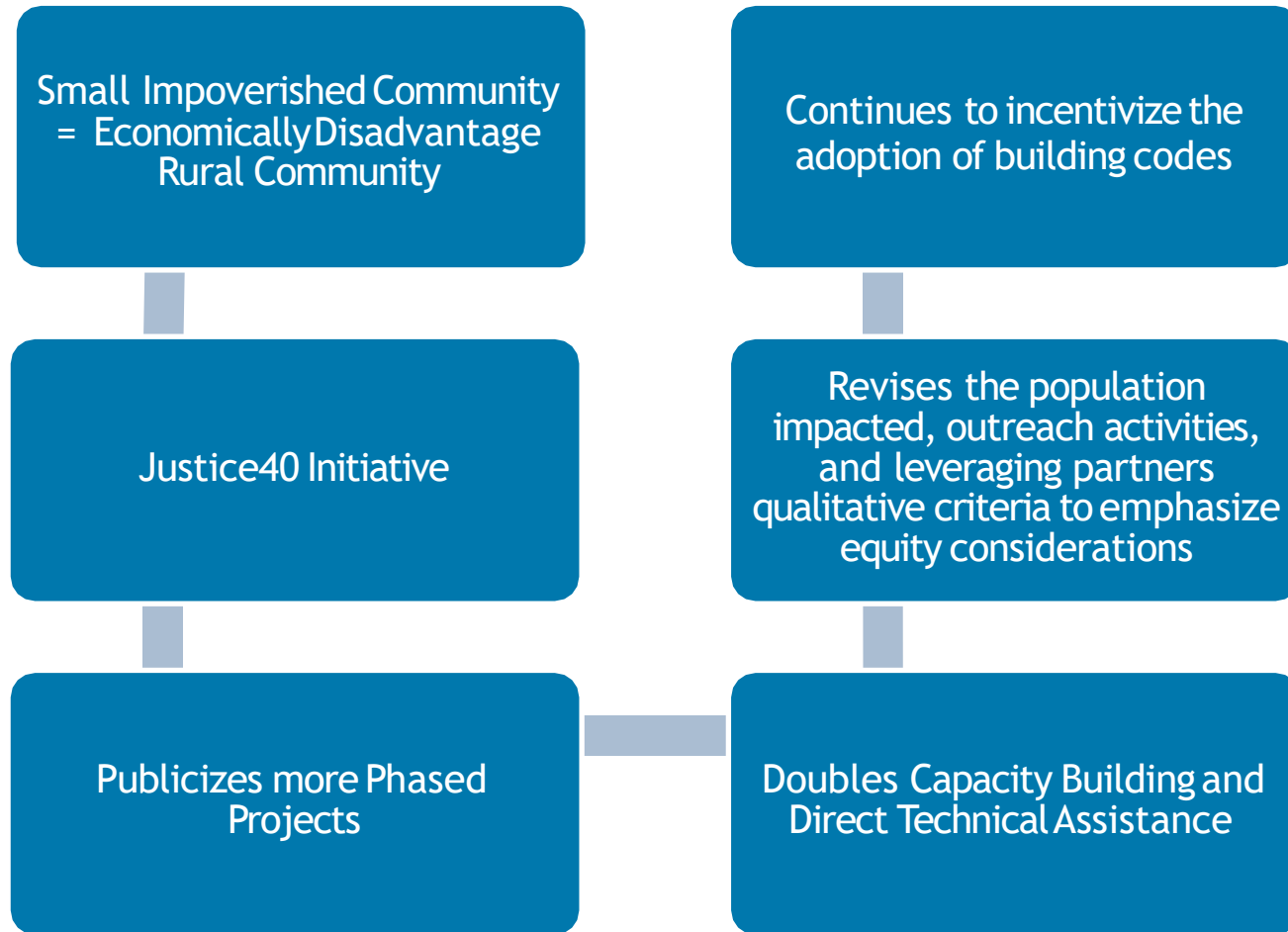


BRIC Funding Doubled for FY2021



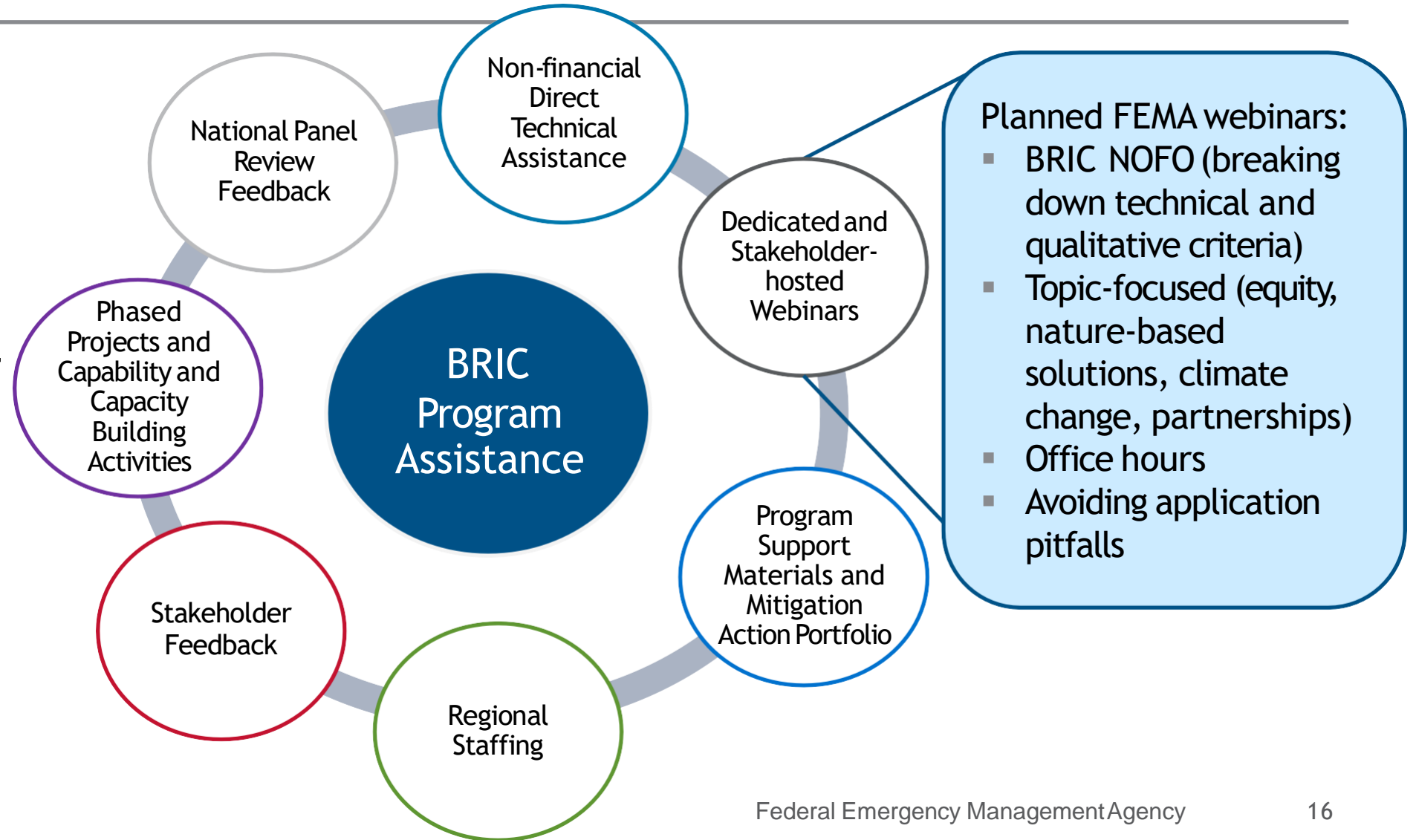
FEMA

What's Coming - New for BRIC in FY 2021



BRIC Program Assistance

FEMA HQ and Regions are working hard to provide technical assistance to SLTTs through a number of avenues:



2021 BRIC and FMA Programs Webinar Series

Date and Time	Webinar Topic
August 26 2-3:30 pm ET	BRIC and FMA FY 2021 NOFO Webinar #2
September 8 2-3:30 pm ET	BRIC FY 2021 NOFO Technical and Qualitative Criteria
September 13 2-3:30 pm ET	BRIC and FMA FY 2021 NOFO Tribal Webinar
September 23 2-3:30 pm ET	Severe Repetitive Loss/Repetitive Loss Mitigation Priorities
October 13 2-3:30pm ET	Federal Agency Roundtable

How to Register: To register for any of the webinar sessions, please visit [FEMA.gov/BRIC](https://www.fema.gov/BRIC) or our [registration page](#) directly.



Thank you!



FEMA

Electric Cooperative Perspectives on Hazard Mitigation and Resilience

Speakers:

Moderator – Shelly Peterson, Iowa Economic Development Authority

Tim Marienau, Chief Executive Officer, Prairie Energy

Ray Rhash, Rate and Budget Analyst, Florida Keys Electric Cooperative





*FEMA,
Iowa Homeland Security,
Stanley Consultants,
&
Prairie Energy
Cooperative*

An Iowa Perspective on Mitigation Projects
for Rural Cooperatives

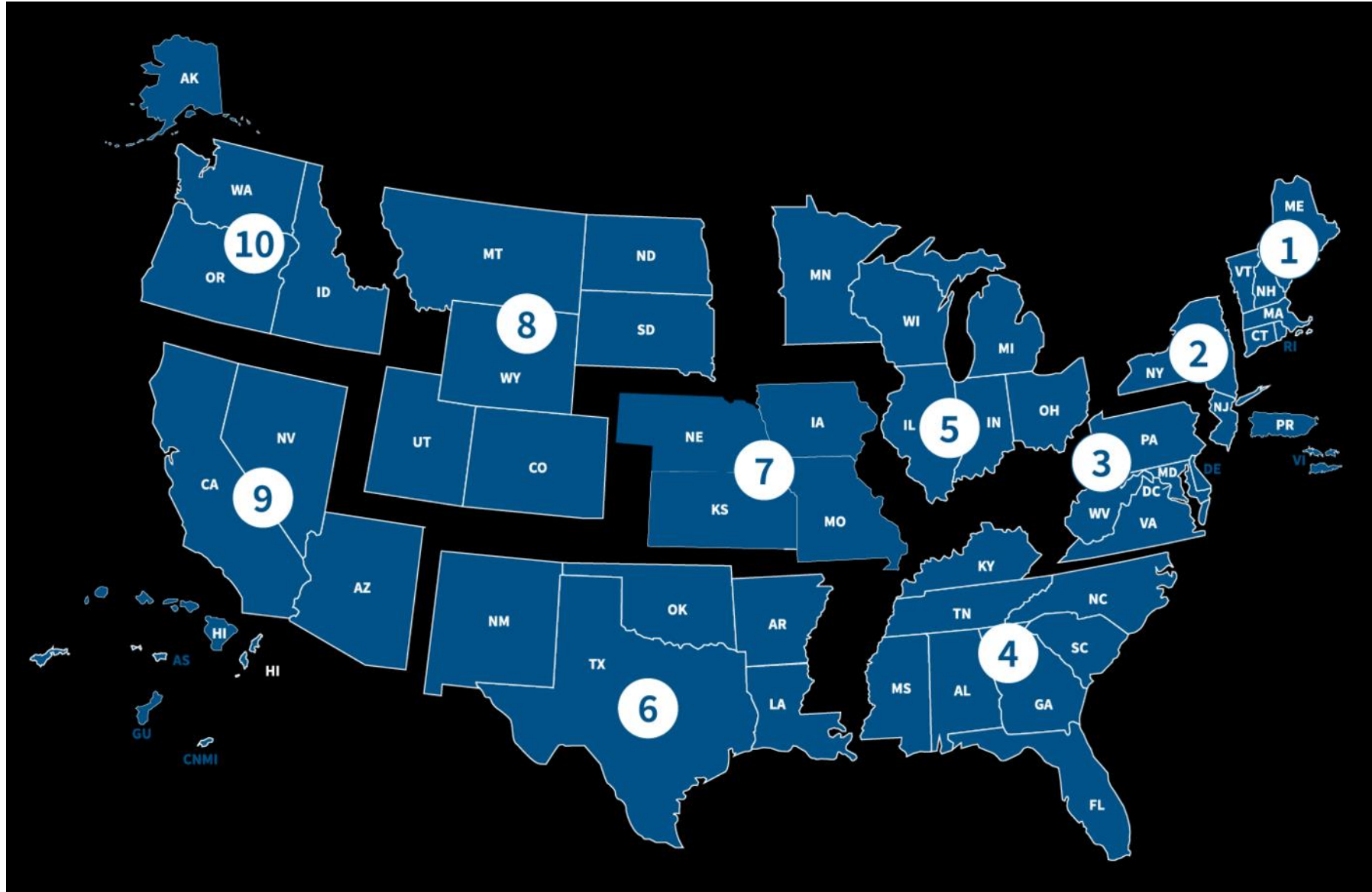
Tim Marienau, CEO



FEMA



- **Federal Emergency Management Agency (Department of Homeland Security)**
 - Washington D.C.
 - 10 Regions across the US - Kansas City (Region VII)



IHSEMD



- **Iowa Department of Homeland Security & Emergency Management**

- The structure of homeland security and emergency management in Iowa begins with the governor, who holds the responsibility for protecting Iowa's citizens. The governor appoints the Iowa homeland security advisor and the director of the Iowa Department of Homeland Security and Emergency Management (HSEMD). The HSEMD director serves as the state administrative agent for grants administered by the federal government.
- Iowa Homeland Security and Emergency Management is the coordinating body for homeland security and emergency management activities across the state.
- Preparedness, Response, **Recovery**, Prevention, & **Mitigation**
- IHSEMD works with FEMA to manage & administer the Public Assistance program
- Public Assistance (disaster & mitigation)
- Tim - Disaster Project Specialist 2009 – 2014
 - Cooperatives
 - Iowa State University
 - University of Northern Iowa

Stanley Consultants



- **Services provided to Prairie Energy:**
 - 3-5 Year Construction Work Plans
 - Annual infrastructure (Capital) Projects.
 - USDA RUS Environmental and Financial (Loans).
 - Cost of Service Studies
 - HMGP Projects
 - PECO identifies potential mitigation projects/measures for future resiliency
 - Stanley Consultants conduct BCA analysis
 - Stanley, Consultants, IHSEMD and PECO work together for NOI's (notice of interest)

Iowa has experienced 44 presidentially-declared disasters
from 1990 to 2020, and 62 declarations total

2020	8/17/2020	DR-4557, Severe Storms (Derecho)	\$ 3,304,526
2020	3/23/2020	DR-4483, Iowa Coronavirus (COVID-19)	\$ 44,000,000
2019	3/12/2019	DR-4421, Severe Storms & Flooding (Missouri River)	\$ 132,863,113
2018	9/12/2018	DR-4392, Severe Storms & Tornadoes	\$ 1,660,205
2018	8/20/2018	DR-4386, Severe Storms, Tornadoes, Straight-line winds, and Flooding	\$ 15,615,311
2017	8/27/2017	DR-4334, Severe Storms, Tornadoes, Straight-line winds, and Flooding	\$ 5,861,888
2016	10/31/2016	DR-4289, Severe Storms and Flooding	\$ 13,664,183
2016	9/29/2016	DR-4281, Severe Storms, Straight-line winds, and Flooding	\$ 5,730,801
2015	7/31/2015	DR-4234, Severe Storms, Tornadoes, Straight-line winds, and Flooding	\$ 7,404,150
2014	8/5/2014	DR-4187, Severe Storms, Tornadoes, Straight-line winds, and Flooding	\$ 14,358,591
2014	7/24/2014	DR-4184, Severe Storms, Tornadoes, Straight-line winds, and Flooding	\$ 17,809,370
2014	7/14/2014	DR-4181, Severe Storms, Tornadoes, Straight-line winds, and Flooding	\$ 5,751,934
2013	7/31/2013	DR-4135, Severe Storms, Tornadoes, and Flooding	\$ 4,551,831
2013	7/2/2013	DR-4126, Severe Storms, Tornadoes, and Flooding	\$ 20,510,098
2013	5/31/2013	DR-4119, Severe Storms, Straight-line Winds, and Flooding	\$ 7,594,458
2013	5/6/2013	DR-4114, Severe Winter Storm	\$ 13,282,121
2011	8/30/2011	DR-4018, Severe Storms and Flooding	\$ 4,132,709
2011	8/24/2011	DR-4016, Severe Storms, Straight-Line Winds and Flooding	\$ 5,743,592
2011	6/27/2011	DR-1998, Flooding	\$ 46,273,269
2011	5/5/2011	DR-1977, Severe Storms, Tornadoes and Straight-Line Winds	\$ 2,702,114
2010	7/29/2010	DR-1930, Severe Storms, Flooding and Tornadoes	\$ 52,178,016
2010	7/27/2010	DR-1928, Severe Storms and Flooding	\$ 3,008,482
2010	3/2/2010	DR-1880, Severe Winter Storms	\$ 84,281,915
2010	2/25/2010	DR-1877, Severe Winter Storms and Snowstorm	\$ 5,996,437
2009	8/13/2009	DR-1854, Severe Storm	\$ 6,484,642
2008	5/27/2008	DR-1763, Severe Storms, Tornadoes and Flooding	\$ 1,155,443,647
2008	1/4/2008	DR-1737, Severe Winter Storm	\$ 28,052,066
2007	9/14/2007	DR-1727, Severe Storms and Flooding	\$ 6,273,630
2007	5/25/2007	DR-1705, Severe Storms, Flooding and Tornadoes	\$ 12,175,172
2007	3/14/2007	DR-1688, Severe Winter Storms	\$ 65,377,279

Public Assistance from FEMA - 30 DR's in 14 years

\$1,792,085,550



DR 4421 HMGP Project - March 2019 Disaster

PECO has a "stacked" 4421 HMGP application that has been forward to FEMA to approve that totals \$1,725,550.00

- 7 - Three-Phase retrofit projects (16.95 miles) @ \$1,660,550.00
- 3 - Single Phase retrofit Projects (1.30 miles) @ \$65,000.00



2020 BRIC Application

PECO submitted other projects with IHSEMD for future mitigation IHSEMD suggested we apply for funding in a new program with the Feds:

“Building Resilient Infrastructure and Communities (BRIC) will support states, local communities, tribes and territories as they undertake hazard mitigation projects, reducing the risks they face from disasters and natural hazards. BRIC is a new FEMA pre-disaster hazard mitigation program”

5	- Three Phase Projects	9.00 miles	@	\$733,500.00
1	- Two Phase Project	3.40 miles	@	\$207,400.00
23	- Single Phase Projects	17.35 miles	@	<u>\$849,600.00</u>
				\$1,790,500.00



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23	- Single Phase Projects	17.35 miles	@	<u>\$849,600.00</u>
				\$1,790,500.00

DENIED JULY 2021



DR 4557 HMGP Project - August 2020 Disaster

PECO submitted a new Notice of Interest (NOI) with IHSEMD for future mitigation. IHSEMD accepted and PECO is eligible for \$3 MM as of March 16, 2021.

- June 15, 2021 application deadline
- Looking at a lot of options:
 - Substation Ties
 - Retrofits / Reconductor
 - Hardening the entire system
 - Automated Switching - Entire System
- Potential delays with RUS - new administration – new employees (environmental reviews)

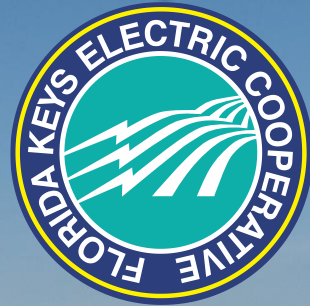


Contact Information:

Tim Marienau, CEO

- 2099 Highway 3 West | Clarion, IA 50525
- Main Office: 515.532.2805 | Cell Phone: 515.460.5955
- tmarienau@prairieenergy.coop

FLORIDA KEYS ELECTRIC COOPERATIVE (FKEC) AND FEMA'S HAZARD MITIGATION GRANT PROGRAM (HMGP) CASE STUDIES



Ray Rhash, DBA, Planning, Rate, and Budget Analyst, FKEC

OVERVIEW

- FKEC's Mitigation Projects
- Overview of Costs
- Parting Suggestions for HMGP Success

FKEC'S HMGP MITIGATION PROJECTS

Water Crossing Structure Cathodic Protection - Total Cost \$10,500,000

FDEM/FEMA approved. Construction underway.

- The 114 water crossing transmission poles spanning six water crossings were installed in the 1970's and since faced exposure to extreme environmental conditions created by subtropical waterborne effects of time, tide, and wind.
- Concrete cracking, spalling, and corrosion of reinforced steel have taken place in spite of annual scheduled maintenance.
- “Life Jacket Technology” is the remedy and provides structural integrity along with zinc protection to reduce concrete spalling and lengthen the life of the transmission water crossing structures.



FKEC'S HMGP MITIGATION PROJECTS

**Self-Supporting Transmission Poles – Total Cost \$6,000,000
FDEM/FEMA Approved. Phase 1 engineering underway.**

- This project is slated to replace twenty guyed transmission turn-pole structures built in the early 1970's.
- The self-supporting pole design eliminates guy wires, guy supports, and anchors in the ecologically sensitive shallow water habitats of the Florida Keys.



FKEC'S HMGP MITIGATION PROJECTS

Sea Oats Beach Relocate 37 Transmission Poles – Total Cost \$6,500,000. FDEM/FEMA approved. Waiting for contract.

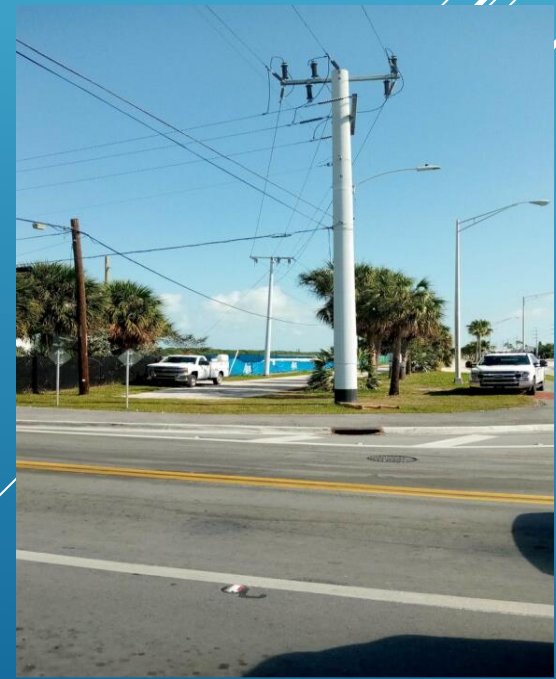
- This project calls for the relocation of 37 transmission structures to the other side of U.S. Highway One.
- Hurricane Irma's tidal surge caused one to three feet of erosion around these transmission poles.
- Failure of one of these poles means a power outage for 80 percent of the residents of the Florida Keys and closure of U.S. Highway one, the only highway connecting the Florida Keys to mainland Florida.
- Relocating these poles decreases the likelihood of failure due to hurricane storm surge.



FKEC'S HMGP MITIGATION PROJECTS

Self-Supporting Distribution Poles – Total Cost \$3,000,000 FDEM Approved Awaiting FEMA Approval

- This project focuses on replacing 78 guyed poles on the main distribution feeders of FKEC's system with self-supporting distribution poles.
- A self-supporting distribution pole is engineered to withstand the strain of category five hurricane force winds and reduce the impact to the environment by removing guy wires.




OVERVIEW OF COSTS

The four HMGP projects total \$26,000,000. However, with HMGP funding picking up 75 percent of the costs and Keys Energy Services paying its share FKEC's total cost is becomes \$3,251,250

	Total Cost	FEMA/HMGP Share @75%	Keys Energy Services Share @56.5%	Florida Keys Electric Share @ 43.5% & 25%
Water Crossing Structure Cathodic Protection	\$10,500,000	\$7,875,000	\$1,483,125	\$1,141,875
Self-Supporting Transmisison Poles	\$6,000,000	\$4,500,000	\$847,500	\$652,500
Sea Oats Beach Transmisison Poles	\$6,500,000	\$4,875,000	\$918,125	\$706,875
Self-Supporting Distribution Poles	\$3,000,000	\$2,250,000		\$750,000
Total Cost	\$26,000,000	\$19,500,000	\$3,248,750	\$3,251,250

PARTING SUGGESTIONS FOR HMGP SUCCESS

- Perform a self-assessment of your infrastructure to determine vulnerabilities and potential weaknesses.
 - Consider third-party support in application formulations, submission, and management.
- 

Key Relationships: Local Engagement and Strategic Prioritization

Speakers:

Moderator – **Megan Levy**, Local Energy Programs Manager, Wisconsin Office of Energy Innovation

Sushma Masemore, Deputy Assistant Secretary for Environment, State Energy Director, North Carolina Department of Environment and Natural Resources

JaLeesa Tate, State Hazard Mitigation Officer, Maryland Emergency Management Agency

Dr. Katya Wowk, Director of Texas OneGulf, Senior Associate for Strategic Planning & Policy, Harte Research Institute for Gulf of Mexico Studies





***Energy System Planning and
Building Community Resilience in North Carolina***
NASEO - FEMA BRIC Program Workshop

August 25, 2021

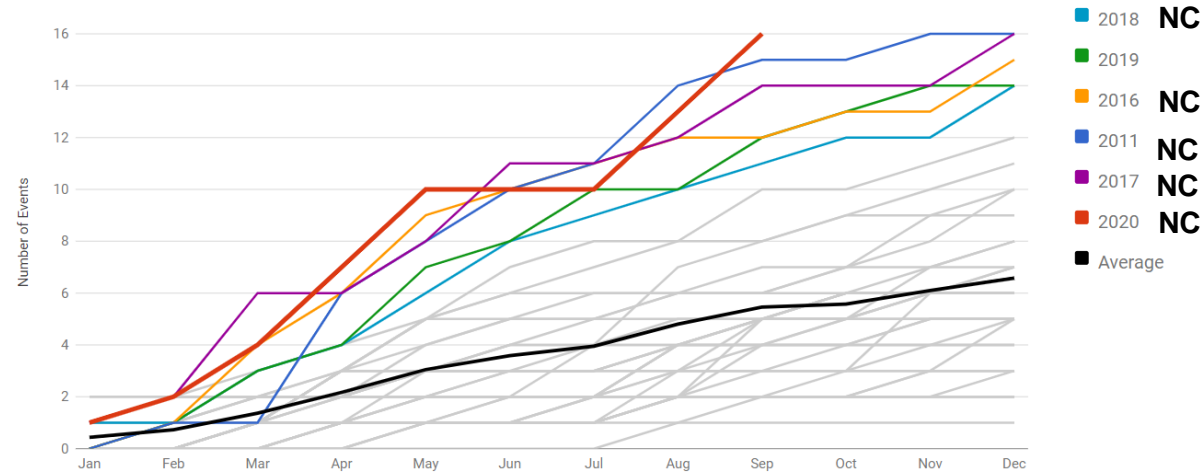
Sushma Masemore, P.E.



Frequency of Billion-Dollar Disaster Events in the U.S.

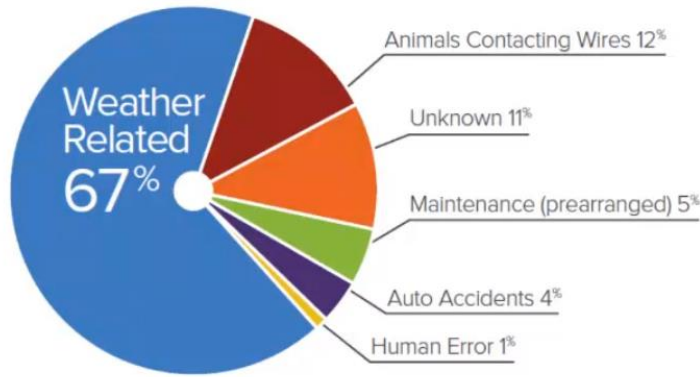
1980-2020 Year-to-Date United States Billion-Dollar Disaster Event Frequency (CPI-Adjusted)

Event statistics are added according to the date on which they ended.



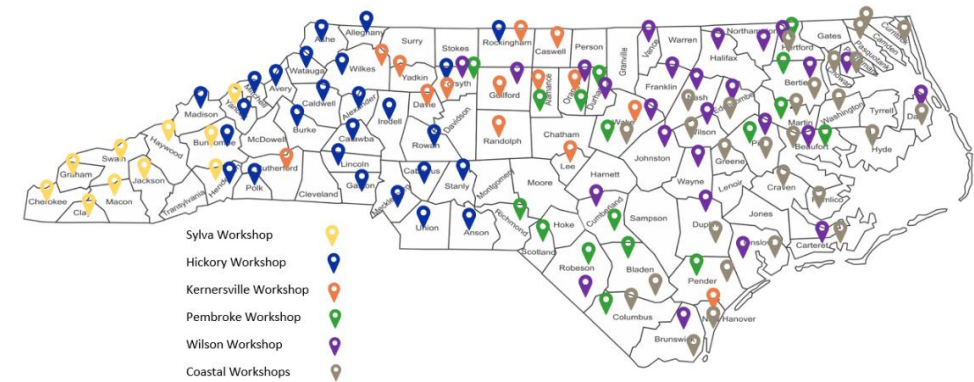
Statistics valid as of October 7, 2020.

Source: National Oceanic and Atmospheric Administration, <https://www.ncdc.noaa.gov/billions/>

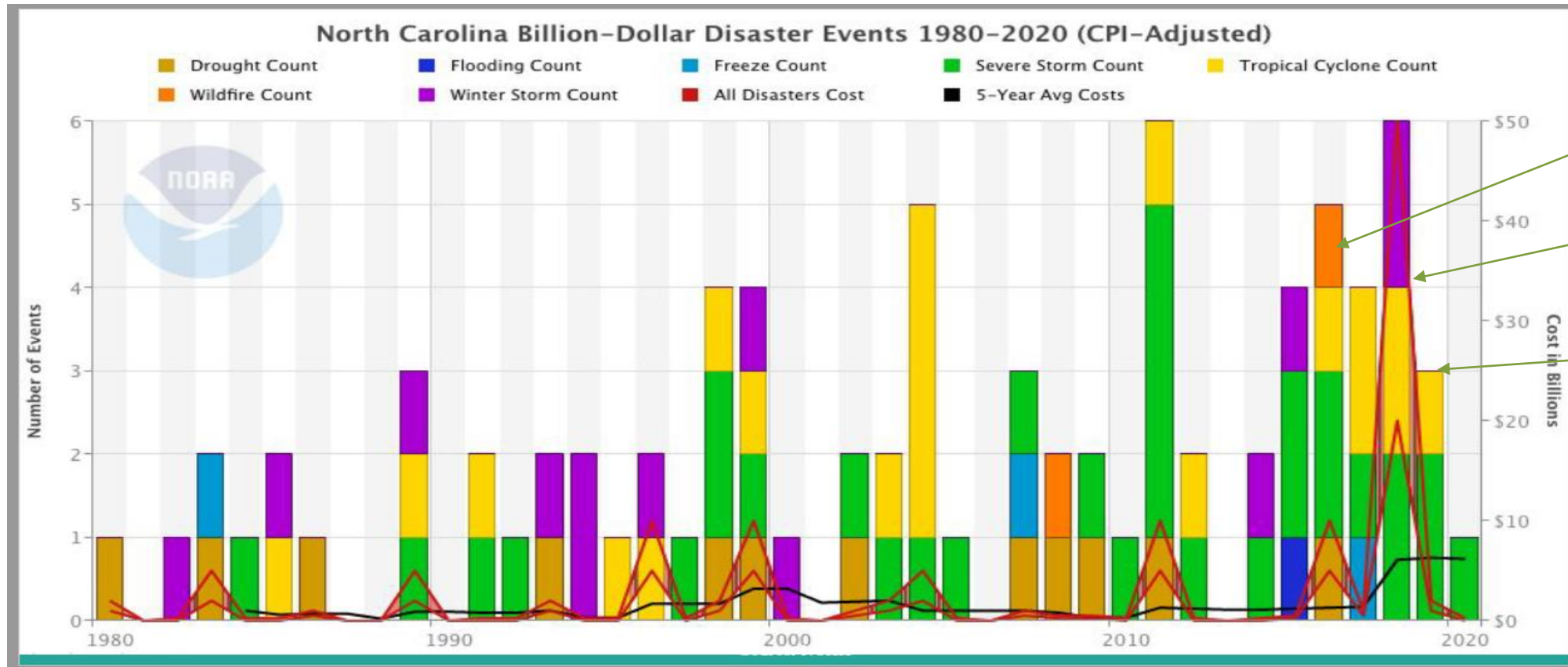


Carolina's Grid Disturbance types

Source: Advanced Energy



North Carolina Billion-Dollar Disaster Events

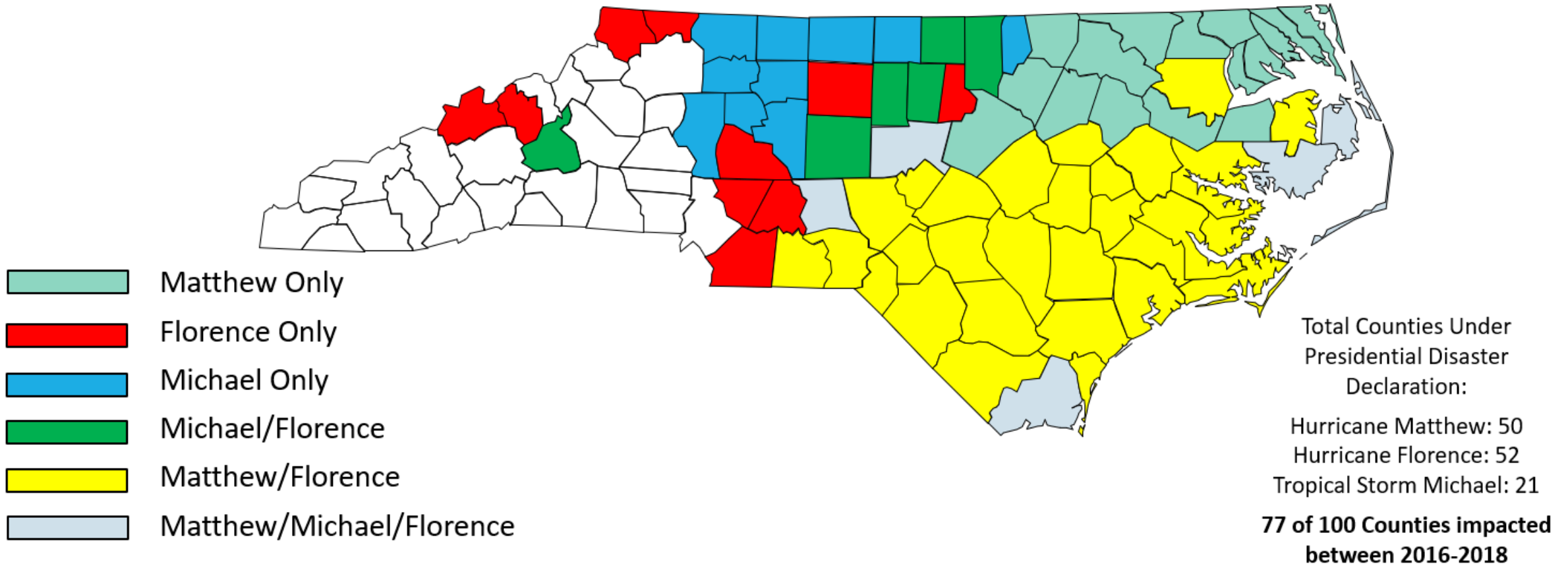


Hurricane Matthew (2016)

Hurricanes Michael and Florence (2018)

Hurricane Dorian (2019)

Widespread impacts: Matthew, Michael, Florence



Hurricane Florence Impacts

Transmission Summary

DEP System Outage Information	Lines	Substations	Wholesale PODs
Peak Storm (183)	45	90	48



Distribution Summary

Restored	Events	Outages
NC	22,604	1,643,762
SC	3,806	177,984
Total	26,410	1,821,746
DEC	5,569	387,791
DEP	21,878	1,448,718
Total	27,447	1,836,509



\$17 billion
in estimated damages statewide



51 counties
FEMA declared for Individual and/or Public Assistance



5,000+ people rescued
by air, water and land



21,272 people sheltered
on night of Sept. 15

- Florence was the largest mobilization in Duke Energy storm history.
- Flooding and wind damage were unprecedented than any storm to hit Duke Energy.
- 9 Duke substations flooded.

Duke spokesperson Randy Wheelless

NC Climate Science Report

North Carolina Climate Science Report



NC Climate Science Report (Kunkel et al. 2020):
<https://ncics.org/programs/nccsr/>

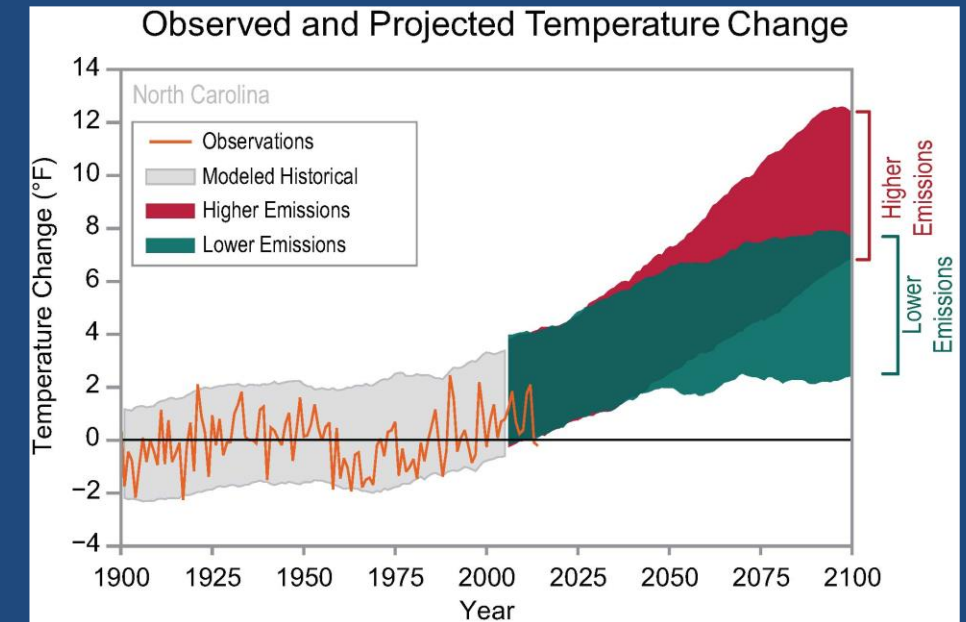
“Large changes in North Carolina’s climate

— much larger than at any time in the state’s history —

are **very likely** by the end of this century under both the lower and higher scenarios.”

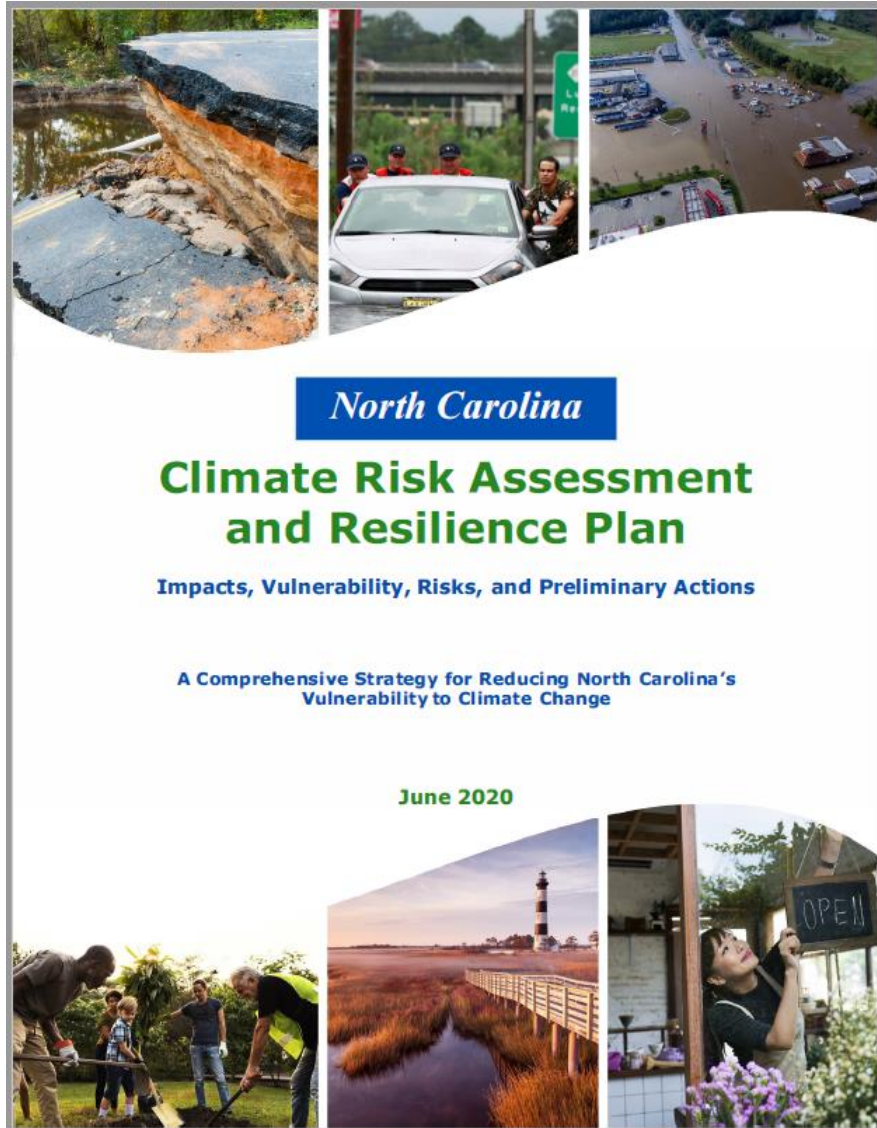
Very likely

90–100% probability of outcome



<https://statesummaries.ncics.org/>

North Carolina Resilience Plan



- Executive Summary
- 1. Key Findings and Recommendations
- 2. Resilience Plan Development Process
- 3. NC Climate Science Report Summary
- 4. Climate and Environmental Justice
- 5. Vulnerability, Risk, and Potential Options for Addressing Climate-Related Hazards
 - Agriculture and Forestry
 - Coastal Resources
 - Commerce and Business
 - Cultural Resources
 - Ecosystems
 - Housing, Buildings, and Support Services
 - Health and Human Services
 - Public Safety
 - Transportation
 - Water and Land Resources
 - Energy
- 6. Nature-Based Solutions to Resilience
- 7. Path Forward

Sector Strategy
Developers: 200+

Community Workshops
Participants: 300+

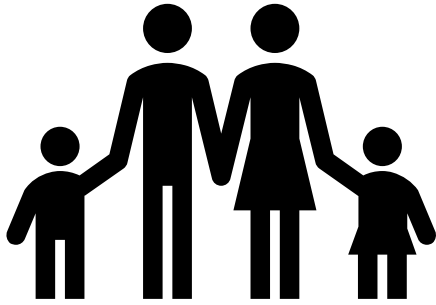
NWL Stakeholders:
100+

Vision of Resilience

- *A resilient North Carolina is a state where our communities, economies, and ecosystems are **better able to rebound, positively adapt to, and thrive** amid changing conditions and challenges, including disasters and climate change; **to maintain and improve quality of life, healthy growth, and durable systems**; and **to conserve resources** for present and future generations.*

Why does climate change impact some more than others?

Inequity in climate vulnerability and resilience



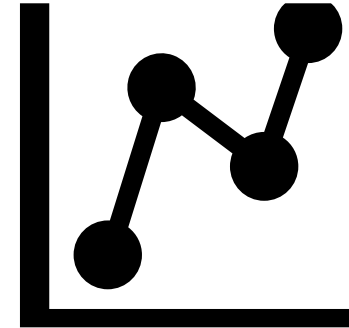
Social vulnerability



Unequal exposure to climate hazards



Infrastructure and housing disparities



Inequalities in resilience policy and programming

Recommendations for:

Cabinet agencies

State government

Community voice

Research

Hazards Affecting the Energy System

Non-Climate Stressors



Population Growth



Aging Infrastructure



Socioeconomic disparity



Physical Attacks, Cyber Security, and other manmade disasters



Rural-Urban Divide



**Public Health Threats/
Pandemics**

Climate Stressors

(Projected by the end of this century under both the lower and higher emissions scenarios)

Virtually Certain
Sea Level will continue to rise



Very Likely
Summer Heat Index Values will increase



Likely
Annual Total precipitation will increase



Likely
Hurricane intensity will increase



Likely
Severe droughts will become more intense



Likely
Increase in precipitation will lead to an increase in inland flooding



Virtually Certain= 99-100% probability of outcome
Very Likely= 90-100% probability of outcome
Likely= 66-100% probability of outcome
About as Likely as Not= 33-66% probability of outcome
Unlikely= 0-33% probability of outcome
Very Unlikely= 0-10% probability of outcome
Exceptionally Unlikely= 0-1% probability of outcome

Policy on Resiliency

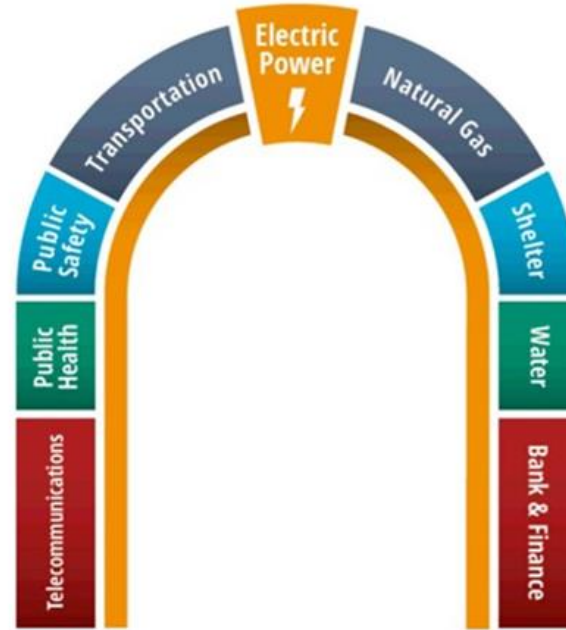
- No uniform methodology or best practice
- No state utilizes a resilience metric in regulated utility planning processes such as IRP, IDP, ISOP
- NARUC Report found that in regulatory proceedings resilience values for DERs have only been used qualitatively for decision making

Source: North Carolina Climate Science Report, <https://ncics.org/nccsr>



But Electric Power Can't Be Considered in Isolation...

- Electric power is foundational to so many of the services that a community requires
- Resilience thus requires looking beyond simply the grid, but what the grid enables
- Utilities and communities/governments may see resilience differently





Safety and Security



Law Enforcement/ Security



Fire Services



Search and Rescue



Government Services



Community Safety



Food, Water, Shelter



Food



Water



Shelter



Agriculture



Health and Medical



Medical Care



Patient Movement



Public Health



Fatality Management



Medical Supply Chain



Energy (Power & Fuel)



Power (Grid)



Fuel



Communications



Infrastructure



Alerts, Warnings, and Messages



911 and Dispatch



Transportation



Highway/Roadway



Mass Transit



Railway



Hazardous Materials



Facilities



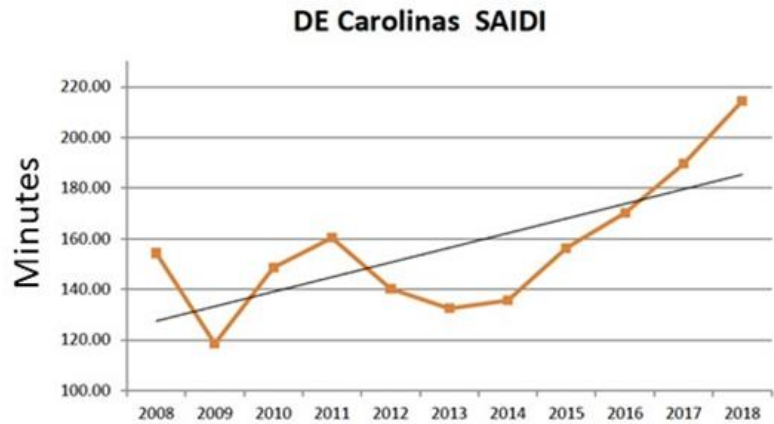
HAZMAT, Pollutants, Contaminants

FEMA Community Lifelines

Example Metric: SAIDI

System Average Interruption Duration Index (SAIDI)

$$SAIDI = \frac{\text{Total Customer Outage Duration}}{\text{Total Number of Customers}}$$

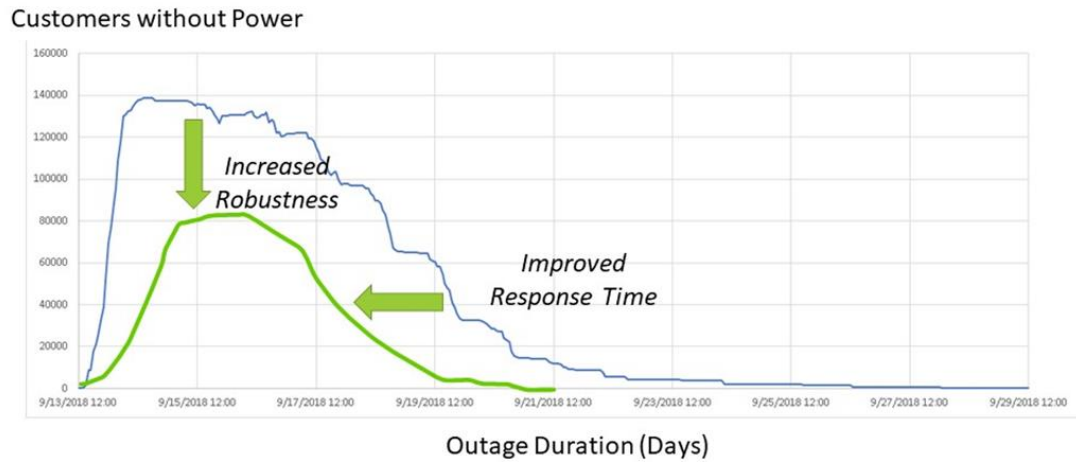


Jurisdiction	Date Range	Without MEDs		With MEDs	
		SAIFI	SAIDI	SAIFI	SAIDI
South Carolina Duke Energy Carolinas	12 Months Ending 3/31/19	1.23	241	1.77	654
South Carolina Duke Energy Progress	12 Months Ending 3/31/19	1.30	143	2.41	1,479

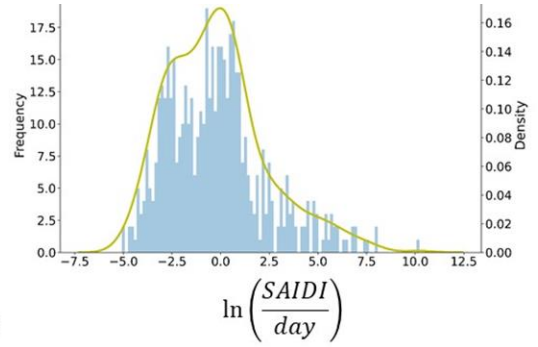
*MED - Major Event Days



How Do We Define Resilience?



- Case 1: Loss of generation / transmission
- Case 2: Outages lasting < 24 hours, some damage to distribution systems
- Case 3: Outages lasting > 24 hours, heavy damage to distribution systems

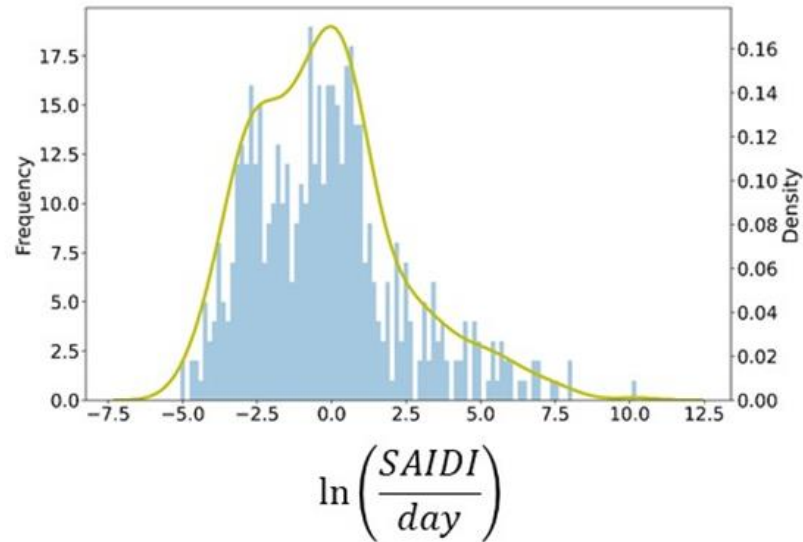


Storm (Year)	Date	SAIDI/Day
Hurricane Irene	August 2011	41.5 hours
2014 Ice Storm	February 2014	21.5 hours
Hurricane Michael	October 2016	14 hours
Hurricane Florence	September 2018	381 hours



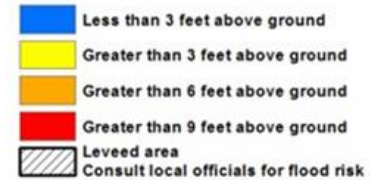
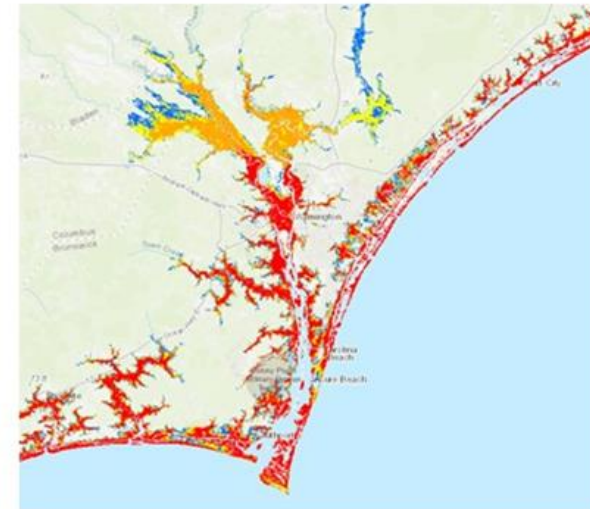
Resilience Uses Risk-Based Measures of Vulnerability

Reliability: Historic Analysis

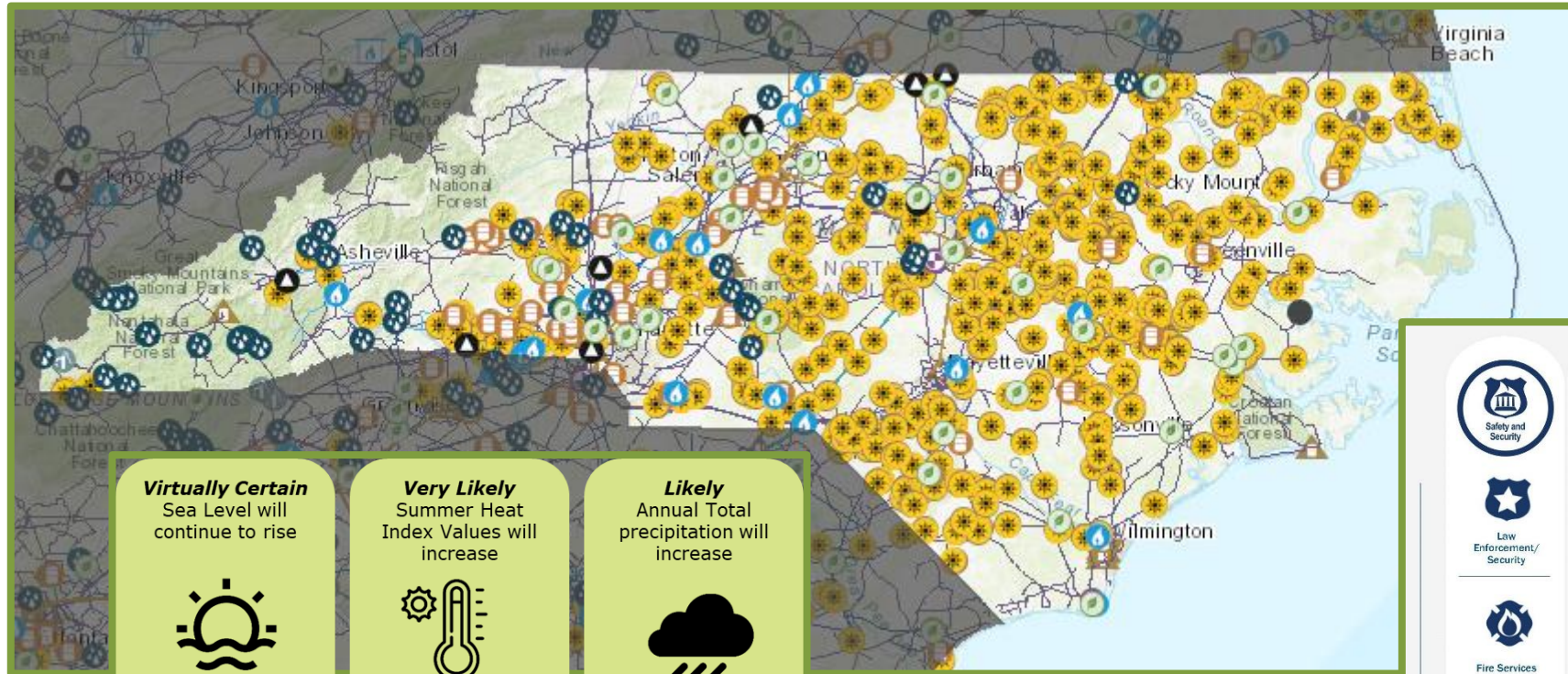


- Reliability: Historic data guides investment
- Resiliency: What infrastructure is at risk given expected conditions?
 - SLOSH-MOM (NOAA)

Resilience: Risk-Based Analysis



Community Energy Resiliency Planning



Energy assets

Community critical infrastructure

Virtually Certain
Sea Level will continue to rise

Very Likely
Summer Heat Index Values will increase

Likely
Annual Total precipitation will increase

Likely
Hurricane intensity will increase

Likely
Severe droughts will become more intense

Likely
Increase in precipitation will lead to an increase in inland flooding

Climate threats

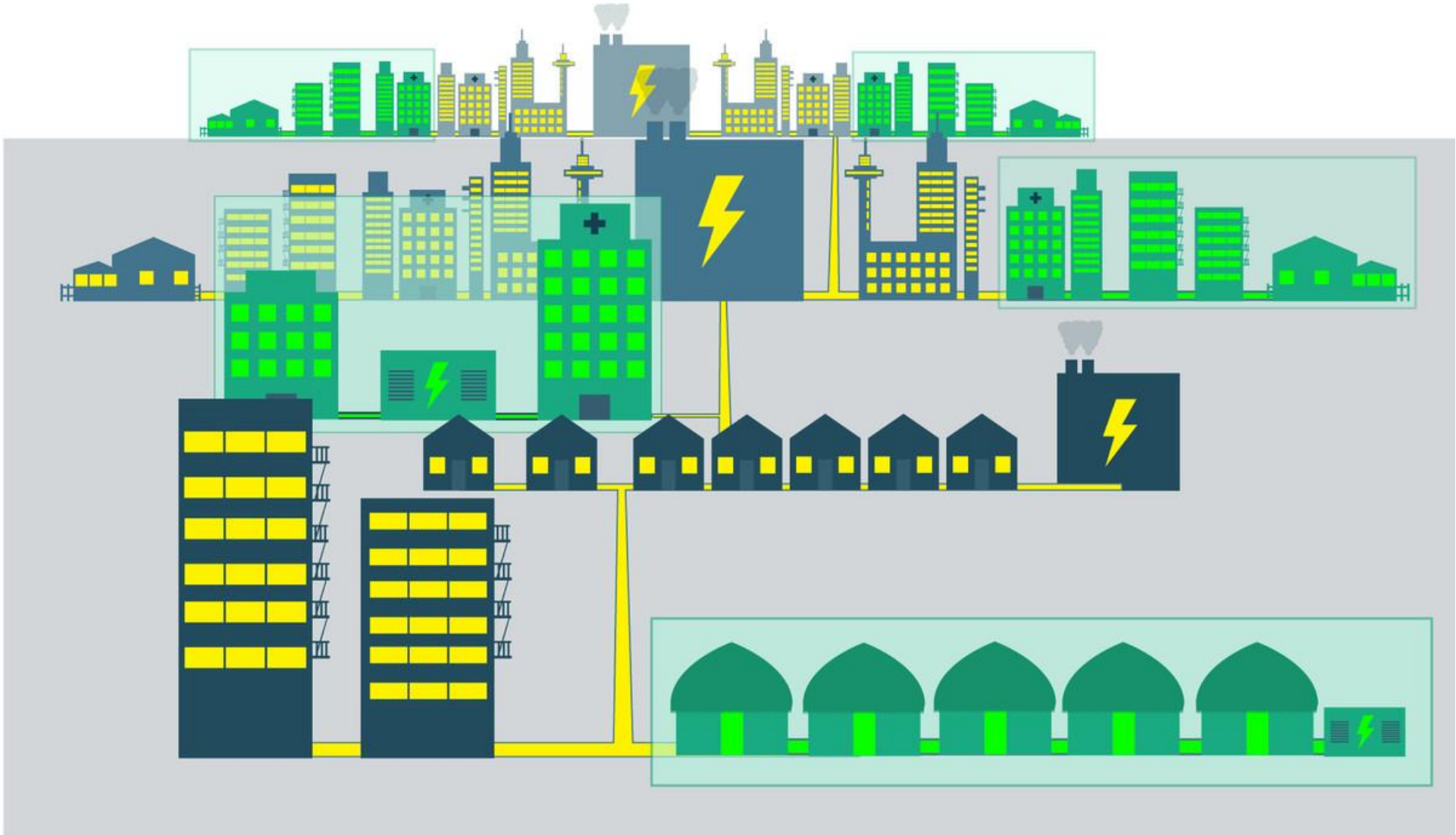
COMPONENTS of Lifetimes

Safety and Security	Food, Water, Shelter	Health and Medical	Energy (Power & Fuel)	Communications	Transportation	Hazardous Materials
Law Enforcement/Security	Food	Medical Care	Power (Grid)	Infrastructure	Highway/Roadway	Facilities
Fire Services	Water	Patient Movement	Fuel	Alerts, Warnings, and Messages	Mass Transit	HAZMAT, Pollutants, Contaminants
SAR Search and Rescue	Shelter	Public Health	911 and Dispatch	Railway		
Government Services	Agriculture	Fatality Management	Responder Communications	Aviation		
Community Safety		Medical Supply Chain	Finance	Maritime		

Clean Energy Solutions



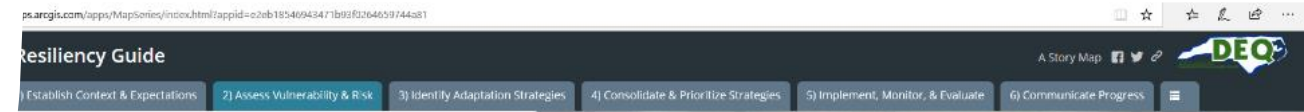
Integrated Distribution Planning



Community Energy Resilience Planning

New Hanover County BRIC Proposal

- Funding local governments with a focus on green-gray infrastructure project development:
 - Vulnerability assessments
 - Resilience planning
 - Engineering and design to get to shovel-ready projects
 - At least 1 construction project in vulnerable communities



Assess Vulnerability and Risk

Why Assess Vulnerability and Risk?

Short-term resilience means reducing future suffering, damage, and loss of life in a community. To achieve this, communities need to know who and what is more prone to these negative impacts. A primary goal of a vulnerability and risk assessment is to identify the most vulnerable areas and assets, and to determine the primary goal of a vulnerability and risk assessment. It serves as the foundation for developing a resilience plan that identifies the most vulnerable areas and assets, and to determine the most effective ways to reduce vulnerability and risk. This assessment is the first step in developing a resilience plan that identifies the most vulnerable areas and assets, and to determine the most effective ways to reduce vulnerability and risk. This assessment is the first step in developing a resilience plan that identifies the most vulnerable areas and assets, and to determine the most effective ways to reduce vulnerability and risk.

What is 'Normal'?

A community probably has a general sense of what geographic areas or populations of your community are at greatest risk from natural hazards and impacts from long-term stressors. In fact, your community's most recent resilience plan should contain a baseline vulnerability and risk assessment which can serve as the first step in developing an enhanced assessment that considers additional factors and the local context.

In many communities, the current understanding of risk is usually based on sources that rely on information, such as historical data or statistics of the past climate and historical events. These sources might include personal experiences, FEMA flood maps or computer-modeled impacts of disaster scenarios (using FEMA HAZUS software) often conducted for hazard mitigation and emergency response planning.

Striving to build community-wide resilience takes this step a bit further to also consider:



Energy System Resiliency Planning

Valuing Resiliency

Metrics can be used to quantify human and economic costs of power outages and make investment decisions related to energy infrastructure planning and operations.

Consequence Category	Resilience Metric
Direct	
Electrical service	<ul style="list-style-type: none"> Cumulative customer hours of outages Cumulative customer energy demand not served Average number (or percentage) of customers experience an outage during a specified time period
Critical electrical service	<ul style="list-style-type: none"> Cumulative customer hours of outages Cumulative customer energy demand not served Average number (or percentage) of critical loads that experience an outage
Restoration	<ul style="list-style-type: none"> Time to recovery Cost to recovery
Monetary	<ul style="list-style-type: none"> Loss of utility revenue Cost of grid damages (e.g., repair or replace lines, transformers) Cost of recovery Avoided outage cost
Indirect	
Community function	<ul style="list-style-type: none"> Critical services without power (hospitals, fire stations, police stations) Critical services without power for more and N hours (e.g., N>hours or backup fuel requirement)
Monetary	<ul style="list-style-type: none"> Loss of assets and perishables Business interruption costs Impact on Gross Municipal Product, Gross Regional Product
Other Critical Assets	<ul style="list-style-type: none"> Key production facilities without power Key military facilities without power



North Carolina
Utilities Commission

Questions?

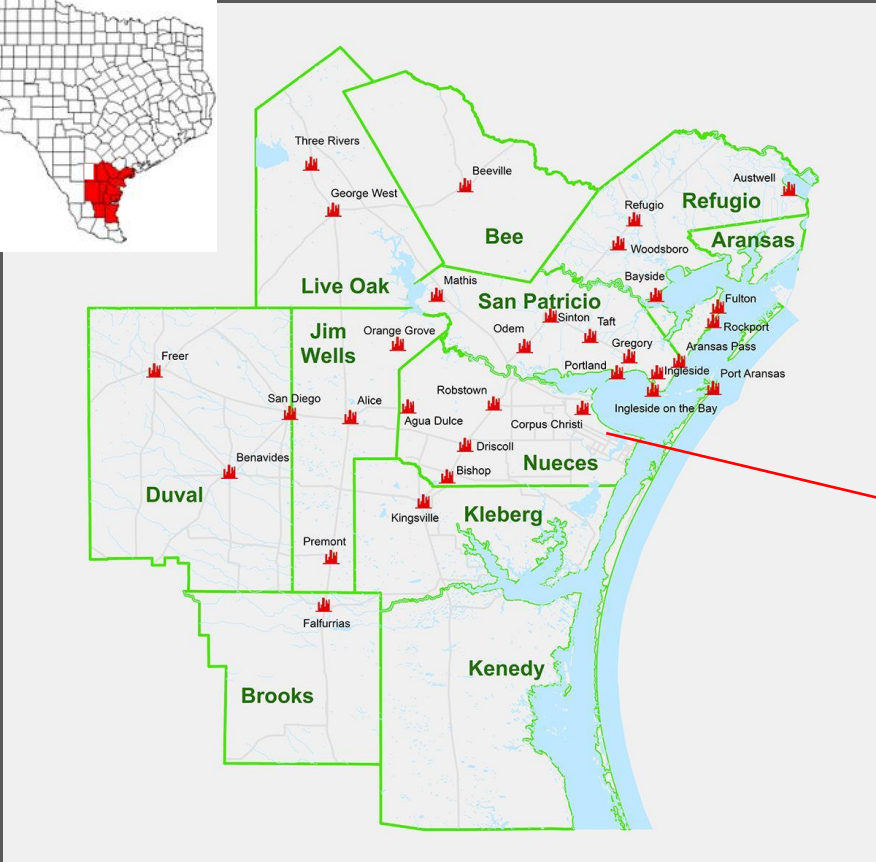
South Texas Coastal Bend Regional Resilience Partnership



Dr. Katya Wowk - Director, Texas OneGulf
Co-Lead, Regional Resilience Partnership
Harte Research Institute for Gulf of Mexico Studies
Texas A&M University Corpus Christi

Ms. Emily Martinez – Director, Regional Economic Development
Co-lead, Regional Resilience Partnership
Coastal Bend Council of Governments





South Texas
Coastal Bend

Harte Research Institute for Gulf of Mexico Studies
TAMUCC – the *Island University*



Geochemical and Environmental
Research Group / Oceanography
Texas A&M University

Gulf of Mexico Coastal Ocean
Observing System *Regional
Association*

Meadows Center for Water
and Environment
Texas State University

Harte Research Institute
for Gulf of Mexico Studies
*Texas A&M University
Corpus Christi*

Center for U.S. and
Mexican Law
*University of
Houston*

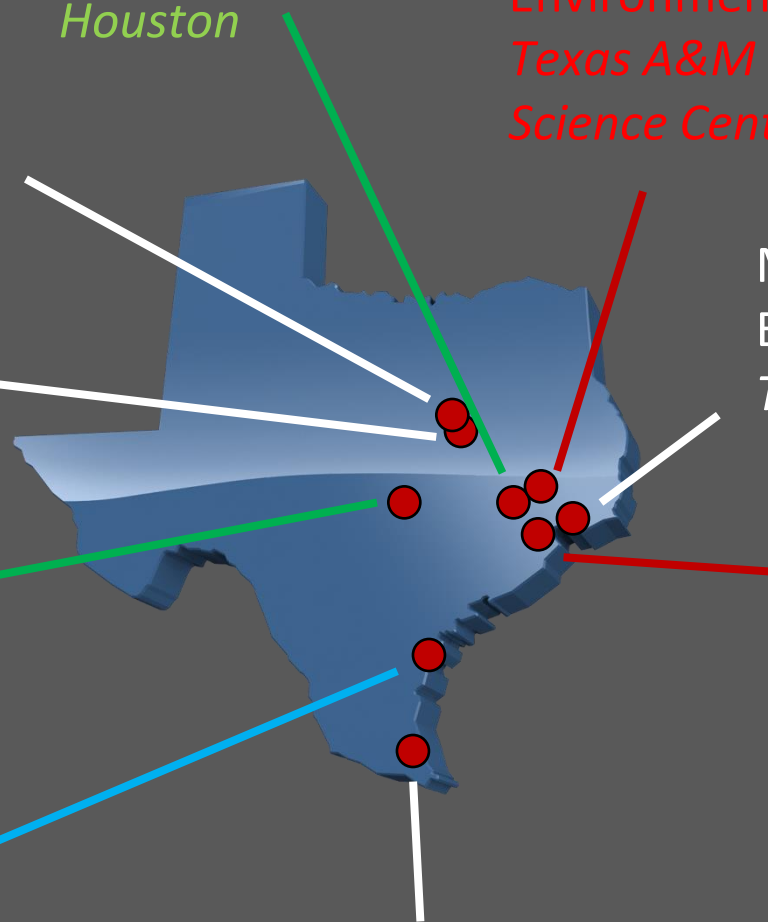
Center for Translational
Environmental Health Research
*Texas A&M University Health
Science Center*

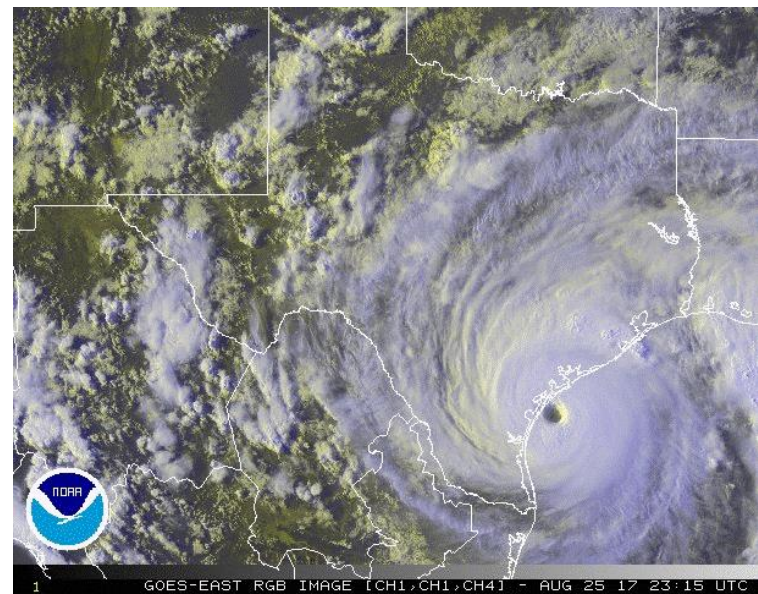
Marine Biology, Science &
Engineering
Texas A&M University Galveston

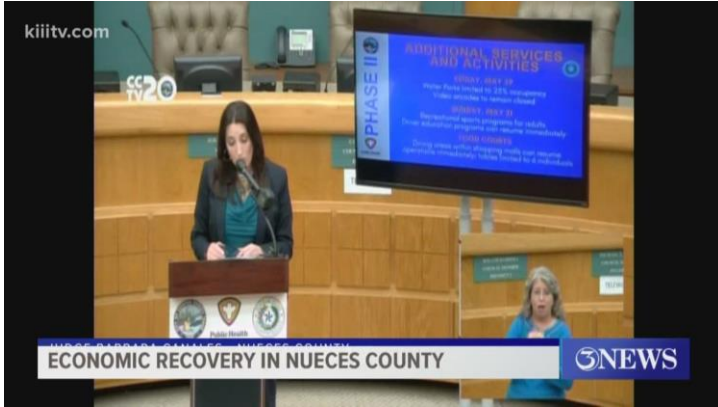
Sealy Center for Environmental
Health and Medicine
University of Texas Medical Branch

Biological and Environmental Sciences
University of Texas-Rio Grande Valley

Natural Science Focus
Human Health Focus
Policy Focus
Consortium Lead





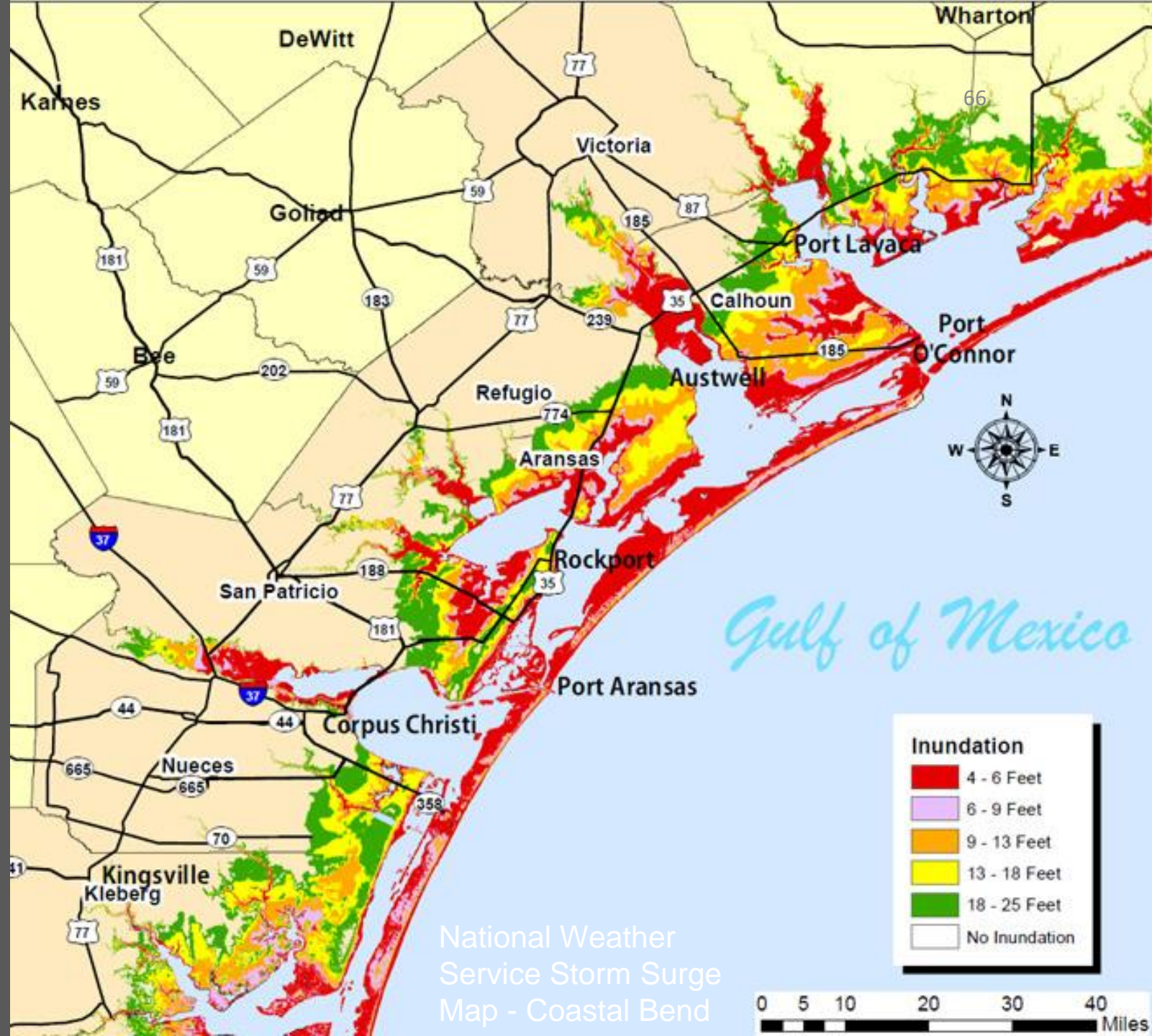


Resilience Is *LOCAL*

But strengthened capacity is needed at the regional level!

South Texas Coastal Bend

- Economic development does not happen in a vacuum
- What your town does affects the town three doors down, *and vice versa*
- Regional approach gives one voice to multiple communities



Collaborative	Membership [†]				Administrative or Fiscal Host	Funding Source(s) [‡]				
	Local government	Public agencies & utilities*	Nonprofit, Academia	Business/Private		Member dues/ Cost-share	Philanthropic grants	State or federal grants	Other	In-kind services
<i>King County-Cities Climate Collaboration (K4C)</i>	✓	✗	✗	✗	County	✓				✓
<i>Capital Region Climate Readiness Collaborative (CRC)</i>	✓	✓	✓	✓	Nonprofit – Local Government Commission	✓			✓	✓
<i>Sierra Climate Adaptation & Mitigation Partnership (Sierra CAMP)</i>	✓	✓	✓	✓	Nonprofit – Sierra Business Council	~	✓		✓	✓
<i>Los Angeles Regional Collaborative for Climate Action and Sustainability (LARC)</i>	✓	✓	✓	✓	University – UCLA	✓		✓		✓
<i>San Diego Regional Climate Collaborative (SDRCC)</i>	✓	✓	✓		University – USD	~	✓	✓	✓	✓
<i>Southeast Florida Regional Climate Change Compact (Compact)</i>	✓	✗	✗	✗	Nonprofit – Institute for Sustainable Communities; County – Broward (fiscal)	✓	✓	✓		✓

†Note on Membership: “✗” indicates entities/organization types that are not eligible at all for membership in the collaborative, while blank spaces indicate member types that are eligible but so far the collaborative does not have any from that category.

‡Note on Funding Sources: blank spaces indicate funding sources not used to date, while tildes (~) indicate mixed or optional dues structures (i.e., SDRCC, which does not charge dues to public agency members, and Sierra CAMP, which has a voluntary/suggested contribution structure).

*Other public agencies include regional authorities like water and air districts, councils of government, port authorities, etc. Utilities (e.g., electric) are included in this category regardless of ownership.

Regional Resilience Partnership of the South Texas Coastal Bend

MEMORANDUM OF UNDERSTANDING
ESTABLISHING A JOINT PROJECT BETWEEN
TEXAS A&M UNIVERSITY-CORPUS CHRISTI
AND
COASTAL BEND COUNCIL OF GOVERNMENTS
Agreement No. 1

I. PARTIES

This Memorandum of Understanding ("Agreement") is entered into by Texas A&M University-Corpus Christi ("TAMUCC"), represented herein by Dr. Kelly Quintanilla in her capacity of President, and the Coastal Bend Council of Governments (CBCOG), represented herein by Mr. John Buckner, in his capacity of Executive Director, with the purpose of setting forth the general framework for specific projects in the future in matters related with: Disaster Resilience and Mitigation of the Texas Coastal Bend and Investigation and the Disclosure thereof, subject to the following considerations, recitals and clauses:

RECITALS

II. TAMUCC HEREBY DECLARES THROUGH ITS AGENT:

- (1) That it is a university managed by a Board of Regents of The Texas A&M University System (the "A&M System"), and that it has legal capacity to engage in, and be engaged under the terms of the policies of the A&M System and the laws of the State of Texas.
- (2) That its purpose is supporting investigation and education activities as well as the disclosure thereof, which includes long term development in the sustainable use and preservation of the Gulf of Mexico and resilience building of Gulf coastal communities, specifically through the Harte Research Institute for Gulf of Mexico Studies.
- (3) That the TAMUCC President has the legal capacity to execute this Agreement and additional agreements with other institutions according to the laws of the State of Texas and the policies of the A&M System.
- (4) That its legal domicile is located at Texas A&M University Corpus Christi, 6300 Ocean Drive, Corpus Christi, Texas 78412, United States of America, telephone +1(361) 825-2000.



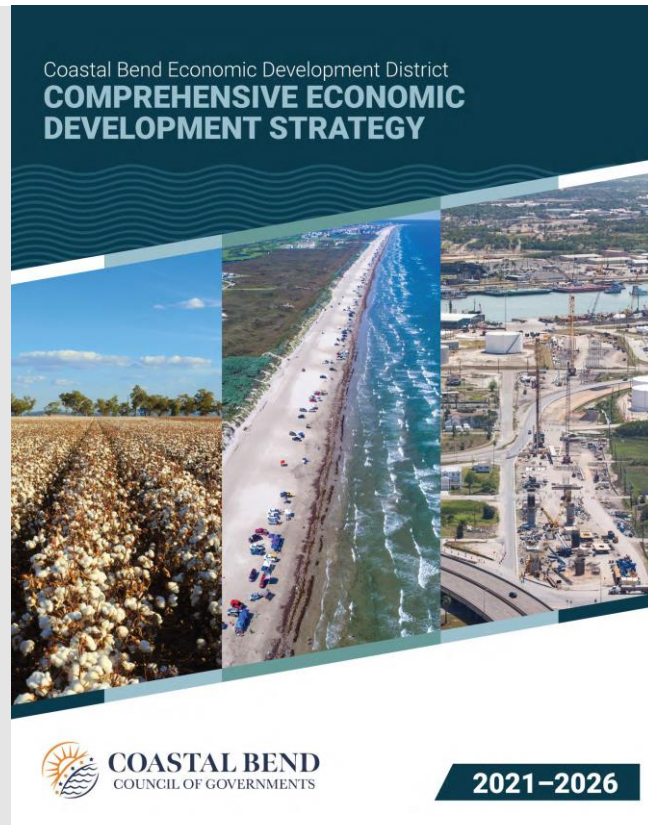
RRP builds community capacity to mitigate disaster risk

- RRP Listserv for training and funding announcements
- Monthly training sessions (local officials, small business, NGOs, students)
- Direct technical support and guidance to counties and cities on building and implementing recovery, resilience and risk mitigation plans
 - Co-develop input to recovery and mitigation surveys
 - Targeted assistance in San Patricio & Refugio Counties

Future efforts:

- Strategic resilience assessment locally and across counties
- Technical assistance in data and GIS
- Develop funding strategies, assist with grants applications and administration

Initial Projects: CBCOG Comprehensive Economic Development Strategy



Objective 1.3: Coastal Bend has heightened attractiveness to global visitors and businesses

Strategic Actions

1. Identify and promote tourism assets in the region with promotional advertising.
2. Create a shared regional website to market goods and services.
3. Promote the 17 opportunity zones in the Coastal Bend to attract diverse partners.
4. Advance GIS tools to facilitate inventories of utilities accessibility (power and water) to attract industry.
5. Develop an inventory of capital providers to expand access to investments for existing and new businesses and entrepreneurs in the region.

Action Groups:

- CBCOG CEDS Committee, local economic development and planning agencies, local convention & visitors bureaus (e.g., Visit Corpus Christi), local chambers of commerce, higher learning institutions (regional universities and community colleges) and their research units

Measuring Progress:

- Number of new and existing businesses; number of visitors; amounts of capital investments; evidence of regional collaboration and partnerships (e.g., regional websites)

GOAL 2: Strengthen Resilient Infrastructure Investments

Strengthened and expanded physical and digital infrastructure is critical to the Coastal Bend Region's economic development and quality of life. CEDS entities will support cooperative and regional planning on issues related to broadband, water resources, energy, housing, transportation connectivity, supply chains, land use, storm water management and more, especially considering infrastructure assets in light of climate and environmental change, e.g., increased intensity or frequency of hurricanes, flooding and drought.

Objective 2.1: Digital infrastructure assets are expanded and strengthened

Strategic Actions

1. Encourage communities to incorporate planning for future fiber optics in public improvement projects.

- CEDS is a strategy-driven plan for regional economic development.
- CEDS is a prerequisite for designation by EDA as an Economic Development District (EDD) (must be updated every 5 yrs)
- CEDS is the result of a regionally-owned planning process designed to build capacity and guide the economic prosperity and resiliency of a region

Initial Projects: Training Program

Earl C. Sams Foundation awarded \$10K to RRP to build the **RRP Training Program**:

- Partnerships and Networks for Resilience;
 - Training for Recovery & Resilience; and
 - Building Data-Informed Action Strategies.
- Communities and organizations assessed what they learned and included actions / ideas from the training in a *Local Action Strategy for Resilience*
- Strategy* includes both a set of priorities in need of action to build-resilience, and a set of immediate and near-term actions that can be taken to advance those priorities.

Initial list of training programs: Grants Procurement; Successful Grant Writing; Data for Resilience; Long-term Recovery Planning; Pre- and Post-Disaster Preparation; Preparing for Damage Assessment; Community Engagement; Mitigation; 508 Compliance and Disability Integration Plans; Federal Reporting Guidelines; Continuity Training; Smart Land-Use Planning; Floodplain Management; Networks for Resilience.



Initial Projects: Geospatial Framework for Economic Resilience and Development

Funding approved by the U.S. Department of Commerce Economic Development Administration



Geospatial Resilient Economic Development (GeoRED):

Geographic Information System for the Coastal Bend

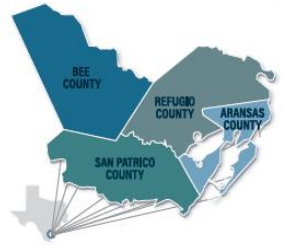
The economic prosperity of a region depends on its ability to prevent, withstand, and quickly recover from major disruptions. This has become clear in the Coastal Bend, a region that is still recovering from Hurricane Harvey and is now met with economic disruptions from COVID-19. To strengthen our economic resilience to shocks, we must be able to anticipate and evaluate risks, including how vehicle physical, social, economic, environment, and other factors may impact key economic assets.

The Regional Resilience Partnership (RRP) is building a geographic information system (GIS) platform, called Geospatial Resilient Economic Development (GeoRED). GIS is a powerful tool for building resilience to disaster and economic risks. The U.S. Department of Commerce Economic Development Administration is funding this project for four Coastal Bend counties: Aransas, Bee, Refugio, and San Patricio.

GeoRED Online Platform

GeoRED will be an online tool available to the public. It will serve as a platform for local officials and experts alike to share information and data to support different applications. The tool will include:

- Physical data sets such as parcel level data and hazard information such as flood risk and stormwater drainage data, which can be used for disaster assessments
- Economic development data, such as supply chains, labor market analytics, local business data, and tax collections, which can be used to track changes in the economy and assess economic competitiveness
- Data that is unique to the residents and character of each county



RRP is a partnership of the Coastal Bend Council of Governments and Texas A&M University-Corpus Christi led by the Harza Research Institute for Gulf of Mexico Studies that works with local officials, business partners, nonprofits, and other organizations to help bring communities from recovery to holistic resilience, meeting healthy communities, economies, ecosystems, and strong and resilient infrastructure.



RRP advanced a \$1M (\$800K from EDA & \$200K local match) project to build the South Texas Platform for Resilient Economic Development in an initial four Coastal Bend Counties to:

- integrate physical data sets with hazard information
- link to municipal business licenses, tax information, supply chain information to track local and regional available development sites
- integrate select data sets to enhance resolution and understanding of risk and resilience, e.g., urban infrastructure layers and labor market analytics
- provide a common online platform to assess risk in a geospatial framework as well as economic development opportunities

Key Lesson: Local Data & Partnerships

Framework	Themes addressed											No. of metrics	Reference		
	Governance	Social	Spatial	Built environment	Economy	Natural Environment	Water	Wastewater	Stormwater	Waste	Energy			Mobility	Other(s) *
EPA conceptual framework	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	163	[15]
City Resilience Framework	✓	✓	✓										✓	156	[13]
UNDRR Disaster Resilience Scorecard for cities	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓	47 preliminaries 117 detailed	[8,9]
City Resilience Index to Sea Level Rise	✓	✓		✓	✓	✓	✓						✓	13	[18]
Climate Disaster Resilience Index	✓	✓		✓	✓	✓						✓	✓	120	[19]
Climate Disaster Resilience Index	✓	✓		✓	✓	✓						✓	✓	82	[20]
Climate Resilience Screening Index	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	117	[16]
Flood Resilience Index	✓	✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	91	[21]
Resilience Factor Index	✓	✓		✓	✓								✓	17	[22]
Community disaster resilience	✓	✓		✓	✓	✓							✓	26	[23]
NIST (National Institute of Standards and Technology)	✓	✓		✓	✓	✓	✓	✓			✓	✓	✓	-	[24]

**We want to hear
from you!**

***Contact us to
partner for
resilience***

RRP@tamucc.edu

Thank you!



RRP can be expanded to provide strategic direction and capacity building to the Coastal Bend, Texas and the Gulf. The three pillars include:

- I. Partnerships & Networks for Resilience - develop data-sharing and trust with communities
- II. Training & Data-Informed Actions - co-develop actionable strategies for resilience
- III. Implement Actions, Monitor & Update Actions – implement, monitor and update actions

BRIC, BCA, ESPC, SHMO, CHP, CTP, DER, SAIDI—Oh my! Overcoming Language and Organizational Barriers within the Energy-Emergency Management Nexus

Speakers:

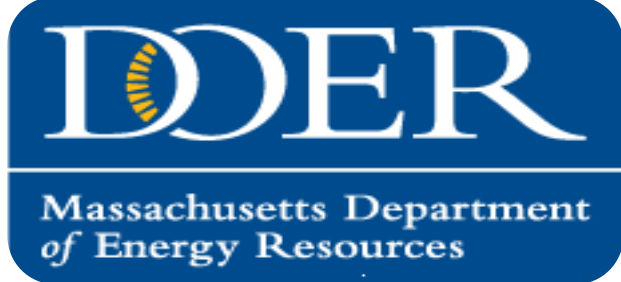
Moderator – **Ben Bolton**, Tennessee Department of Environment and Conservation

Paul Holloway, Emergency Planning and Energy Analyst, Massachusetts Department of Energy Resources

JB Cuartas, Director, Reliability and Security Division, New Jersey Board of Public Utilities

Eli King, State Energy Emergency Management Director, Department of Commerce, Washington State



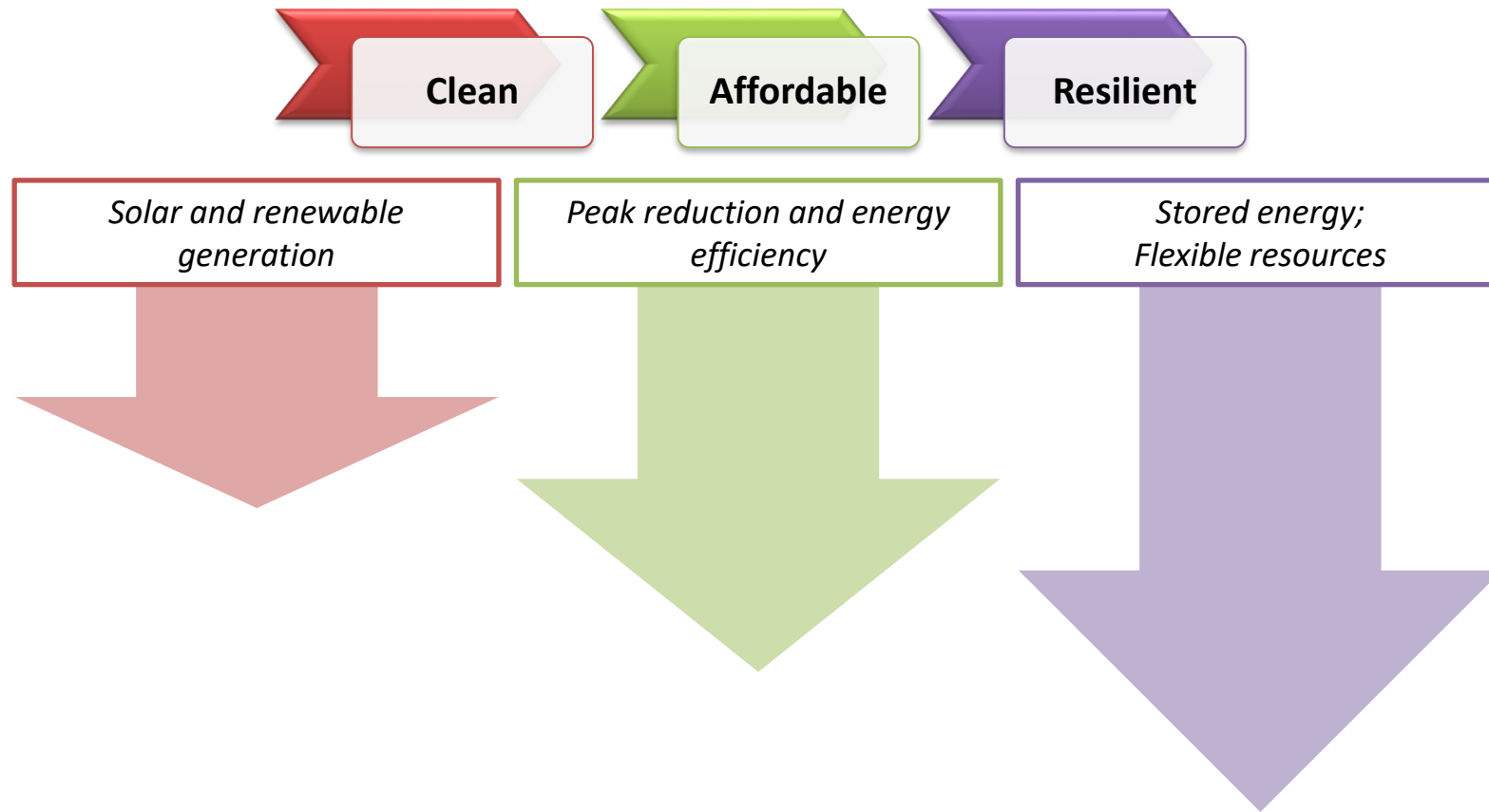


COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENERGY RESOURCES
Patrick Woodcock, Commissioner

**Overcoming Barriers in the
Energy/Emergency Management
Nexus:
Opportunities**

August 25th, 2021

DOER Mission



Emergency Mgmt + Energy + Opportunities

Emergency Management:

- CEMP, ESF-12, State EAP, IOU ERPs: Concept of Operations/Org., R&R
- Energy Profile: How and what do you use...and where is it coming from
- Concept of Critical Lifelines: Energy is #1 (After Life Safety/Preservation)
- IAPs/SitReps: The landscape, incident priorities, reporting structure, situation
- Know stakeholders & vice versa:
- ESF Team, Energy System and EMs, current policy and regulatory issues, etc.

Energy Offices and Utility Regulators

- Policy and Planning vs. Regulation of IOU EDCs and LDCs
- Regulated vs. Unregulated Energy Sectors
- Nexus of energy policy/planning and regulation: opportunity to improve resiliency

Future Opportunities (and Vulnerabilities) for Energy and EM:

- Electrification
- Distributed Generation + Aggregation (DERA)
- Transmission Planning and Cost-Allocation Reform
- Other Infrastructure Investment – build to reliability and resiliency

Opportunities Part 2

BRIC:

- Opportunity to advance resilient energy projects
 - How do we measure and assign value to resiliency and clean energy?
 - Benefit-Cost Analysis for resilient clean energy projects?
- Diesel/Propane Generators (easy) v. Battery storage/PV, micro-grids, etc. (hard)
- Striking a Balance:
 - traditional mitigation projects: culverts, habitat restoration, hardening, etc.
 - Resilient energy projects
 - Balancing \$ and Benefits of each (see BCA)

Future Opportunities:

- More Rounds of BRIC = more opportunities to refine selection criteria/BCA

THANK YOU!

Paul Holloway
Emergency Planning and Energy Analyst
Massachusetts Department of Energy Resources
100 Cambridge Street, Suite 1020
Boston, MA
Tel: (617) 626-7354
Cell: (857) 262-1334
E-mail: paul.c.holloway@mass.gov

BREAK

3:15-3:30 PM ET



Equitable Energy Risk Assessment and Management

Speakers:

Moderator – **Sandy Fazeli**, Managing Director, Policy, NASEO

Judith Judson, US Vice President of Strategy, National Grid



BREAK

4:00-4:30 PM ET



Addressing the State and Local Cost Share: Public-Private Partnership Opportunities with Eligible Funding

Speakers:

Moderator – **Edward O'Brien**, Lead Economist, State Energy Office, Louisiana Department of Natural Resources

Tom Hughes, State Hazard Mitigation Officer, Pennsylvania Emergency Management Agency

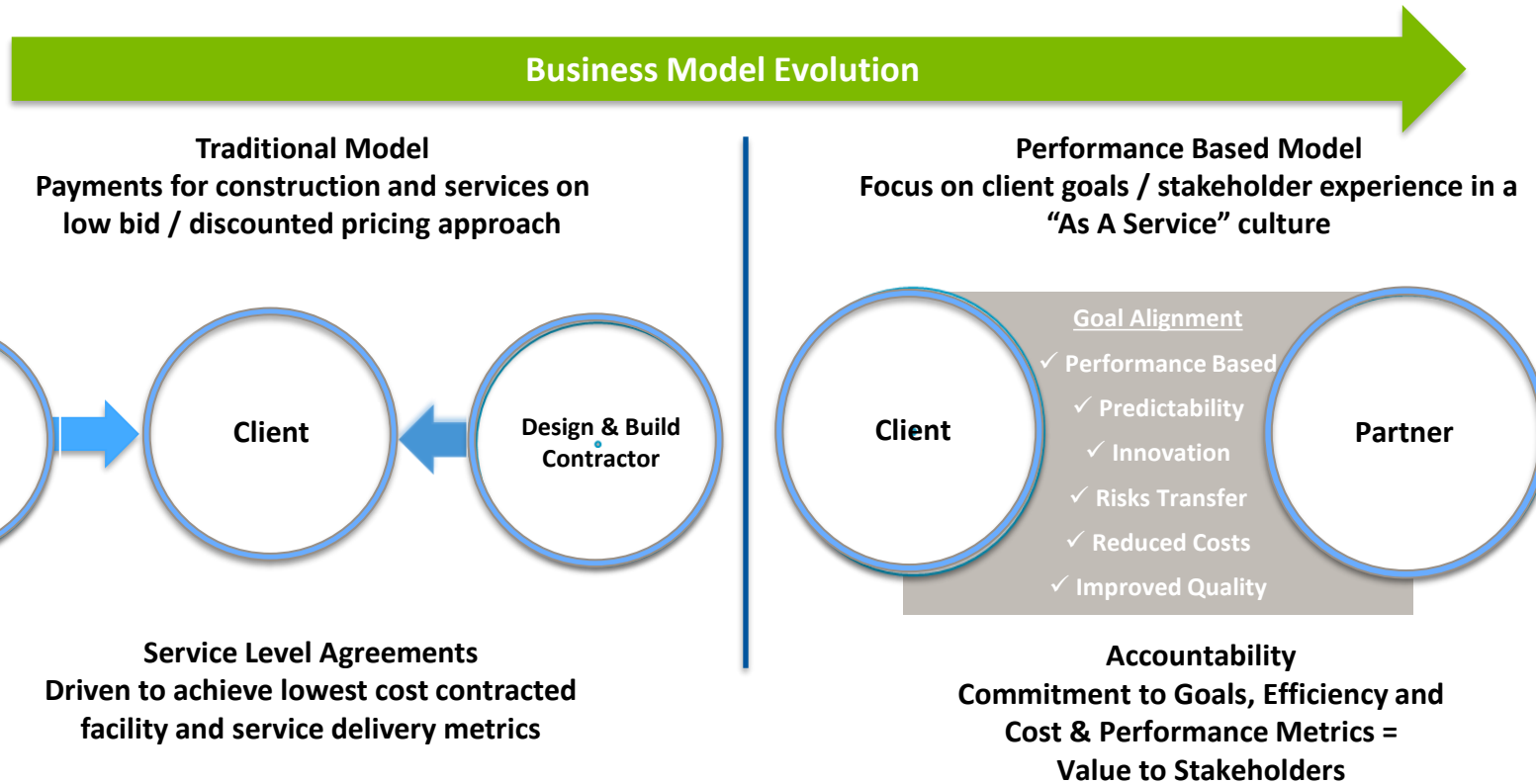
Michael Wilson, Senior Account Executive, Performance Infrastructure, Johnson Controls

Mark Fowler, Director, Government Relations, Ameresco

Juan Macias, CEO, AlphaStruxure LLC



Funding pressures drove short term infrastructure decisions;
New business models and strategies are looking at longer term perspective



How does *Performance Contracting* work?



The program uses GUARANTEED energy savings, operational savings, and avoided capital expenditures to fund repayment of capital for building & infrastructure needs resulting in a net positive impact to the client.

Design – Build – Finance – Maintain

The goal of this P3 model is to transfer the risks best managed by the private sector from the public sector.

“Total Cost of Occupancy” including Operations, Lifecycle and Energy Consumption costs over a long term period

Performance based agreements include:

- Guaranteed Fixed Payments from client begin upon completion of construction
- Payments are subject to deduction for failures in service delivery, availability

Public-Private Partnership (P3)

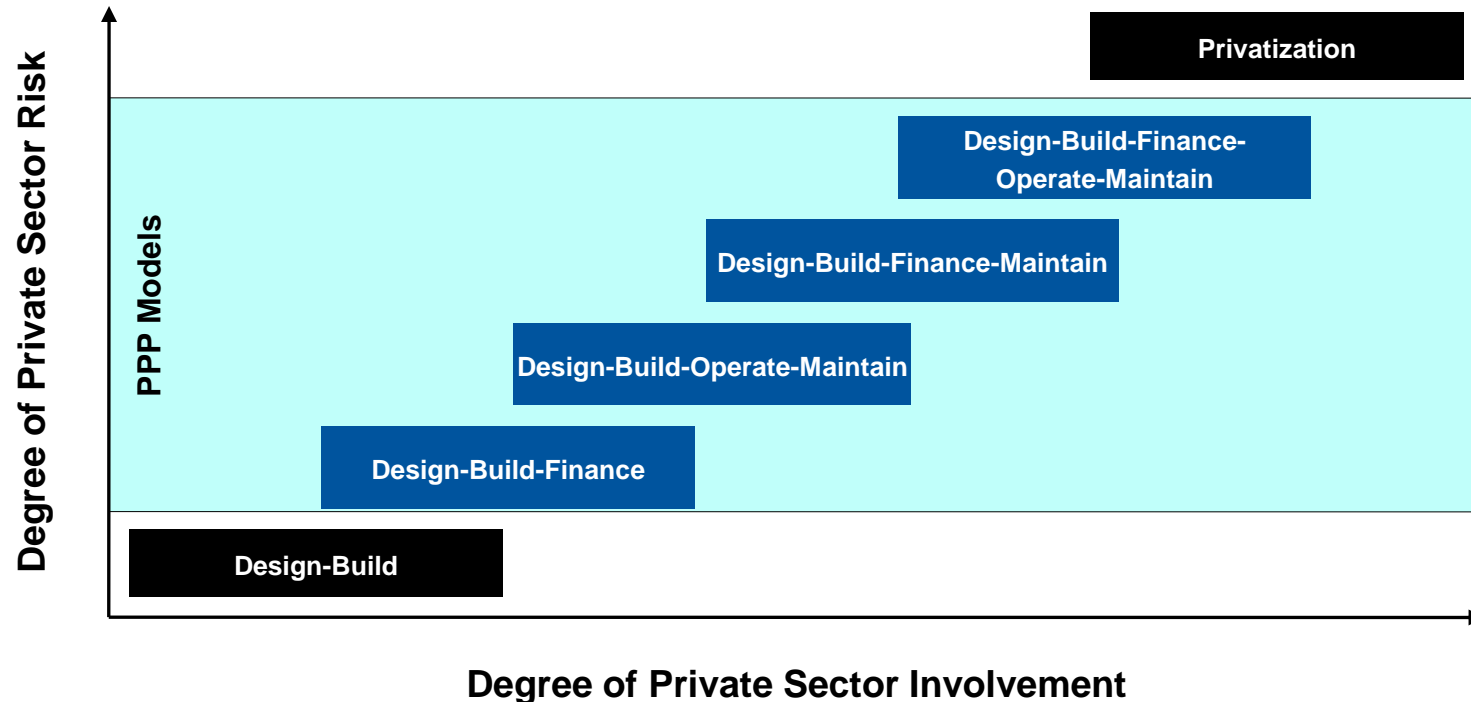
A P3 is an alternate procurement model for the delivery of public infrastructure. In a P3;

- i) public ownership of the asset is retained through the duration of the project, and
- ii) the private sector designs, builds, finances and maintains maintaining the public asset for 25-40 year term.

Scale of Public-Private Partnerships (P3)

P3s can,

- capture a broad spectrum of risk-transfer, where a private-party is issued a license (concession) to design, build, finance, maintain and/or operate an asset for a predefined period
- allocate revenue and demand risk to the party best suited to manage those items, with retention of public ownership
- deliver greenfield construction projects, deep building retrofits, sale-leaseback and other arrangements



Addressing the State and Local Cost Share:

Public-Private Partnership Opportunities with Eligible Funding

August 2021



ameresco.com

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About Ameresco

Ameresco (NYSE:AMRC) is a leading energy services company with a comprehensive portfolio of energy efficiency and renewable energy solutions.

Founded in 2000 | Public in 2010



Comprehensive Portfolio

Objective approach and in-house technical expertise delivers the most advanced technologies to meet the unique needs of each customer. Majority of projects are budget-neutral, funded by energy cost savings.

Customer Driven

Federal & Municipal Governments, Commercial & Industrial, Higher Ed, K12, Public Housing, Healthcare, Airports. Market reputation across North America & Europe for excellence in customer satisfaction.



\$7 Billion+ in energy solution projects, 250+ MWe of Owned Assets in Operation



8,000+ Customers benefitting from energy efficiency measures and renewable energy generation



1,000+ Employees throughout North America and the United Kingdom



Up to 45% Energy cost savings with comprehensive, audit-based improvements



70+ Offices providing local expertise in markets served



In 2019, our renewable energy assets and customer projects delivered a carbon offset equivalent to **11,167,978 metric tons of CO₂**

Industries We Serve



Airports



Colleges & Universities



Federal Government



Healthcare Facilities



Industrial & Manufacturing



K-12 Schools



Public Housing



Retail & Commercial



State & Municipal Government



Utilities



Water Utilities

Ameresco's Experience Spans Markets & Solutions



Ameresco's Advanced Technology Portfolio



Energy Efficiency

- Smart Building Automation & Controls
- Interior Lighting and Controls
- Water / Wastewater Efficiency & Recovery
- HVAC & Ventilation
- Boiler & Chiller System
- Industrial Optimization
- Building Envelope
- Advanced Metering
- LED Street & Area Lighting
- Smart Cities



Distributed Energy Generation, Storage & Microgrids

- Cogeneration Plants
- Solar (On-Grid & Off-Grid)
- Batteries and Energy Storage
- Biomass, Biogas, Landfill Gas to Energy, RNG
- Microgrid
- Geothermal
- Wind
- EV Charging



Infrastructure

- Utility Distribution System
- Retrofits/Expansion
- Modernization
- New Construction
- Monetization / Ownership & Operation



Energy Analytics and Supply Management

- Energy Analytics
 - AssetPlanner®
 - Measurement & Verification
 - Advanced Metering
 - VisionDSM (AEG)
- Energy Supply Management



Operations and Maintenance

- Plant O&M
- Solar O&M
- Facility Management Services
- System Repair & Restoration
- Lighting System Maintenance
- Control System Predictive Maintenance

FEMA BRIC Opportunity



- BRIC = Great opportunity to meet resilience & climate objectives
 - 25% cost share. Multiply local investment
- Coming at a great time
 - Low tax rate environment
 - Low interest rate
- Resilience is a key metric
 - Mitigation project deployment
 - Microgrids as a source of resilience
- We're ready to help!

Funding Sources Customers Can Consider

Project Revenue

(e.g., tolls, parking meters, etc.)

Capital Funding

Subsidies

(e.g., grants, rebates, RECs, etc)

Existing Budgets

(avoided Utility and O&M costs)

User Fees

(earmarked to support sustainability or other groups)

Unique Ability to Finance Any Opportunity

- Track record of \$6+ Billion in energy projects across financing models, markets & technologies
- Budget-neutral infrastructure upgrades use energy savings to pay for projects over time
- Options for customers to implement infrastructure upgrades on- or off-balance sheet
- Innovative funding with renewable energy certificates, grants, utility rebates & tax credits

Performance Contracting (ESPC, USPC)

Design, Build, Own, Operate, Maintain (DBOOM)

Power Purchase Agreements (PPA)

Design-Build

Engineer-Procure-Construct (EPC)

Energy Service Agreements (ESA)

Public-Private Partnership (P3)

Energy-as-a-Service (EaaS)



Benefits of Energy as a Service



Address **deferred maintenance** backlogs with **no capital** outlay or requirements to take on debt



Progress toward **sustainability targets** with efficiency and green, renewable energy solutions



Rely on an **experienced partner** to address facility and energy needs, **removing ongoing risk** and burden of energy infrastructure and management



Enhance **energy conservation** and **modernize energy systems** with comprehensive solutions



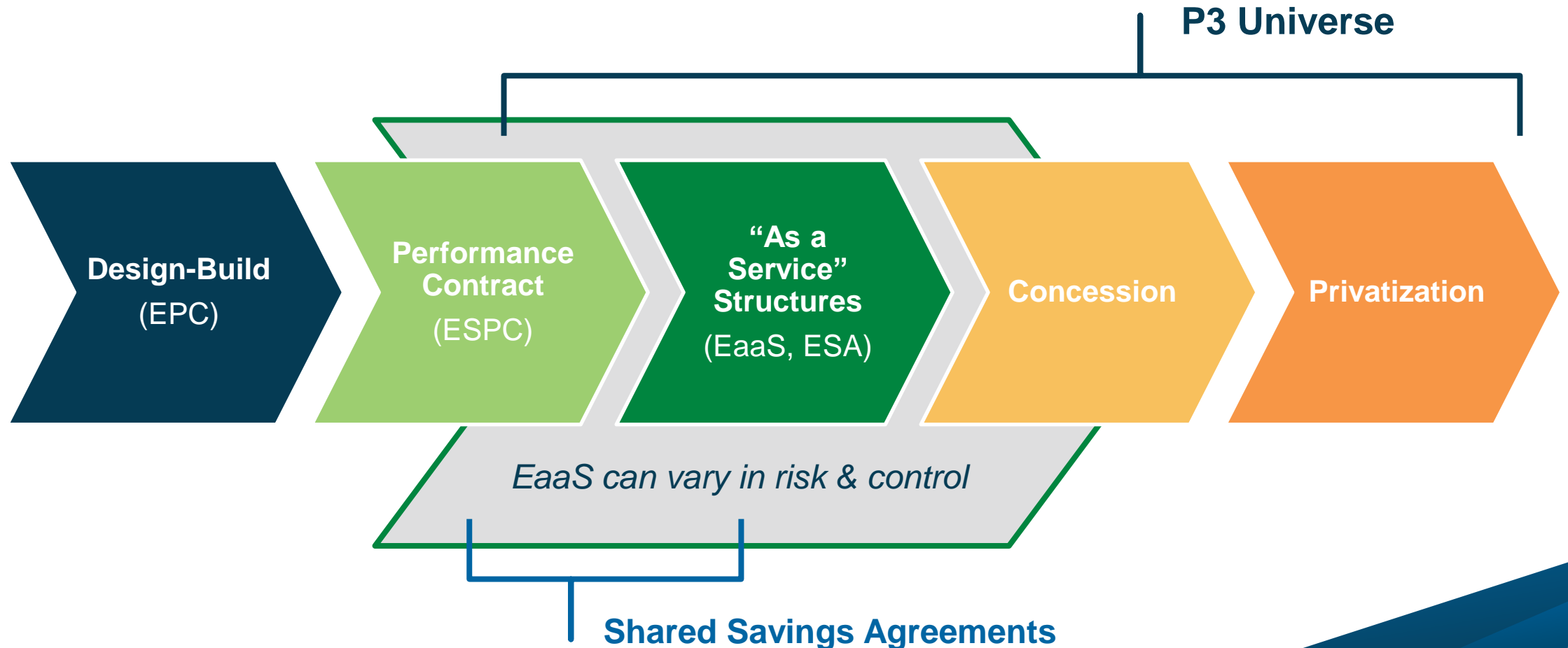
Leverage an **experienced and dedicated team** of operators, engineers, construction personnel



Reduce energy costs and grid reliance while **increasing resiliency** and energy security

Level of Risk Transfer and Control

Under the EaaS umbrella, different projects can be implemented under different structures:



Balance Sheet Impact

- Service agreement structure such that customer **payments are contingent** on Ameresco achieving certain **performance criteria**
- Under the EaaS, the transaction is **structured as a service agreement** and **Ameresco* owns** the equipment and/or assets being installed
- Properly structured, the EaaS should have a **neutral or positive impact on your credit rating** and *may* be treated as **off-balance sheet** (*you will determine whether off balance sheet or not, with ASC 842 Control considerations*)

** Ameresco can own the assets, however an EaaS can be structured in a number of ways to optimize the tax and customer requirements - a special purpose company, Ameresco's capital partner may own the assets, customer. Ameresco will assume risks typically associated with ownership.*

Minneapolis-St. Paul International Airport, MN



Facility Size: 2.8M square feet

ESPC energy project size: \$37,000,000

Solar Capacity: 4.3 MW

Positive Annual Cashflow: \$267,000+

Annual Carbon Savings: 9,464 metric tons

Guarantee and union jobs: 20-year guarantee with O&M, plus local union jobs

- Energy efficiency, solar, EV charging
- Gathered allocations of unused QECB allocation from several surrounding counties / municipalities for regionally important airport project. Helped customer aggregate and issue bonds.
- Without this creative solution, project wouldn't have gone forward.

Texas A&M University-Corpus Christi

Corpus Christi, TX



The Texas A&M University System Office of General Counsel, Treasury Services, and Board of Regents, the energy conservation project passed a rigorous third-party engineering review; was submitted to SECO and referred to the Texas Higher Education Board; and received final approval for Qualified Energy Conservation Bonds (QECCBs) by the Texas Bond Review Board and Governor's Office.

QECCB Bond Amount: \$6,900,000

Project Highlights

Solution Types:

Lighting upgrades, Optimization of central plant, Replacement and addition of chillers, cooling tower refurbishments, boiler replacements, pumps, motors and VFDs, and associated DDC controls, Enrollment in a demand response program, Expansion of submetering infrastructure, Building automation, Indoor air quality improvements, Installation of networked irrigation controllers, Water conservation, transformer upgrades.

Annual Savings:

\$1,155,597

"We are laser-focused on ensuring we use university funds wisely, and these initiatives will greatly reduce our energy costs while also allowing us to replace capital budget items without having to incur capital costs. Ameresco is helping us to pursue much-needed system upgrades in a fiscally responsible way." John Dawson, Ph.D., Associate Vice President for Operations, Texas A&M University-Corpus Christi.

U.S. Marine Corps Recruit Depot

Parris Island, SC



The U.S. Marine Corps Recruit Depot Parris Island chose Ameresco to deploy a comprehensive Energy as a Service ESPC project over 120 buildings to further the Marine Corps Installation Command mission. The project ensures a **reliable, secure energy supply** and **reduce lifecycle operating costs** of Marine Corps facilities while **managing future commodity price volatility**.

Project Highlights

Solution Types:

Efficiency Measures; Energy-as-a-Service (EaaS); Solar; CHP; Microgrid; Storage; Operations & Maintenance

Utility Energy Demand:
75% Reduction

Water Consumption:
25% Reduction

Onsite Electric Generation:
10 MW

Battery Energy Storage System:
4 MW / 8.1 MWh

Annual Energy Savings:
\$6,000,000

Boston Housing Authority



Facility Size: 3.8M square feet. (4,300 units)

ESPC Size: \$66,700,000

Reduction of gas & water use: 30%

Annual Energy Savings: \$4,800,000.
\$119M over 20-year term.

Union Labor: Project Labor Agreement with
Section 3 tenant work & training opportunity

*Environmental Justice focus

Next Steps



- Now is the time to get busy
- Complete/outline project scope
- Develop a place, complete energy audit, identify facilities.
- Ameresco is ready to help. Give us a call.



Mark Fowler
Director of Government Relations
(202) 650-6215
mfowler@ameresco.com

Closing Remarks

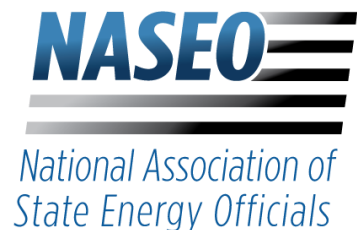
Campbell Delahoyde, Senior Program Manager, NASEO



Day 3 Preview

Innovative Opportunities for Energy Sector Hazard Mitigation

Session Times	Session Description
12:30-1:00 PM ET	Keynote and Opening Remarks for Day 3
1:00-2:00 PM ET	Hazard-Specific Solutions: Hurricanes, Extreme Wind, and Flooding
2:00-3:00 PM ET	Hazard-Specific Solutions: Wildfires, Droughts, Earthquakes
3:00-3:15 PM ET	Break
3:15-4:15 PM ET	Hazard-Specific Solutions: Extreme Heat and Cold
4:15 PM ET	Closing Remarks



End of Day 2

Thank you!

