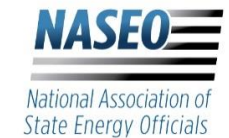


# Texas

## READINESS FOR RESILIENCE

### Workshop



# Monty C. Dozier, PHD

*Texas A&M AgriLife Extension Service,  
Governor's Commission to Rebuild Texas*

## Call to order

*READINESS FOR RESILIENCE*

# Workshop Introduction & Sponsor Remarks

*Philip Bane, Managing Director, Smart Cities Council*

*Alice Tornquist, Vice President of Spectrum and Technology Policy, Qualcomm*

*Peter O'Dell, Chief Executive Officer/Founder, Swan Island Networks, Inc.*

*Steve Crout, Director of Policy and Resilience Programs, Smart Cities Council*

*READINESS FOR RESILIENCE*

Keynote  
Governor's Plan to  
Rebuild Texas

***Parr Rosson, PhD***  
***Interim Director, Texas***  
***A&M AgriLife Extension***  
***Service***

*READINESS FOR RESILIENCE*



## Building Capacity For Future Proofing Texas from Manmade and Natural Disasters



**REBUILD  
TEXAS**

The Governor's  
Commission to  
Rebuild Texas

Applying Lessons from Hurricane Harvey



# Outline of Today's Presentation

- **New Application of an Established Network**
- **Lessons Learned From Harvey**
- **Future Proofing Texas Communities**





“I knew from the beginning of our efforts that we needed points of contact embedded in those impacted communities, a team that could be our eyes and ears for what was needed for recovery,” Sharp explained. “AgriLife Extension already has staff serving every county in this state, and I knew they would be our best tool for both monitoring recovery and ensuring issues don’t go unresolved.”



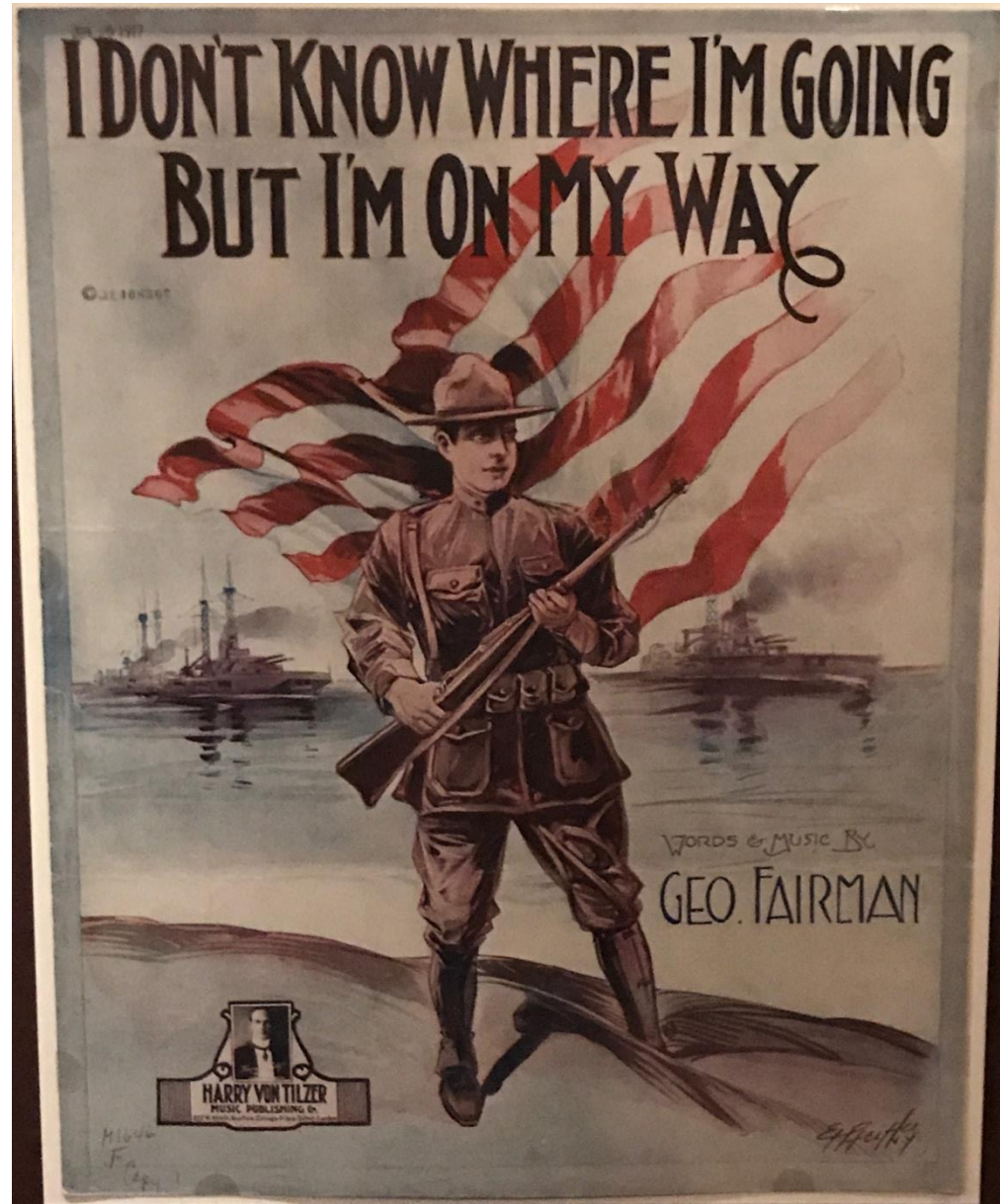


[www.rebuildtexas.today](http://www.rebuildtexas.today)



## Applying the Extension Network to Recovery

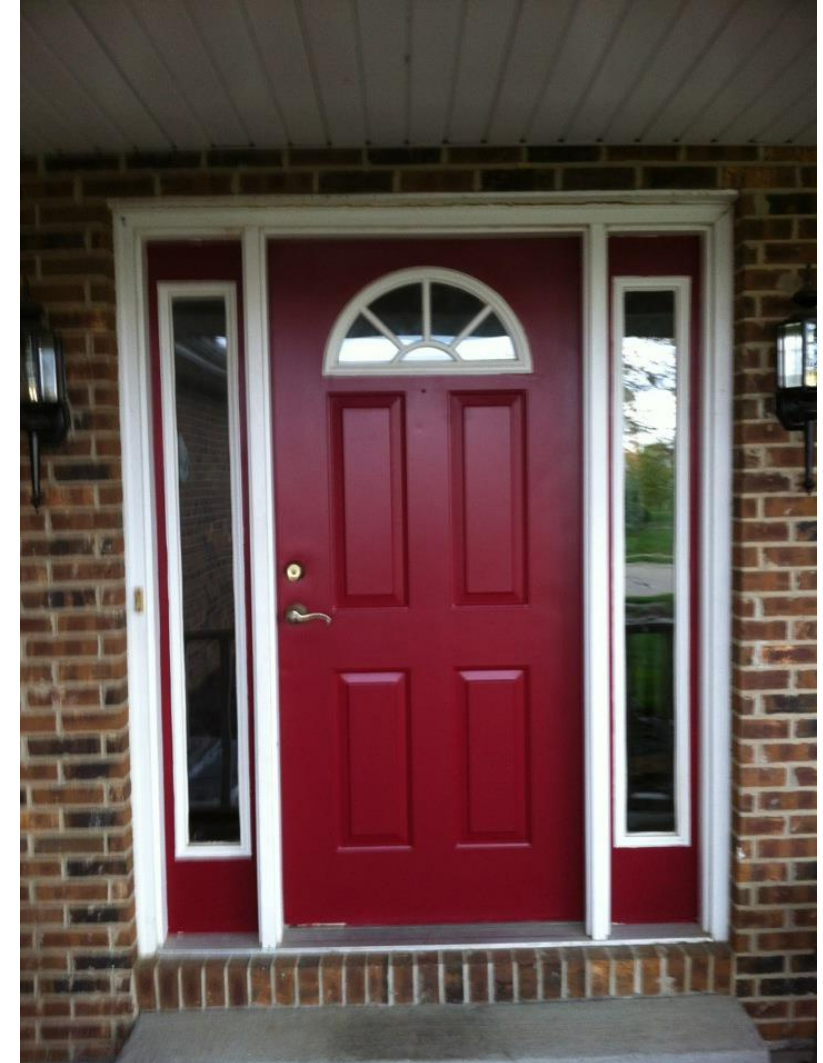
- ✓ *A Presence in Every County*
- ✓ *Span of Control*
- ✓ *Ability to Concentrate Our Resources*



# REBUILD TEXAS

The Governor's Commission to Rebuild Texas

- Texas A&M Forest Service and the Survey 123 App
- Contact – daily → 5 x a week → once a week
- Local officials
- FEMA Public Assistance Categories A through G
- Assistance Center & Joint Field Office
  - State and Federal Partners







# Agent Liaison Efforts

Over 6,500 issues reported

County officials – 2,199

City officials – 1,447

School officials - 410

745 separate resolutions delivered

Flooded Water Wells – 1,500 tested & treated

Mosquito Control

DSNAP Location

Replacement Fire Truck

Burning of debris with air-curtain incinerators

How “big is big” report for Governor



FEMA

## Assist with Public Assistance Reimbursements

To aid local jurisdictions with completing and filing the required paperwork to secure reimbursement from FEMA's public assistance program, a group of AgriLife Extension and TEEEX employees received training from TDEM & FEMA in aspects of Public Assistance reimbursement of FEMA.

Those agents were then deployed across the Harvey impact zone to assist with completion of forms and data entry to expedite reimbursements for local jurisdictions.

# Inspections for Temporary Housing



- Support GLO housing mission
- Jefferson, Hardin & Orange
- Counties of the GHAC
- Initial Site Inspections
- Verification of unit and supporting infrastructure placement



# Recovery Workshops



**HARVEY COMMUNITIES FORUM**

**LEARN** from community leaders from Texas and beyond who have gone through the long-haul of disaster recovery. Hear their experiences with the good and the bad, insights about the road ahead, and stories of community-led success.

**WE INVITE YOU,** our Texas community leaders, local officials and staff to hear first-hand accounts of homegrown, realistic solutions, and to network with other communities impacted by Harvey.

**RSVP:**  
[harveycommunitiesforums.eventbrite.com](http://harveycommunitiesforums.eventbrite.com)

**TEXAS A&M AGRILIFE EXTENSION**

**BEAUMONT**  
APRIL 16  
LAMAR INSTITUTE OF TECHNOLOGY

**ROSENBERG**  
APRIL 17  
ROSENBERG CIVIC CENTER

**VICTORIA**  
APRIL 23  
MASTER GARDENER PAVILION

**CONROE**  
APRIL 24  
LONE STAR CONVENTION CENTER

TIME:  
**9AM-4PM**

REGISTRATION AT  
**8:30AM**

**REBUILD TEXAS**  
The Governor's Commission to Rebuild Texas

The Lone Star  
Cooperation & Expo Center

**UT**

- Hosted across the impact zone
- Targeted local officials and decision makers
- Peer to peer
- Perspective of the road ahead
- Resource Workshops
- Listening Sessions

Texas A&M Agrilife Extension Provides Equal Opportunities in Its Programs And Employment to All Persons, Regardless of Race, Color, Sex, Religion, National Origin, Disability, Age, Genetic Information, Veteran Status, Sexual Orientation, Or Gender Identity. The Texas A&M University System, U.S. Department Of Agriculture, And The County Commissioners Courts Of Texas Cooperating.

Individuals With Disabilities, Who Require An Auxiliary Aid, Service Or Accommodation In Order To Participate In Any Extension Activity, Are Encouraged To Contact The Event Point Of Contact For Assistance 5 Days Prior To The Activity.

# Resiliency Educational Outreach



**HARVEY  
COMMUNITIES  
FORUM**

**LEARN** from community leaders from Texas and beyond who have gone through the long-haul of disaster recovery. Hear their experiences with the good and the bad, insights about the road ahead, and stories of community-led success.

**WE INVITE YOU,** our Texas community leaders, local officials and staff to hear first-hand accounts of homegrown, realistic solutions, and to network with other communities impacted by Harvey.

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TEXAS A&M  
**AGRILIFE**  
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LONE STAR  
CONVENTION CENTER

TIME:  
**9AM-4PM**

REGISTRATION AT  
**8:30AM**

- Harvey Community Forums
- 4-H Recovery
- Partnering with Philanthropic Organizations
- TDEM/TEEX Listening Sessions
- Mental Health First Aid
- Support for Long Term Recovery Committees
- Recovery and Preparedness Workshops
  - CHARM & Green Infrastructure
  - Agriculture Producers
- GCRT Report



# Resiliency Educational Outreach



- Partnering with Philanthropic Organizations to Long Term Recovery Committees
- Mental Health First Aid
- Recovery and Preparedness Workshops
  - Community Health & Resource Management (CHARM) & Green Infrastructure
  - Agriculture Producers



# **Strengthen our Support of the Texas Division of Emergency Management**

**Texas A&M AgriLife Extension DARTs**

**Aid in animal response**

**Extension Liaisons**

**Disaster Summary Outlines**

**Preliminary Damage Assessments**

**Rapid Assessments of Ag related damage and losses**

**Completing Requests for Public Assistance**

**Filing of Documentation for Reimbursement**



# Thank you!

---



TEXAS A&M  
AGRI LIFE

# Readiness for Resilience Overview of Smart Technology Roadmap

***Charriss York, Extension Program Specialist,  
Texas A&M AgriLife Extension Service***

***Steven Mikulencak, AICP, Extension Program  
Specialist, Texas A&M AgriLife Extension Service***

***Steve Crout, Director of Policy and Resilience  
Programs, Smart Cities Council***

***READINESS FOR RESILIENCE***

# TX Roadmap to Resiliency Smart Technologies

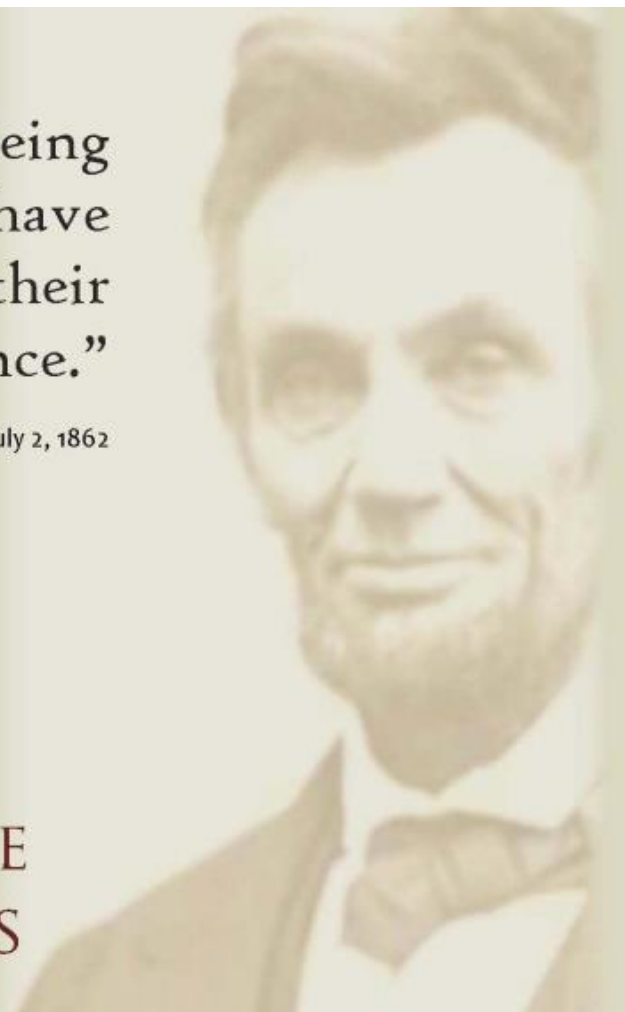
TEXAS A&M  
**AGRILIFE**  
EXTENSION

“The land grant university system is being built on behalf of the people, who have invested in these public universities their hopes, their support, and their confidence.”

Abraham Lincoln, upon signing the Morrill Act, July 2, 1862

SERVING YOU TODAY

TRUSTED RESEARCH  
LOCAL EDUCATORS...  
EXTENDING KNOWLEDGE  
PROVIDING SOLUTIONS







“I knew from the beginning of our efforts that we needed points of contact embedded in those impacted communities, a team that could be our eyes and ears for what was needed for recovery,” Sharp explained. “AgriLife Extension already has staff serving every county in this state, and I knew they would be our best tool for both monitoring recovery and ensuring issues don’t go unresolved.”

# Harvey response



[www.rebuildtexas.today](http://www.rebuildtexas.today)

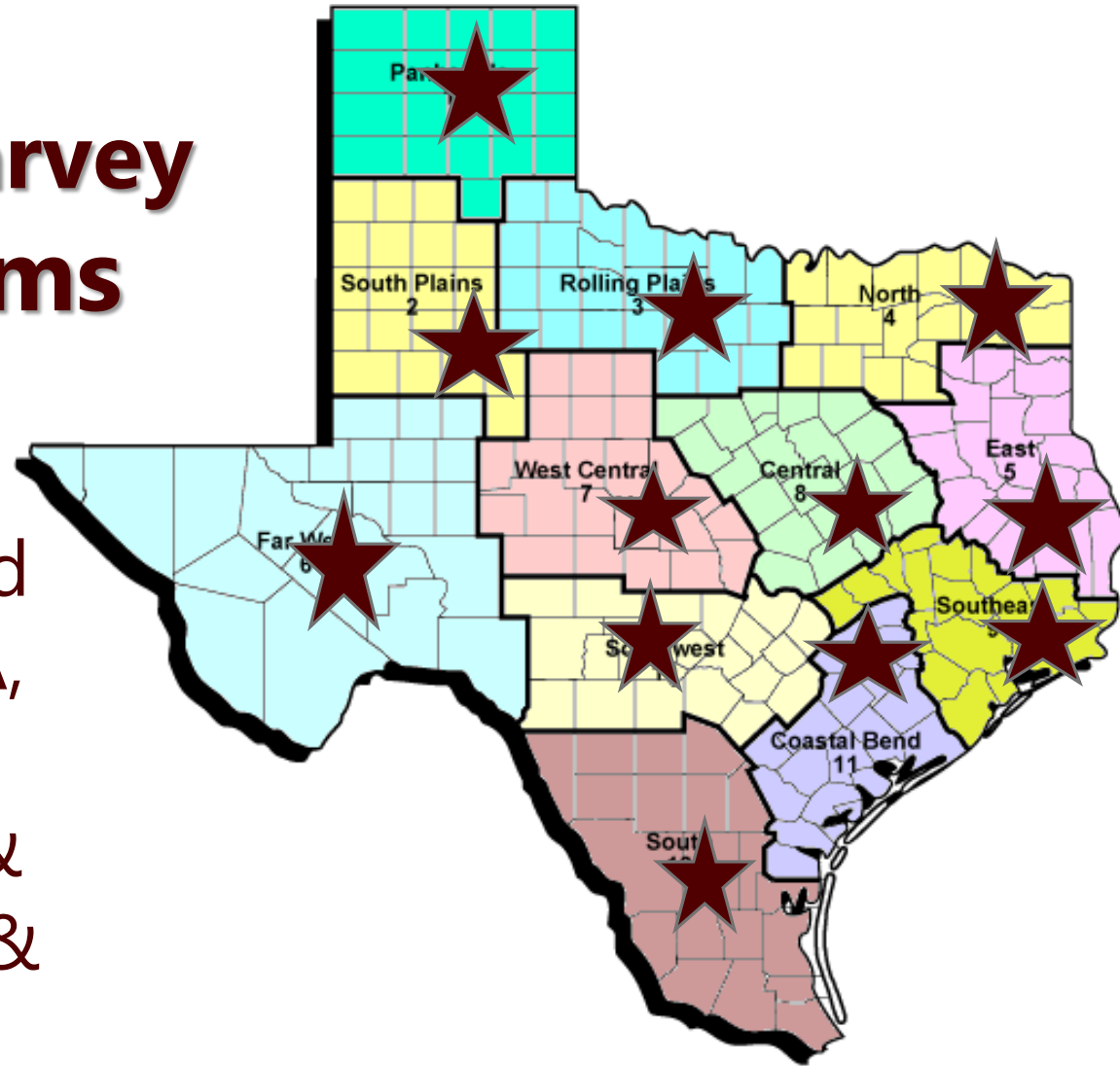


Applying the  
Extension Network  
to Recovery



# Hurricane Harvey Strike Teams

**120** AgriLife ST  
members activated  
supported by TDA,  
TAHC, & USDA-  
NRCS personnel &  
local jurisdictions &  
volunteers



# Statewide presence

- ⦿ Agent Liaison Efforts
  - ⦿ Over 6,500 issues reported
    - ⦿ 2,199 County officials
    - ⦿ 1,447 City officials
    - ⦿ 410 School officials
  - ⦿ 747 separate resolutions delivered
- ⦿ Harvey Communities Forums
- ⦿ TDEM/TEES Listening Sessions
- ⦿ GCRT Report





**RSVP ONLINE: [agrilifeextension.eventbrite.com](http://agrilifeextension.eventbrite.com)**

## **Readiness for Resilience:**

**A Smart Technology Roadmap for Texas**

**Register by  
December 9th**

**RSVP for the location most convenient for you :**

**HARRIS COUNTY  
DECEMBER 11  
9:30AM-2:30PM**

**University of Houston Student Center  
4455 University Dr. Houston, TX 77204**

**ORANGE COUNTY  
DECEMBER 12  
8:00AM-12:30PM**

**Convention and Expo Center  
11475 FM1442 Orange, TX 77630**

**ARANSAS COUNTY  
DECEMBER 13  
7:30AM-12:00PM**

**The Inn at Fulton Harbor  
215 N Fulton Beach Rd. Fulton, TX 78358**

### **FAQ's**

#### **Is there a cost to attend?**

There is no cost to attend these workshops. Breakfast or lunch will be provided.

#### **Who should attend?**

Local leaders and staff who have been working in the trenches of Harvey response and recovery, including long-term recovery groups, emergency responders, mitigation, hospitals, levee and flood control districts, planners, and representation from other local, regional, state and federal agencies.

#### **What is on the Agenda?**

- Smart Cities technologies to build community resilience
- Governor's Commission to Rebuild Texas Report
- Working group discussions with technology partners

**For more information contact [smikulencak@tamu.edu](mailto:smikulencak@tamu.edu) or [cyork@tamu.edu](mailto:cyork@tamu.edu)**

Join us at a half-day Discovery Workshop to provide unfiltered input about the challenges and successes during and after Harvey. As we focus on investing in long-term community resilience, hear from technology partners how bringing smart technologies to the table can streamline response and recovery, improving lives and reviving economies.

The knowledge you share at these workshops will help experts create a roadmap for Texas that links local needs with technology and funding solutions. The conversation will continue at a Spring 2019 conference, convening community leaders, stakeholders, and technology experts to pave the way for local projects.

*Be a part of building a more resilient Texas.*



Qualcomm Incorporated has sponsored this program to assist Texas communities impacted by Hurricane Harvey







TX Roadmap to Resiliency  
Smart Technologies

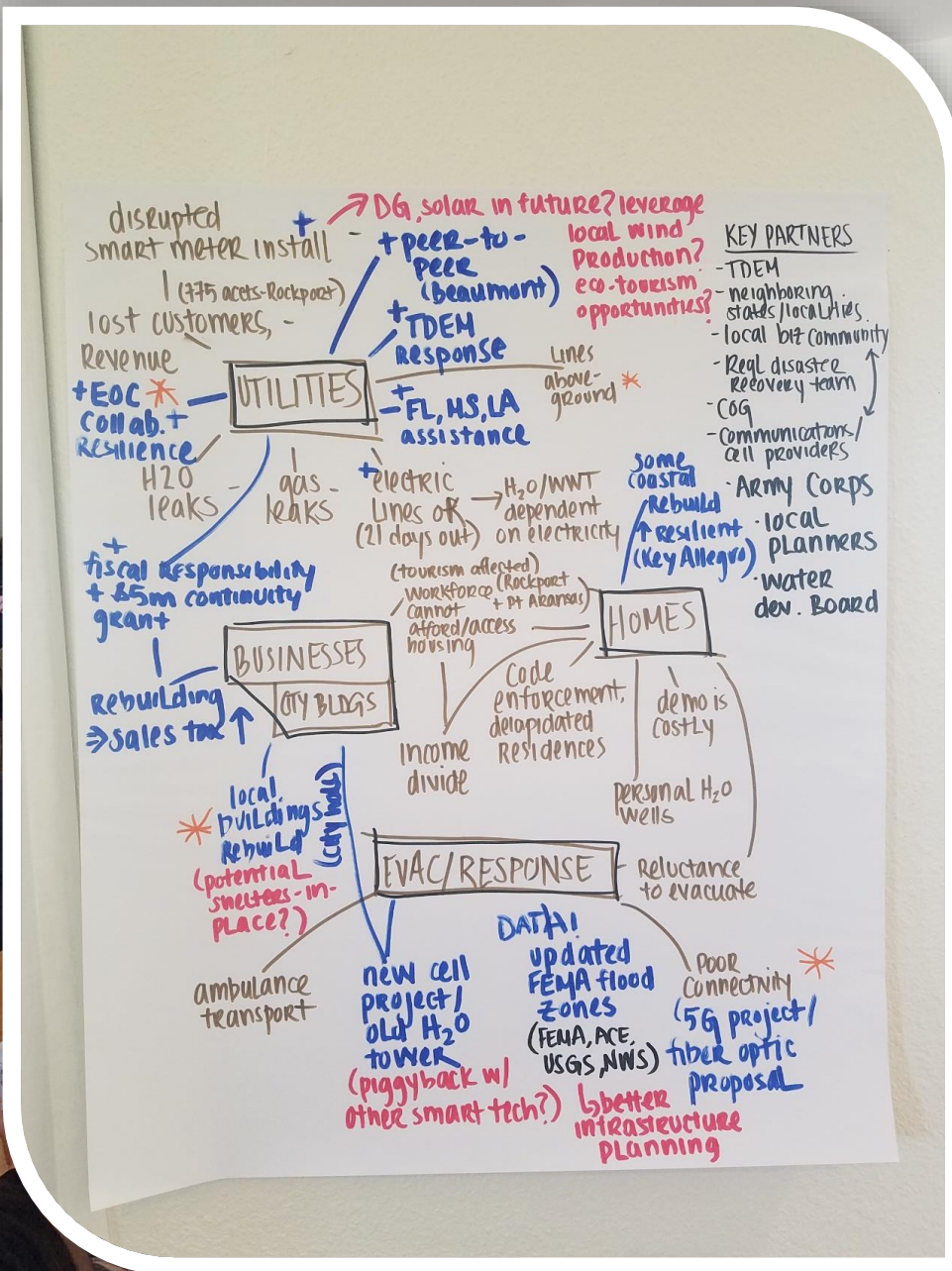
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TX Roadmap to Resiliency  
Smart Technologies

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**AGRILIFE**  
EXTENSION









Sponsored by: **Qualcomm**

# READINESS FOR RESILIENCE

## A Resilient Technology Roadmap for Rebuilding Texas

“Readiness for  
Resilience”

A Resilient Technology  
Roadmap for Rebuilding  
Texas

With Partners:  National Association of State Energy Officials | Smart**Cities**Council |  **The Business Council** for Sustainable Energy™

TEXAS A&M  
**AGRILIFE**  
EXTENSION

**REBUILD**★**TEXAS**  
The Governor's Commission to Rebuild Texas



# “Readiness for Resilience”

A Resilient Technology  
Roadmap for Rebuilding  
Texas

## ***What is the Readiness for Resilience Program?***

A Partnership, sponsored by Qualcomm, with:

- Texas A&M AgriLife Extension
- Smart Cities Council
- Business Council for Sustainable Energy
- National Association of State Energy Officials

### ***The program includes three stages:***

- 1) Discovery phase to learn of local rebuilding needs and project priorities;
- 2) Development of a “Resilience Roadmap” pairing technology best practices with identified community needs
- 3) Pairing the Resilience Roadmap with public-private partners and funding opportunities to spur smart, resilient project development. ensure smart, resilient and sustainable technology is incorporated into infrastructure rebuilding.

# Discovery Workshop Action Areas

Stakeholders Discuss Priorities



**Public Safety:** How can Texas factor smart city technologies and processes into public safety priority areas to keep people safer during and after natural disasters?

**Energy:** How can Texas improve its energy resilience with smart city technologies and processes to build greater infrastructure resilience while creating co-benefits?

**Telecom and IT:** What smart technologies and design principles should Texas consider as it designs more connected, citizen-centered, affordable and resilient services?

**Transportation and Mobility:** What mobility solutions, technologies and standards might Texas consider as it moves to create a more intelligent, resilient and sustainable transportation system?

## Activity 1: Resilience Priority Identification

Identify 2- 3 projects that offer the biggest potential for increased resilience

**FOCUS AREA:**

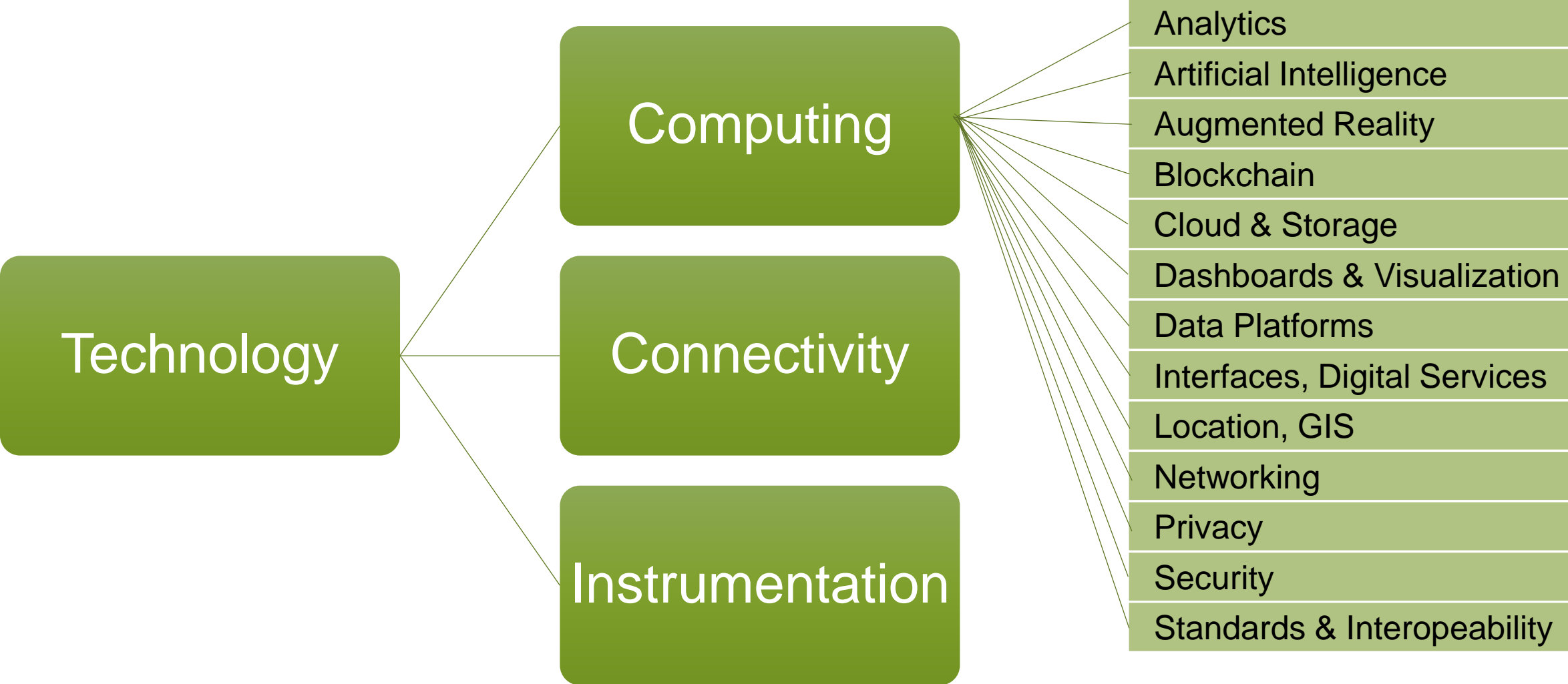
Resilience Challenges Faced with Harvey	Biggest Community Needs for Recovery & Resilience	Potential Reconstruction Projects to Meet Needs (full list)	Prioritized Projects (why a priority: e.g. biggest impact, quick win)	Key Project Stakeholders
Flooding Winds Debris Evacuation	Preparedness Communication Energy	See Recommendations		Government Industry Non-profit Academia

## Activity 2: Technology Solutions & Best Practices

Focus Area:

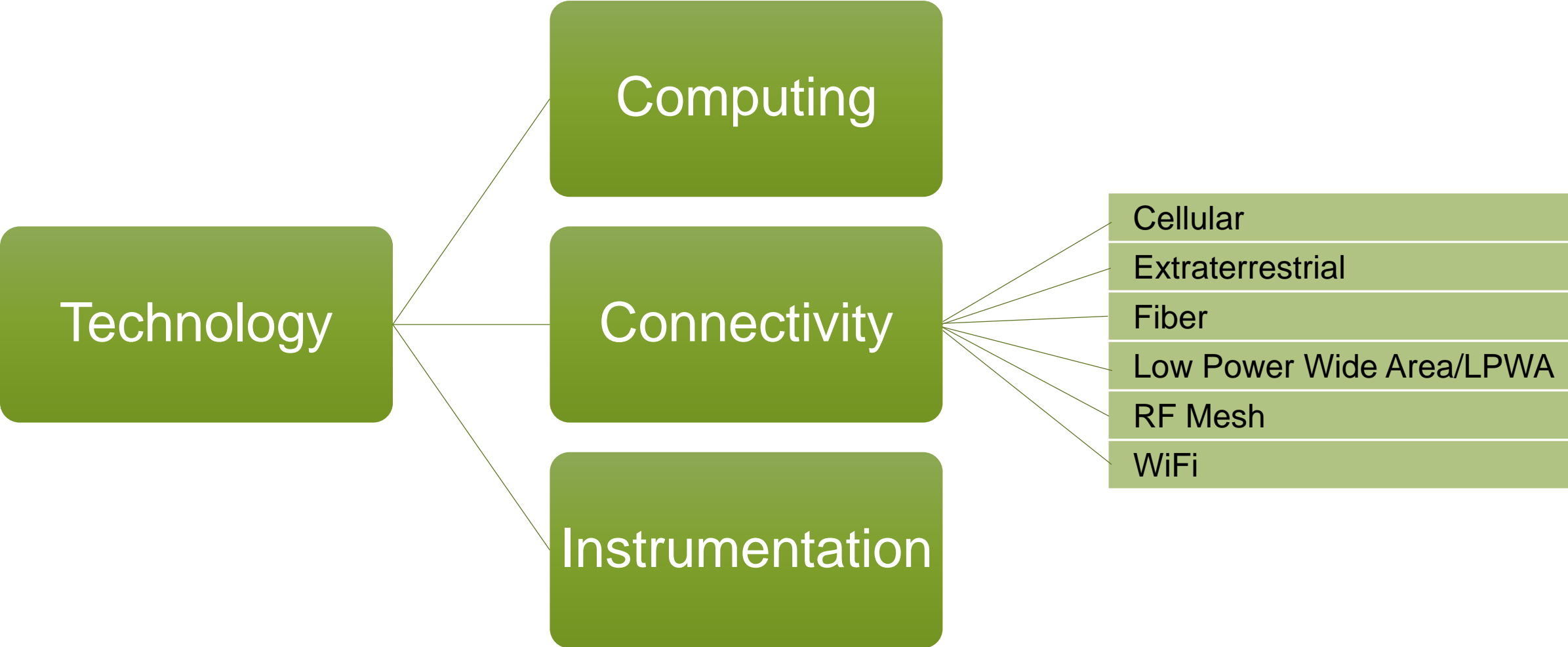
Priority Resilience Project(s)	“Smart” Technology/Best Practices (ways innovative tech can add value)	Potential Benefits Above and Beyond a Traditional Solution	Potential Collaboration Opportunities	Potential Process Innovations (new business models, legislation, etc.)	Critical Success Factors (to factor into guidelines)

# Technology Enablers

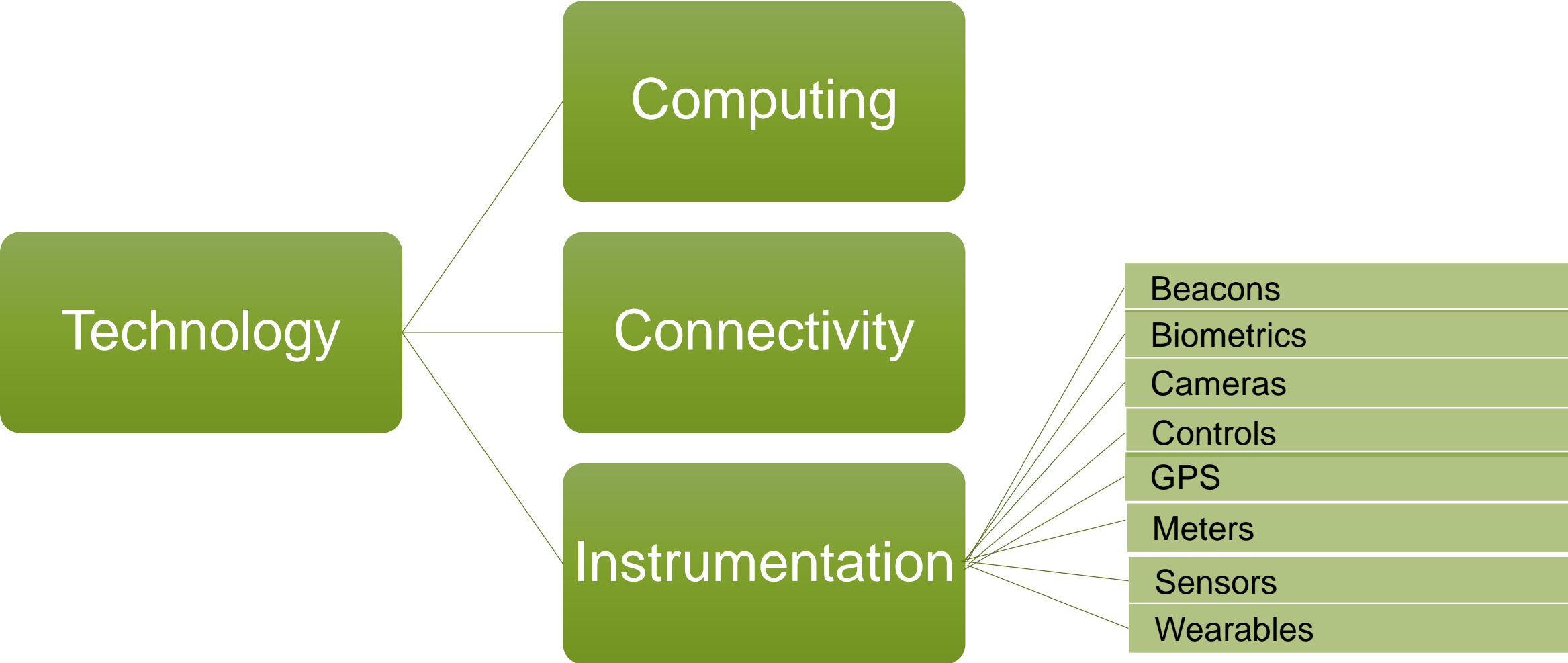




# Technology Enablers



# Technology Enablers



# Public Safety

## Local Challenges and Priorities



## Common Themes

- Coordinate response across agencies
- Direct people and resources during and immediately after the disaster, and
- Plan and prepare for emergencies before they occur, with an eye to vulnerable populations.



# Public Safety

## Projects and Technology Best Practices

### Project PS-1: “Match.com”-style resilience tool:

- Integrated resilience tool for public to access people, processes, systems and data they need to assist with preparedness, response & recovery (*Houston-Galveston and Coastal Bend*)

### Project PS-1B: Proactive debris removal planning:

- Resilience planning tool could help community members and emergency responders understand rights of way, identify all the options for where to put debris and get MoU’s in place in advance.
- Consider options for handling debris (what can be salvaged, mulched, used for waste-to-energy, etc.), and provide safety guidelines. (*Coastal Bend*)

### Project PS-4: Volunteer Rescue Network:

- Extending public safety response through a system of volunteers using “ride-sharing” technology.
- This could include offering evacuation car-pooling, connecting volunteer expertise with special populations, matching people in need to volunteers offering food and shelter, matching pets and temporary foster homes, etc. (*Houston-Galveston and Southeast TX*)

# Project-Governor's Report Mapping: Public Safety

Smart Resilience Project	County			Resilience Focus			Relevant Governor's Commission Report Recommendations (Chapter #, Recommendation #)
	Harris	Orange	Aransas	Prepare	Respond	Recover/Revitalize	
PS-1: Match.com-style resilience tool	●		●	●	●	●	<b>6-9:</b> Create recovery task force to provide specialized assistance to communities and individuals to speed local level recovery. <b>8-16:</b> Examine ways to better inform public about how to prepare for and survive a disaster.
PS-1A: Localized damage prediction			●	●			<b>8-4:</b> Strengthen quality and sharing of data used in emergency management operations.
PS-1B: Proactive debris removal planning			●	●	●	●	<b>6-1:</b> Catastrophic debris management plan and model guide <b>6-2:</b> Improve contracting for debris removal <b>6-3:</b> Study issues surrounding removal of "wet" debris
PS-1C: Evacuation scenario planning		●		●	●		<b>6-18:</b> Grant TxDOT authority to pre-purchase and stockpile food and water for each hurricane season
PS-2: Smart, resilient buildings	●		●	●		●	<b>6-7:</b> Improve oversight, accountability and availability of individuals in building trades offering services to disaster survivors.
PS-3: Affordable housing	●				●	●	<b>6-19:</b> Study and recommend ways to resolve restrictions impeding debris removal or trailer placement for short-term disaster housing.
PS-4: Volunteer rescue network activation	●	●		●	●		<b>8-2:</b> Review current training courses to strengthen training for recovery operations for state and local emergency management personnel.

# Energy & Utilities

## Local Challenges and Priorities



### Common Themes

- Stable and clean power generation
- Access to back up power during extreme weather emergencies
- Improving building codes relating to flooding and wind storms, and enabling counties to have more code
- Improving back up power generation – currently back-up generators are often diesel
- Improving planning and communications across entities in the field.

# Energy & Utilities

## Projects and Technology Best Practices

- **Project EU-1: Localized infrastructure monitoring:** Improve monitoring of underground and above ground utility infrastructure at the connection level to provide household service visibility to expedite recovery (**Houston-Galveston and Coastal Bend**).
- **Project EU-2: Municipal Microgrids:** Establish public-private partnerships to examine the feasibility of municipal microgrids that enable critical community assets to continue operating event during power outages or disruptions.
- **Project EU-3: Smart Metering, Smart Grid, and Energy Efficiency:** Better manage power outages, reduce financial losses, and shorten outage time by installing smart grid technologies and systems.

# Project-Governor's Report Mapping: Energy & Utilities

Smart Resilience Project	County			Resilience Focus			Relevant Governor's Commission Report Recommendations (Chapter #, Recommendation #)
	Harris	Orange	Aransas	Prepare	Respond	Recover/Revitalize	
Project EU-1: Localized infrastructure monitoring	●		●	●	●	●	<p><b>4-1:</b> Reorganize emergency management functions to unify most critical emergency response and recovery functions</p> <p><b>7-3:</b> Investigate ways to improve hardening of utilities and facilities.</p> <p><b>8-15:</b> Examine ways for state to apply data analytics to improve disaster management through more effective and timely information.</p>
Project EU-2: Municipal microgrids	●	●	●	●	●	●	<p><b>4-1:</b> Reorganize emergency management functions to unify most critical emergency response and recovery functions.</p> <p><b>7-3:</b> Investigate ways to improve hardening of utilities and facilities.</p>
Project EU-3: Smart metering, smart grid and energy efficiency	●	●	●	●	●	●	<p><b>4-1:</b> Reorganize emergency management functions to unify most critical emergency response and recovery functions.</p> <p><b>7-3:</b> Investigate ways to improve hardening of utilities and facilities.</p> <p><b>8-15:</b> Examine ways for state to apply data analytics to improve disaster management through more effective and timely information.</p>



# Telecom & IT

## Local Challenges and Priorities

### Common themes

- More reliable baseline and emergency communications infrastructure.
- Improved information sharing with the public.
- A standardized communication platform for agencies and communities engaged in recovery efforts. Lack of local-level coordination impedes response and recovery.



# Telecom & IT

## Projects and Technology Best Practices

**Project TI-1: Resilient communications infrastructure:** All regions recommended creating greater telecom system resilience by hardening and expanding infrastructure and creating more redundancy.

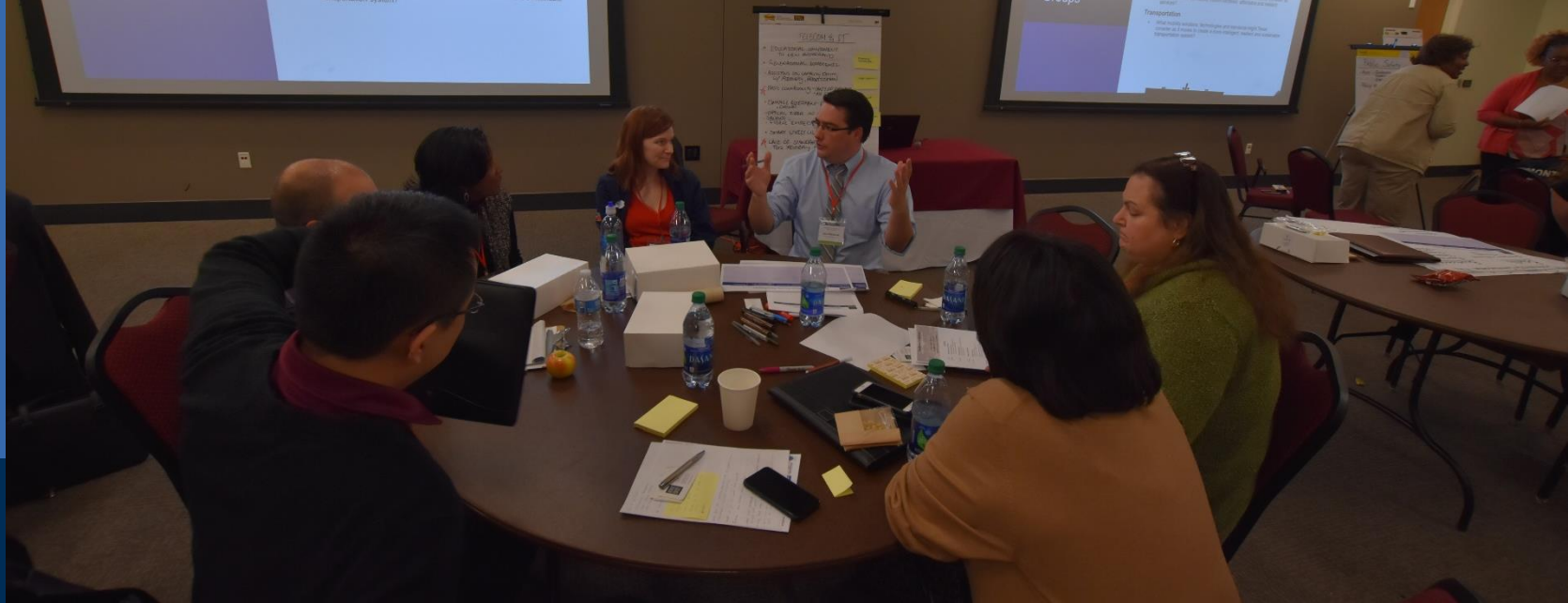
**Project TI-2: Integrated community notification system:** All regions recommended improving the way storm related information gets to the public. A multi-faceted notification system to get key information out to the public, better guide evacuation, and assist people during and in the aftermath disasters.

**Project TI-3: Interlocal mobile communications system:** Develop self-contained, mobile communications and IT system(s) for use in emergency and high-impact events. Mobile units can be shared across regions and agencies and directed to where they are needed the most **(Coastal Bend)**.

**Project TI-4: Telecom system gap analysis:** Conduct a gap analysis of local connectivity and power and develop plan to fill gaps to improve emergency response planning, response and recovery **(Coastal Bend)**.

# Project-Governor's Report Mapping: Telecom and IT

Smart Resilience Project	County			Resilience Focus			Relevant Governor's Commission Report Recommendations (Chapter #, Recommendation #)
	Harris	Orange	Aransas	Prepare	Respond	Recover/Revitalize	
TI-1: Resilient communications infrastructure	●	●	●	●	●	●	<p><b>5-1:</b> Consider appropriating additional funds from Emergency Radio Infrastructure Account to fund radio infrastructure.</p> <p><b>8-14:</b> Cultivate relationships with private technology providers for assistance when communications systems are damaged or destroyed.</p>
TI-2: Integrated community notification system	●	●	●	●	●	●	<p><b>4-1:</b> Reorganize emergency management functions to unify most critical emergency response and recovery functions.</p> <p><b>8-10:</b> Establish state website at the Texas A&amp;M University System that is easy to use and presents important post-disaster information about response and recovery activities.</p> <p><b>8-11:</b> Consider ways to make better use of 911 and social media during disaster response.</p> <p><b>8-12:</b> Explore development of new mobile app to deliver important information to responders and disaster victims alike.</p>
TI-3: Interlocal mobile communications system			●	●	●	●	<p><b>7-3:</b> Investigate ways to improve the hardening of utilities and facilities.</p> <p><b>8-9:</b> Review laws and practices affecting the use of drones during emergency events and recommend changes in operations to promote use.</p>
TI-4: Telecom system gap analysis			●	●	●	●	<p><b>7-4:</b> Create comprehensive inventory of needed mitigation and resiliency projects statewide and develop a prioritization methodology to guide local, state and federal decision makers.</p>



# Transportation

## Local Challenges and Priorities

### Common themes

- Improved and more real-time broadcasting of information to the public about evacuation routes and closed roadways.
- Improving emergency evacuation processes and evacuee access to services.
- Opening up transportation routes after disasters, removing debris, and addressing the mobility needs of vulnerable populations (i.e., retirees, elderly, and poor) are priorities.

# Transportation

## Projects and Technology Best Practices

**Project TM-1: Real-time, coordinated evacuation and resource routing:** Improve evacuation effectiveness and efficiency by using a variety of communications devices, sensors and data to route and reroute people to safety and resources in real-time during a disaster.

**Project TM-2: Smart signage:** In addition to strategically placing signage and incorporating real-time data to improve signage along evacuation routes, a smart system would use real-time triggers, such as roadway water-level sensors, to adjust signage, suggest reroutes and automate road closure gates (**Houston-Galveston and Southeast TX**)

**Project TM-4: Roadway flood protection:** As roadways are being repaired, seek opportunities to upgrade materials and incorporate green stormwater infrastructure and other sustainable design principles to improve drainage and reduce flood risks. Also incorporate water-level, traffic count, environmental and other sensors to enable real-time condition monitoring, reporting and route management (**Houston- Galveston**).

# Project-Governor's Report Mapping: Transportation

Smart Resilience Project	County			Resilience Focus			Relevant Governor's Commission Report Recommendations (Chapter #, Recommendation #)
	Harris	Orange	Aransas	Prepare	Respond	Recover/Revitalize	
TM-1: Real-time coordinated evacuation and resource routing	●	●		●	●		8-15: Examine ways for state to apply data analytics to improve disaster management through more effective and timely information.
TM-2: Smart Signage	●	●		●	●		8-15: Examine ways for the state to apply data analytics to improve disaster management through more effective and timely information.
TM-3: Evacuation transportation assistance	●		●	●	●		6-14: Develop a process to capture vehicle identification information in FEMA's vehicle assistance program.
TM-4: Roadway flood protection	●			●	●	●	7-1: Special study committee to propose options for state-local partnership to future-proof Texas against flood events on a watershed basis.

# Mapping Projects to Smart Cities Framework

The Smart Cities Framework shows how a project in one area can address other responsibility and benefit areas. It also shows technology enablers for each project and encourages cross-solution technology adoption to improve coordination and unlock synergies.

“Smart for Resilience” Projects”	Additional Benefit Areas																Technology Enablers			
	Buildings	Digital Services	Economic Dev.	Education & Training	Emergency Response	Energy	Environmental Svcs	Health	Human Services	Payments	Public Safety	Street Infrastructure	Sports, Culture, Tourism	Telecommunications	Transportation	Waste Management	Water & Wastewater	Computing	Connectivity	Instrumentation & Control
<b>Project PS-1: “Match.com” resilience tool</b>			●	●	●	●	●	●		●				●	●	●	●	<ul style="list-style-type: none"> <li>Analytics</li> <li>Data Platform</li> <li>Mobile App</li> <li>Cloud and Storage</li> </ul>	<ul style="list-style-type: none"> <li>WiFi</li> <li>Cellular</li> </ul>	<ul style="list-style-type: none"> <li>Beacons</li> <li>Biometrics</li> <li>Cameras</li> <li>GPS</li> </ul>
<b>TI-3: Interlocal mobile communications system</b>					●	●	●	●		●				●	●	●	●	<ul style="list-style-type: none"> <li>Analytics</li> <li>Data Platform</li> <li>Cloud and Storage</li> </ul>	<ul style="list-style-type: none"> <li>WiFi</li> <li>Cellular</li> <li>Satellite</li> </ul>	<ul style="list-style-type: none"> <li>Beacons</li> <li>Cameras</li> <li>Sensors</li> <li>GPS</li> </ul>
<b>Project TM-2: Smart signage:</b>		●			●		●			●	●				●			<ul style="list-style-type: none"> <li>Analytics</li> <li>Data Platform</li> <li>Location, GIS</li> </ul>	<ul style="list-style-type: none"> <li>WiFi</li> <li>Cellular</li> </ul>	<ul style="list-style-type: none"> <li>Beacons</li> <li>Cameras</li> <li>GPS</li> </ul>



# Activity 1: Public Private Partnership Principles

For each project identified, fill in the 3P Principles outlined below.

## FOCUS AREA:

Project	Create a Shared Vision	Identify Key Stakeholders and Partners	Outline Risks and Rewards for all Partners	Determine Institutional Roles, Responsibilities	Identify Investment, Funding Options	Prioritize Investment Based on Value	Ensure Political, Regulatory Support	Communicate Public Benefit

# Activity 2: Match Projects/Funding Streams/Assistance

Focus Area:

Project	Identify Federal Funding Streams	Identify Additional Federal Assistance Programs	Identify State and Local Funding Streams	Identify Additional State and Local Assistance	Match Projects with Federal, State and Local Funding Streams	Match Projects with Federal, State and Local Assistance	Match Potential PPP Contribution to Each Project	Compile Project Federal State & Local Funding & Assistance

Activator addresses  
government needs



## Activator Discover

- Powerful input tools to capture the needed data
- Instant access to best practices

## Activator Plan

- Collaborative tools for multi-stakeholder planning
- Templates from leading experts

## Activator Exchange

- Trade lessons learned with peer cities

## Activator Finance (coming soon)

- Rocket Mortgage for cities – fill in one form, get introductions to multiple lenders

# Public Private Partnerships

**Moderator: *Lisa Jacobson, President, Business Council for Sustainable Energy***

***June W. Choi, Managing Partner, Serval Ventures***

***Bill Raisch, Executive Director, Center for Enterprise Preparedness at New York University***

***Don Wingate, Vice President, Utility Solutions Microgrid Solutions & Strategic Partners, Schneider Electric***

**READINESS FOR RESILIENCE**



# The Business Council for Sustainable Energy<sup>®</sup>



***Expanding markets for clean energy technologies worldwide***

# 2019 BCSE Members



# BCSE Mission

*BCSE advocates for policies that promote clean, efficient, and sustainable energy products, technologies and services*



2019

# Sustainable Energy in America

Factbook



Energy Efficiency

+



Natural Gas

+



Renewable Energy

**GROWTH SECTORS OF THE U.S. ENERGY ECONOMY**



**Bloomberg**NEF

**The Business Council**  
for Sustainable  
Energy®

**GET THE FACTS**

[www.bcse.org](http://www.bcse.org)

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# BCSE Resilience and Reliability Dialogue

- Thought Leader Speaker Series
- White Paper on Resilience and Reliability
- External education and advocacy initiatives





CLEAN ENERGY BUSINESS NETWORK  
BCSE BOARD OF DIRECTORS MEETING 11.20.18



# GROWING THE CLEAN ENERGY ECONOMY— ONE SMALL BUSINESS AT A TIME



POLICY



EDUCATION



BUSINESS SUPPORT FOR SMALL  
& MEDIUM ENERGY COMPANIES

OUR MISSION



# INNOVATION APPROACH TO PUBLIC PRIVATE PARTNERSHIPS

June W Choi  
Serval Ventures  
NY Bay Capital



# RESILIENT CITIES & INFRASTRUCTURE

- **Robustness** – able to withstand hazard events without surges & partial loss
- **Redundancy** – spare & latent capacity to withstand surges & partial loss
- **Diversity & Flexibility** – services supplied a number of pathways, using distributed & multifunctional equipment
- **Responsiveness** – incorporating automated monitoring, short feedback loops & controls at multiple points, transparency of performance data & rapid adjustment to maintain functionality
- **Coordination** – between systems so knowledge is shared, planning is collaborative & strategic, responses are integrated for mutual benefit

# APPLICABLE LESSONS

from top tech companies  
that move the markets

**F**acebook

**A**mazn

**A**pple

**N**etflix

**G**oogle

## **Innovation Frameworks**

Design thinking

Agile process

Continual iteration

## **Innovation Mindset**

0 to 1

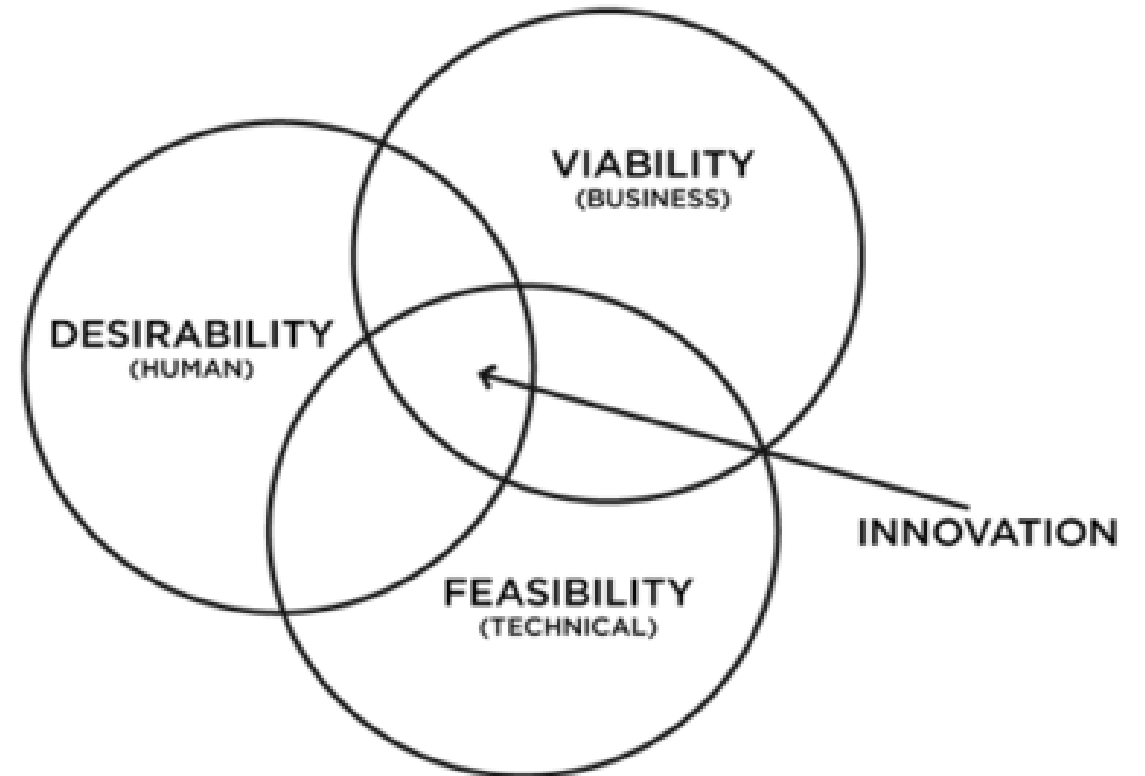
Transparency

# DESIGN THINKING

Sweet spot of human need, technical possibilities, and sustainability

Vital to have diverse people around the table who can really speak from each perspective

Studies show diversity increases success





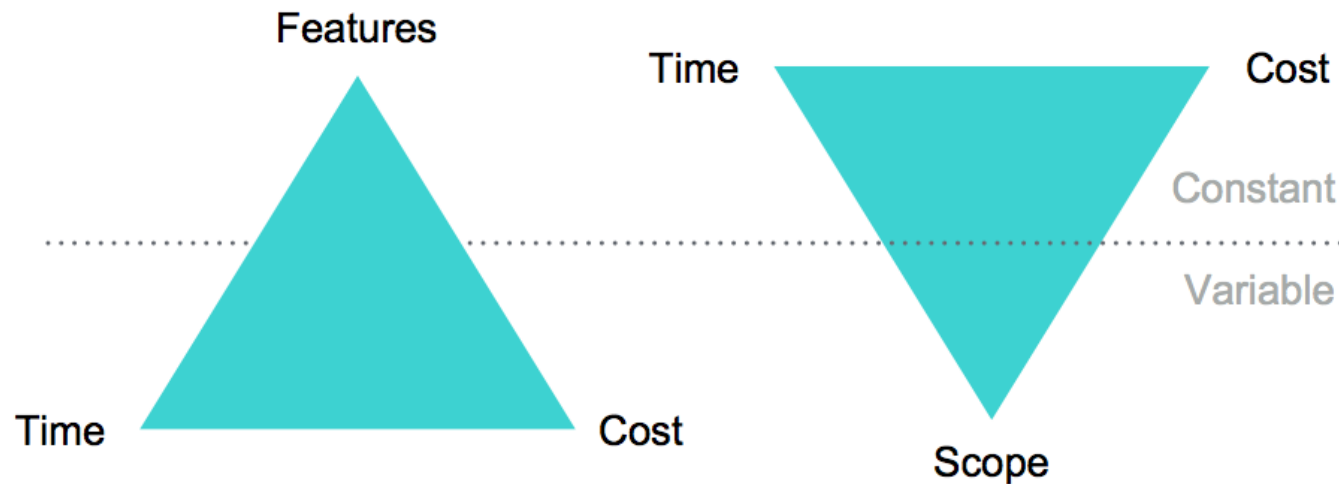
[https://cdn.github.org/local-umbraco/media/1455/gih\\_showcaseprojects\\_penn-bridges\\_art\\_web.pdf](https://cdn.github.org/local-umbraco/media/1455/gih_showcaseprojects_penn-bridges_art_web.pdf)



# AGILE PROCESS

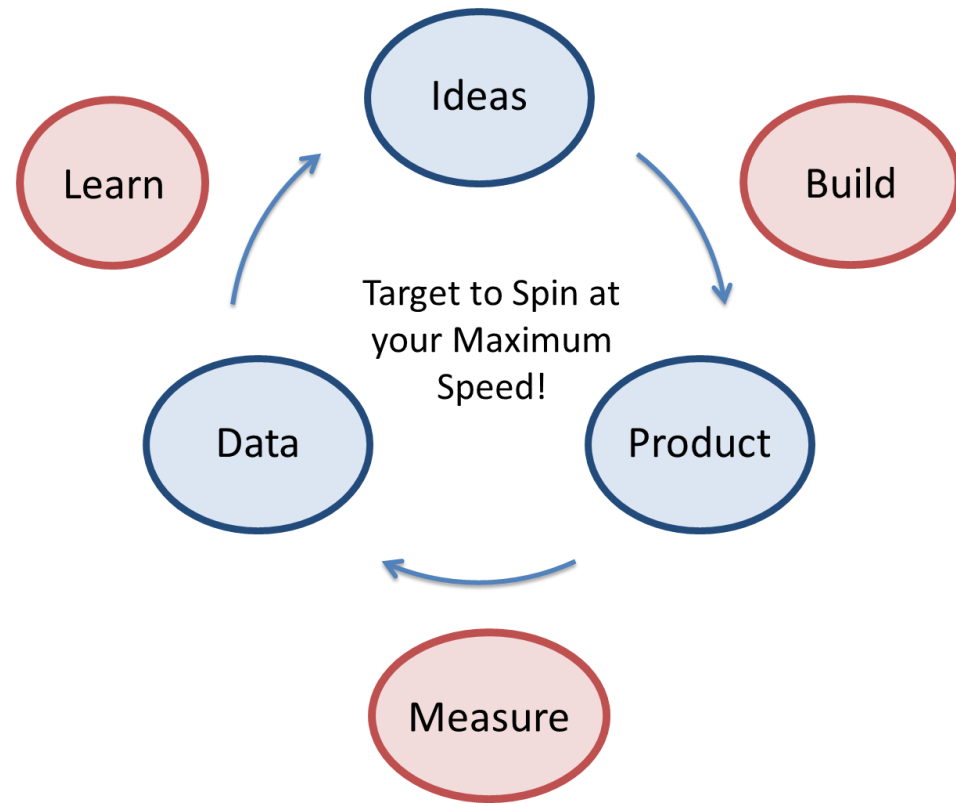
**Waterfall/traditional**

**Agile/current**



Agile is the better process to apply given the rapid pace of technological changes

# CONTINUAL ITERATION/IMPROVEMENT



Time-tested process, adapted from the scientific method, that can be successfully applied to evolving complex challenges

Key is to stay curious & don't get complacent, like good scientists

*Scientific method for business*

**Figure 1. A five-step framework for successful infrastructure investment**



# MINDSET IS THE SECRET SAUCE

## 0 to 1

Building the first of something that doesn't yet exist

Spurs creativity & freshness in approaches to solutions

## Transparency

Social media has made private public

Culturally, today people expect & respect transparency



# APPLYING THE LESSONS TO 3P PROJECTS

- People around the table – design thinking
- Project structure – Agile approach
- Financing sources & structuring – get creative, involve partners early in design process
- Messaging & public engagement – test & learn
- Implementation processes – innovation mindset
- Addressing problems - transparency
- Future or follow-on projects – continual iteration

# CONTACT INFO

June W Choi, [junewc@servalventures.com](mailto:junewc@servalventures.com)

The background of the slide is a world map in shades of red and orange. Overlaid on the map is a complex network of thin, light-colored lines that connect various points across the globe, suggesting a global network or data flow. The map is centered on the Atlantic Ocean.

# The Metropolitan Resilience Network

*A Prototype for Collaborating on  
Shared Risks & Resilience*

## Key Lessons Learned

- **Disruption** will be the norm not the exception
- **Dependencies and interdependencies** on critical infrastructure (power, telecom, transportation)
- **Collaboration** on common risks will be vital.
- **Crisis can be a catalyst.** Optimal resilience is bouncing forward not back!



# Metropolitan Resilience Network Activities



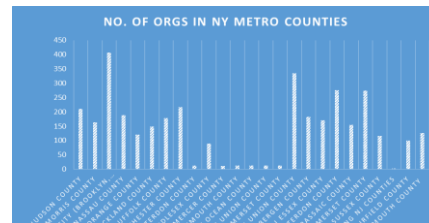
**24/7 Situational Awareness & Common Operating Picture**



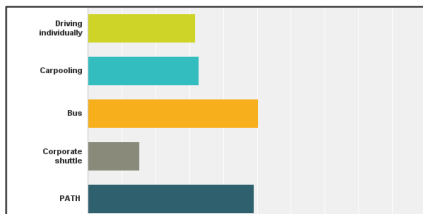
**Face-to-Face Senior Level Forums**



**Live Risk Briefings via Web & Access to Threat Experts**



**Targeted Research**



**Flash Surveys on Operational Status & Next Steps**



**Public-Private Exercises**



**Advancing Public - Private Sector Collaboration (incl. EOCs)**



**“Network of Networks” with 100’s of Contacts at Corporations, Govt. Agencies, Professional & Industry Assoc’s**



**Best Practices & Benchmarking Resources**

## Mission:

*To enable public and private stakeholders  
to collaborate on shared risks & challenges to their  
operations.*

Metropolitan Resilience Network

*Metro-NY/NJ/CT- Funded by Port Authority*

Global Resilience Network

*Building a Community of Networks*



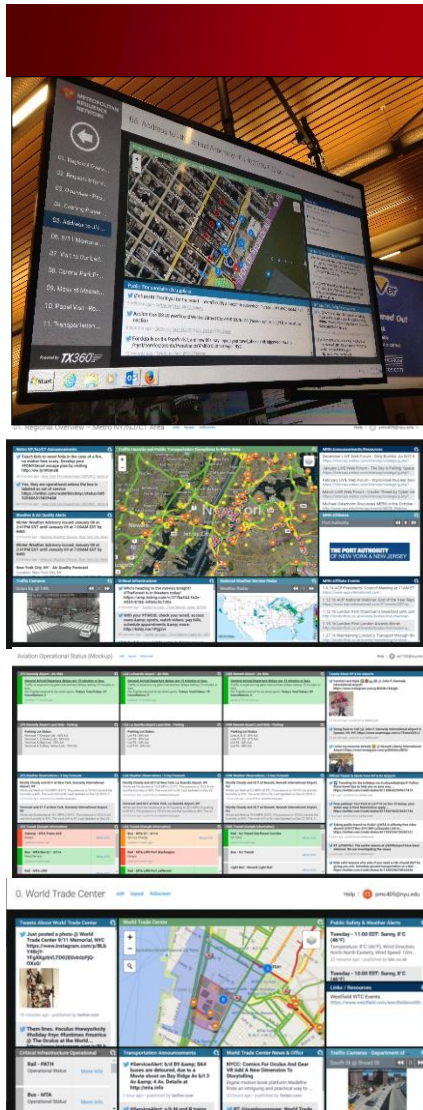
**GLOBAL  
RESILIENCE  
NETWORK**

# Who We Connect



**GLOBAL  
RESILIENCE  
NETWORK**





# 24/7 Situational Awareness Platform

## Situational Awareness Monitoring of the Operational Environment

- Public Safety Alerts
- Critical Infrastructure Status
- Weather
- Transportation: Mass Transit, Traffic
- Ongoing Threats: Infectious Disease, Natural Disasters, Cyber
- Targeted News & Social Media



## Dashboards Types Developed to Date

- **Infrastructure Specific** (transportation, power, communications)
- **Agency Specific** (police, fire, EM alerts)
- **Threat Specific** (infectious disease, terrorism, natural hazards, storm surge)
- **Event Specific** (terror attacks, severe weather)
- **Job Title Specific / Functional**: CEO, Division
- **Facility / Organization Specific** (buildings, airports, professional / industry organizations)

## Information Sources

- **Primarily Authenticated / Trusted Sources**
  - Government
  - Critical Infrastructure
  - Major News Media
- **Additional Sources**
  - Social Media (Key Word Search, Geo-Fence around Targeted Area)
  - Earthcams...
- **Formats**
  - Twitter, RSS, Email, Instagram...

## Threat Identification & Analysis



- Monthly Risk Briefings with Int'l Experts via Live Web Forums
- Written Threat Summaries on each Targeted Threat
- Annual Global Risk Digest distilling insights from int'l think tanks, gov't agencies, etc.



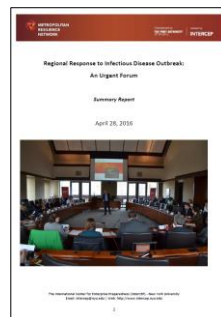
## Direct Connections to Key Subject Matter Experts

To Answer Member Questions &  
Inform Decision-Making / Next Steps

- Public Health Expertise
- Weather
- CBRNE / Terrorism Expertise
- Etc.

Likely Short / Long Term Impacts  
and Recovery Strategies

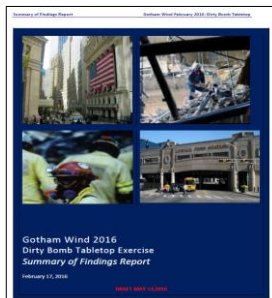
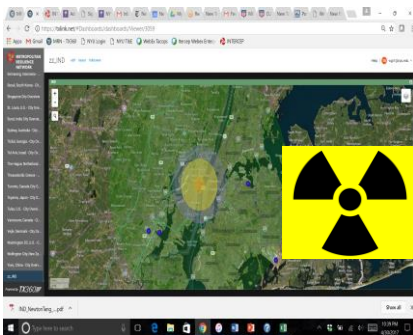
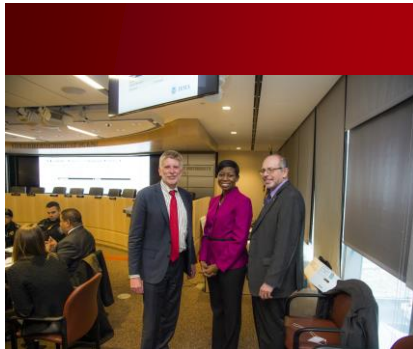




## In Person Forums for Shared Insights & Reporting

*Face-to-Face Senior Leader Forums & Reports with International Experts*

- Annual Urgent Threats Forum & Summary Report
- Regional Infectious Disease Forum & Summary Report



# Joint Exercises with other Public & Private Sector Organizations

Joint Exercises with Government, other Corporations and NGOs forwarding relationships and insights.

- RAD - Dirty Bomb Tabletops
- IND - U.S. National Exercise
- Future Pandemic Exercise?

After Action Reports capture Lessons Learned for your future planning.

Scenarios and Exercise Documents may be available for your organization to apply for internal training / exercises.

# Benchmarking Organizations with Others & Best Practices

Best Practices Resource

Benchmarking

Hurricane Season - Your Input Requested

SurveyMonkey

Q1 What are your organization's main concerns regarding hurricane season?

Concern	Percentage
Damage to facilities	85%
Loss of revenue	80%
Supply chain interruptions	35%
Reputational damage	10%

- Benchmarking Surveys
  - “Radar Check” Current & Emerging Risks to “*know what you don’t know*”
  - Compare Corporate Practices & Tools
- Best Practice Reference Resources on Crisis & Emergency Management, Business Continuity



Image source: Railway Age, December 2015. "Amtrak's Gateway project moves ahead," pages 10-11.



# Special Projects

## *As Identified by Members*

- Emergency / Crisis Communications Research
- Table Top Exercises



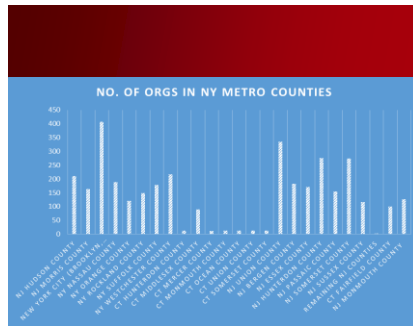
## During Events - Common Operating Picture with Govt, NGOs & Private Sector



MRN Email &  
Text Alerts /  
Event  
Dashboards

- To Coordinate Response Activities
- Can Communicate Plans of Government / Infrastructure to the Private Sector through email, text and online dashboards

# Flash Surveys & Targeted Queries

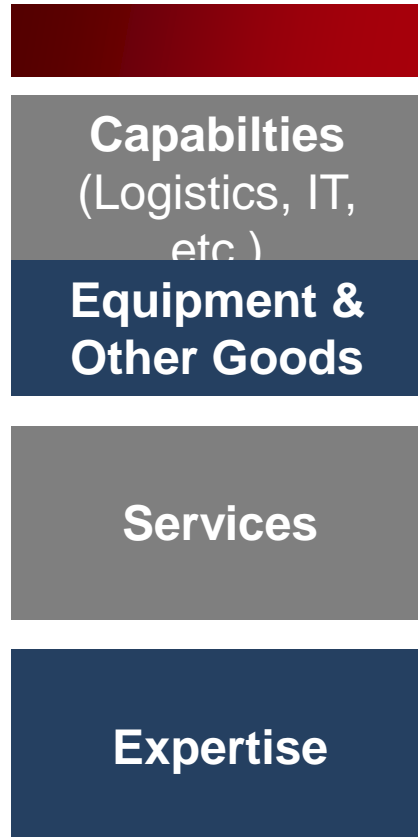


Can Assess

- Damage of the Wider Region
- Needs of Private Sector and other Stakeholders
- Immediate Plans / Next Steps - “who is doing what” at key stages of crisis

## Can Potentially Enable Mutual Aid

Could allow for Requesting and  
Accessing Resources from Network  
Members



# Post-Incident Hot Washes & Lessons Learned / After Action Reporting

Hot Wash  
Web Forums

Lesson Learned  
Discussions

After Action  
Reports

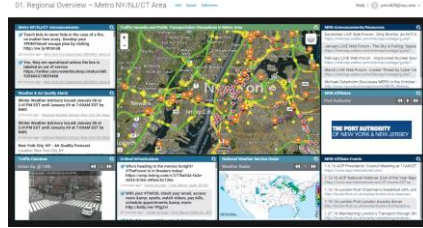
- Post-Incident “Hot Wash” Forums to Identify & Discuss Lessons Learned
- After Action Reports Capture Insights from Major Incidents



## Where We are Goging

- **New Functionalities** (Improved Communications & Collaboration, Resource Request / Management Capacity, Dedicated Industry / Association Focus)
- **Insurance Acknowledgement**
- **Linking Corporate Security Operations Centers**
- Working with other Communities to **Build a National / International Network**

# Metropolitan Resilience Network Activities



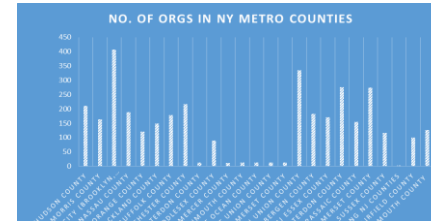
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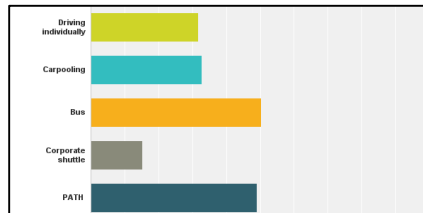
**Face-to-Face Senior Level Forums**



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**“Network of Networks” with 100’s of Contacts at Corporations, Govt. Agencies, Professional & Industry Assoc’s**



**Best Practices & Benchmarking Resources**



Thank You.

Bill Raisch

Director

International Center for Enterprise  
Preparedness, New York University

Web: [www.intercep.nyu.edu](http://www.intercep.nyu.edu)

Call **+1-646-997-4020**

Email [intercep@nyu.edu](mailto:intercep@nyu.edu).

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6 MetroTech Center, JAB Room 551, New York, New York 11201



# RESILIENT

## Schneider Electric: *P3's – Ready Today*

Readiness for Resilience Workshop - Houston, Tx June 2019

Don Wingate, Vice President – Microgrid Solutions & Strategic Alliances  
Schneider Electric Microgrids Business





# What is foundational for Resiliency?

Leading Business Model – P3

-----  
Electrical Infrastructure

-----  
Microgrid Controls

-----  
Repeatable and Scalable

-----



Life Is On

**Schneider**  
Electric

# Schneider Electric, leading the digital transformation of Energy Management and Automation

**€25.7 billion**

FY 2018 revenues

**~5%**

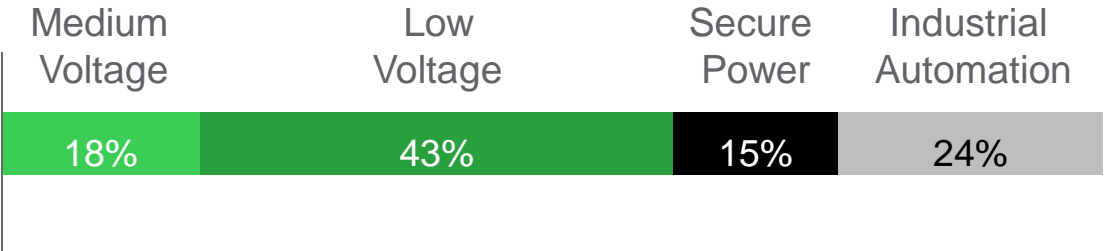
of FY revenues devoted to R&D

**145,000+**

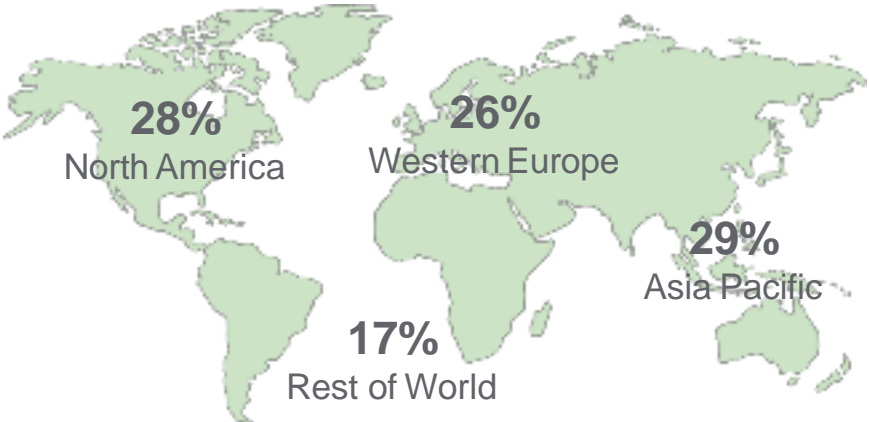
people in 100+ countries

## Our Products & Solutions

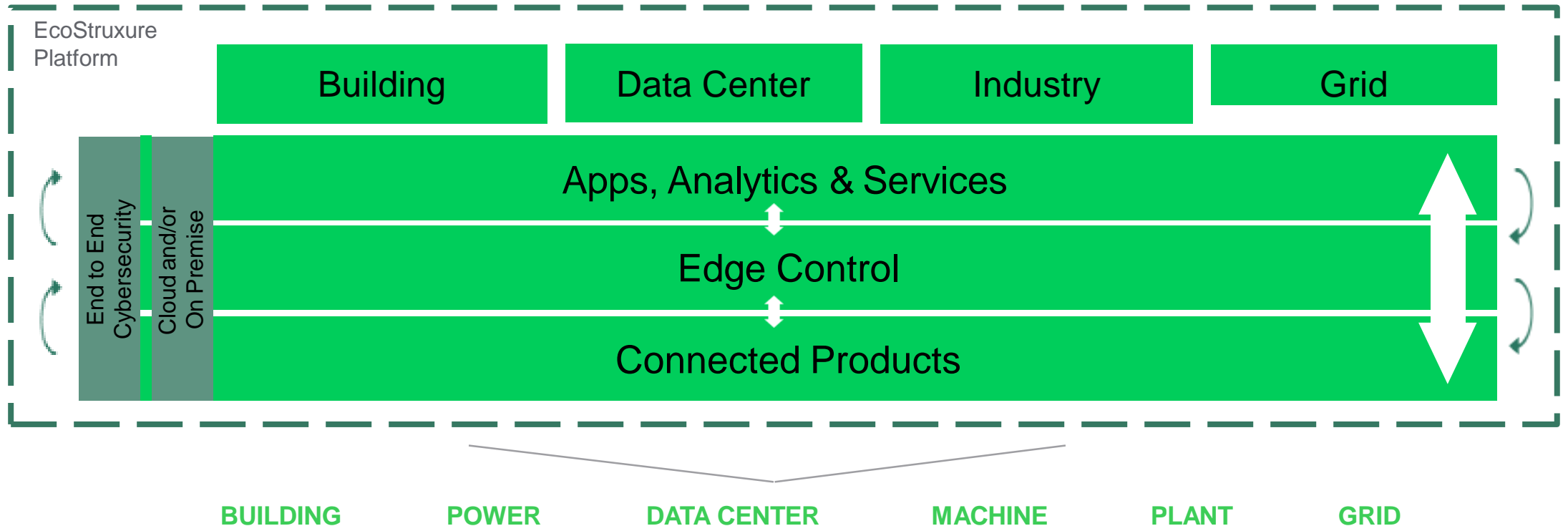
– FY 2018 revenues



## Balanced geographies – FY 2018 revenues



# EcoStruxure: 3 Innovation Layers, 4 End Markets, 6 Architectures



# MacroGrid or Regional Grid

- large interconnected energy system, supports our Modern Energy Economy

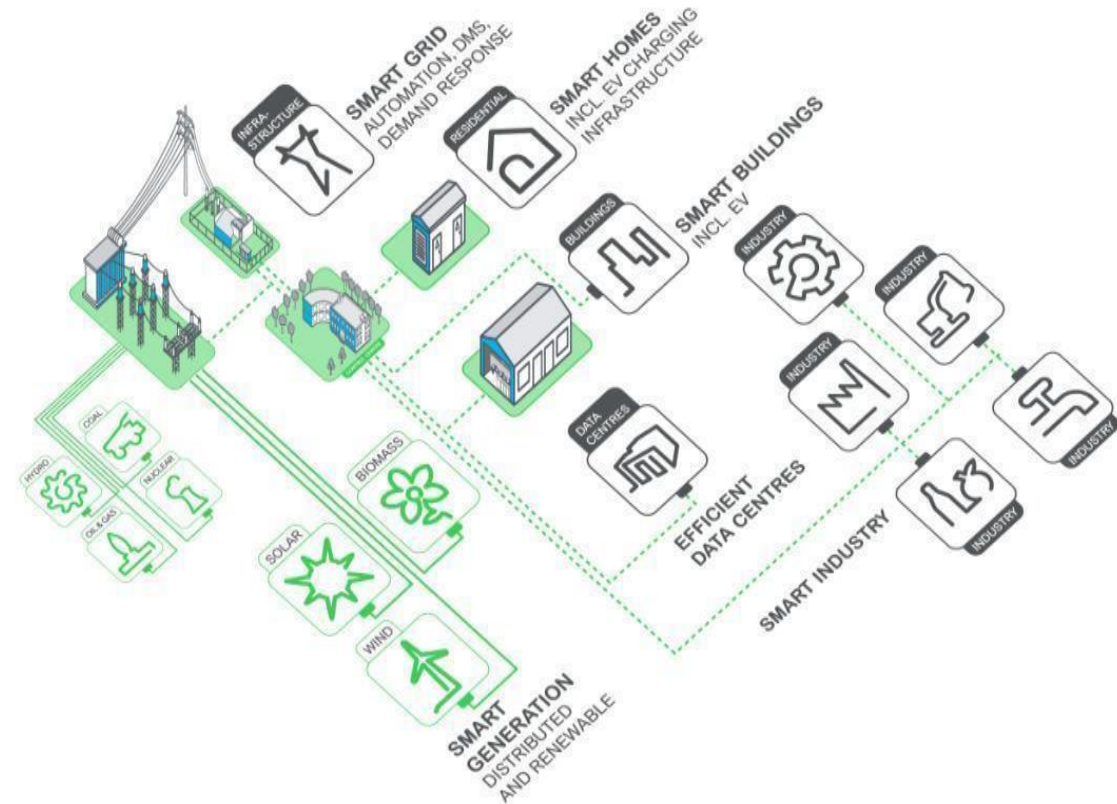
# Mini Grid

- small “off-grid” system usually found on islands or remote locations without Macrogrid interconnection.

# MicroGrid – Focus

- Interactive with the macrogrid, a localized energy system supporting campuses, buildings or subdivisions

Microgrid vs Macrogrid, can be thought of similar to Microeconomics vs Macroeconomics





# New Energy Landscape in 2018 – “Size and Scale”



**Lone Star Ports Harbor Island Crude Export Terminal** – SE providing prime power and sustainable energy in a unique public private partnership

BOWERY FARMING WILL USE SOLAR MICROGRID TO SUPPORT UNINTERRUPTED FARMING



## **Schneider Electric Building Microgrid at Port of Long Beach**

Schneider Electric announced Wednesday that it has a \$5.2 million contract to design, engineer and build a new microgrid at the Port of Long Beach in southern California. The port also is going to get ...



## **Faith Technologies and Schneider Electric Partner to Build State-of-the-Art Microgrid**

Faith Technologies, a leading electrical planning, engineering, design, and installation expert, in partnership with Schneider Electric, a global specialist in energy management and automation, design...



**Successful microgrid activation showcases innovation; supports reliable, efficient, clean energy at Montgomery County, Md., critical facilities**

Schneider  
Electric



## Energy Control Center

### Battery Energy Storage System (BESS)



**CTO** - Configured to Order  
**ETO** - Engineered to Order

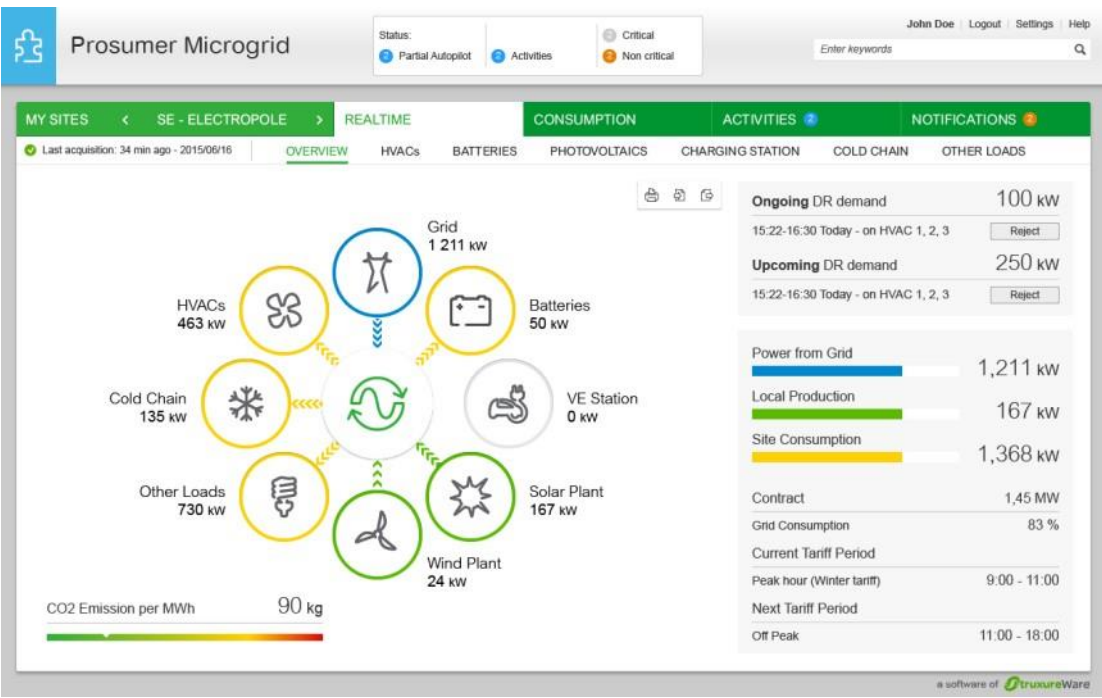


### EcoStruxure Microgrid Advisor



# “Microgrid in a Box” – Fit for Purpose Design





# EcoStruxure Microgrid Advisor

## Optimization Software for Site Managers



### DER Monitoring & Autonomous Optimization

- Web accessible multi-stakeholder dashboards

### Tariff Management

- Consume or produce energy at the most advantageous time based on various tariffs

### Demand Response & Control

- Reduce peak demand charges
- Partner with curtailment service providers for grid ancillary services

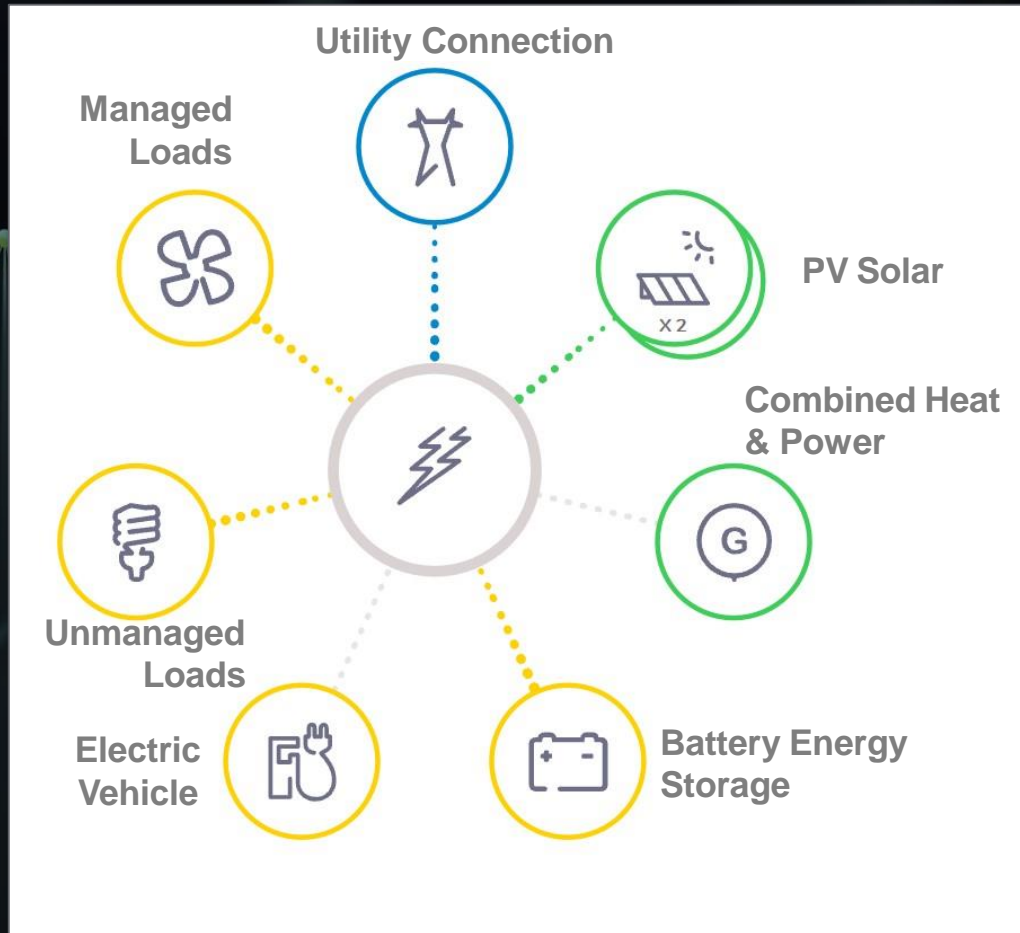
### Self Consumption & Island Mode

- Toggle from economic optimization to resiliency storm mode



# Demand Side Digitization

Historically passive consumers are thinking about energy in new ways



## Cost

- Lower / More Predictable Energy Costs
- Energy / Fuel Source Arbitrage
- Flexibility drives savings / incremental revenue



## Resilience

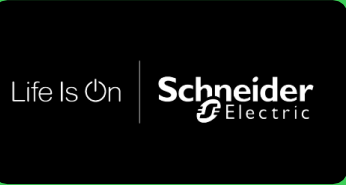
- Serve loads during times of grid stability
- Oasis for employees / customers – shelter in place
- Protect power sensitive / critical assets from poor power quality



## Sustainability

- Reduce carbon footprint
- Improve brand image
- Attract / Service carbon sensitive customers

## "Best-in-Class" Alliances



- *Utility Partnerships*
- *City*
- *Surrounding Venues*
- *Local EPC Partners*

## Investor / Owner

## Host Site



## Value Proposition

- Higher reliability and resilience
- Flexible Capital (No Capex)
- Increased sustainability
- Infrastructure Improvements
- More predictable energy costs
- PPP Business Model

## Capital Availability



- The Carlyle Group's stability (\$205 billion AUM & 30 years) underpins the ability to provide strategic capital
- Willing to put significant capital at risk to fund energy infrastructure initiatives

## Structuring Capabilities



- Complex deal structuring with long term view in mind
- Flexible, innovative structuring approaches to meet all stakeholder's objectives

## Performance Standards



- Features incorporated in funding programs to align interests of project participants while holding DEN and Schneider Electric accountable for performance

## Industry Expertise



- Schneider's experience and expertise facilitates a unique ability to understand the needs of all project constituents



# Minimize Complexity Solutions vs Projects P3 Business Models

# SE / Scale Microgrid, LLC - California R2M2

## Background:

- Electrical transmission and distribution infrastructure contributed to igniting California's recent devastating wildfires.
- Over half of California citizens live or work in High Threat Fire Districts.
- As part of Wildfire Mitigation Plans, state utilities have proposed drastically increasing the quantity and duration of Public Safety Power Shutoffs.
- Outages are expected to last 2 - 5 days

## Rapid Response Modular Microgrids (R2M2)

### Commercial and Industrial Power Solutions



Resilient



Timely



Sustainable



Cost Effective

Remote Monitoring & Microgrid Controls			
	EcoStruxure Microgrid Advisor platform automatically optimizes the operation of distributed energy resources (DER).		
	<b>Manufacturer(s):</b> Schneider Electric, Scale Microgrid Solutions, C-Power	<b>1</b> Common Platform	Communication Protocol
			Native Open ADR 2.0
			Cyber Security Testing
	NIKTO, DIRBUSTER, SQLMAP		
Energy Control Center			
	Integrates DER into an intelligent, pre-engineered, and configurable power control center to easily optimize resources and maximize facility performance.		
	<b>Manufacturer:</b> Schneider Electric	<b>3</b> Configurable Modules	800/1200: Typically used with 25-250 kW DER's
			1600/2500: Typically used with 100-750 kW DER's
			<b>Engineered to Order:</b> Used with any size and type of DER's
Battery Energy Storage System			
	Modular, scalable architecture with best-in-class power conversion and battery technologies.		
	<b>Manufacturer:</b> Schneider Electric	<b>4</b> Standard Modules	125 kW/250 kWh
			250 kW/500 kWh
	<b>Chemistry:</b> Li Ion - NMC		500 kW/1000 kWh
			1000 kW/2000 kWh
Solar PV			
	We work with the best local solar installation professionals to design, engineer, and construct custom rooftop, carport, and ground-mount solar arrays to meet the needs of your facility.		
Dispatchable Generator			
	Provides on-site power that can be adjusted to the output needed.		
	<b>Manufacturer:</b> Mitsubishi	<b>7</b> Standard Modules	265 kW
			1000 kW
	<b>Fuel Options:</b> NG, RNG, Propane		360 kW
			1200 kW
	610 kW		
	1500 kW		
	815 kW		

### Technology provided by Schneider Electric

For information contact 888-778-2733 or visit [www.schneider-electric.us/microgrid](http://www.schneider-electric.us/microgrid)

# 9 Months

65% faster installation. The typical development cycle for a microgrid is 16 - 36 months. The R2M2 process enables system commissioning within 9 months on average.


# Up to 30%

Savings versus the industry standard. Using high-quality, standardized technology enables you to benefit from economies of scale and eliminate bespoke costs associated with traditional microgrid installations.

# \$0

Scale Microgrid Solutions Energy Services Agreement eliminates up-front capital requirements via a fully-funded, pay for performance structure complete with risk mitigating guarantees. Availability is subject to credit review.



- ✓ Industry leading MG Controls
- ✓ Electrical Infrastructure – via 
- ✓ Leading Business Model – P3
- ✓ Targeting Texas & Resiliency

# Schneider Electric – Microgrid Competency Center

For information and assistance:



[don.wingate@se.com](mailto:don.wingate@se.com)  
216-272-1792

# Texas Community Showcase

**Pete O'Dell, Chief Executive Officer/Founder, Swan Island Networks, Inc.**

**Stephanie Bundage, Senior Counsel, Center Point Energy**

**Cate McNaught, Emerging Applications Market Development Manager, Carrier Networks, Corning Optical Communications**

**Moderator: Philip Bane, Managing Director, Smart Cities Council**

*READINESS FOR RESILIENCE*

***Pete O'Dell***  
***CEO/Founder***  
***Swan Island Networks,***  
***Inc.***

***READINESS FOR RESILIENCE***



# SITUATIONAL AWARENESS PLATFORM

- 24/7 proactive, all-hazards threat monitoring – 2000 global info channels
- Common Operating Picture dashboards for everyday ops
- Crisis and events dashboards
- Automated Smart Alerts providing real-time notifications
- Microsoft Azure cloud: security, scale, distributed access
- Easy to deploy, use, customize, integrate, afford
- Partner provided GSOCaaS

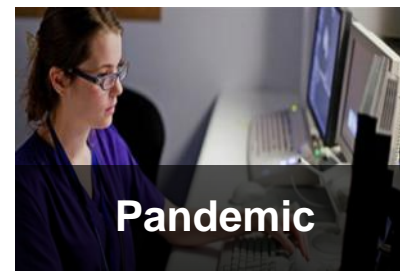
The screenshot displays the TX360 Situational Awareness Platform interface. The top navigation bar includes the TX360 logo, the title "2018 Western US Wildfires", and a user profile for "Impersonating tx360@swanislnd.net". The main content area is divided into several sections:

- Active Wildfires:** A list of active wildfires with details such as location, size, and containment status. Examples include:
  - NV: Sheep Creek Fire (15 Miles north of Battle Mountain) - 40,000 acres, 10% contained.
  - ID: Rabbit Foot Fire (22 Nautical Miles North of Challis) - 34,516 acres, 3% contained.
  - OR: Klondike Fire (9 miles northwest of Selma, OR) - 68,241 acres, 28% contained.
  - WA: Cougar Creek Fire (12 Miles NW of Andevier) - 37,775 acres, 35% contained.
  - OR: Watson Creek Fire (Paisley Ranger District of the Fremont-Winema Natl. Forest) - 17,000 acres, 10% contained.
- Wildfire News Updates:** A section for news articles related to wildfires, including "Wildfire smoke blots out mountains, skylines across US West" and "Fireproof homes could be the answer to massive wildfires across the West".
- Evacuations:** A section for evacuation orders, including "California's largest prompting order" and "Update: Eyes been lifted".
- Map:** A map of the Western US showing the locations of active wildfires and evacuation zones. A callout box for "Glenn County, CA: New evacuations ordered for Mendocino Complex fire (Update)" is visible.
- Incweb Updates:** A section for incident web updates, including "Coal Ridge Fire (Wildfire)", "Donnell Fire (Wildfire)", "Mill Creek 1 (Wildfire)", and "Mendocino Complex Fire Updates (Incweb, Flickr)".
- Wildfire News Article:** A detailed article titled "Cuyama Valley, CA: Front Fire grows to 1,000 acres, campers asked to evacuate". The article describes the fire's growth and the impact on campers and hunters in the Cuyama Valley. It includes a map of the area and a table of CAP Properties.

CAP Properties	
Status:	Actual
Certainty:	Observed
Severity:	Minor
Msgtype:	Alert
Urgency:	Immediate
Response:	Monitor
Category:	Fire



# EVERY ORGANIZATION FACES MORE THREATS THAN EVER BEFORE



# Situational Awareness is critical in all phases of the threat cycle:

## Blue Sky:

- Situational awareness - 360°, 24/7
- Plan, Prepare, Anticipate
- Monitor
- Enable info sharing
- Partner
- Exercise

## Gray sky! – identified threat

- Enhanced monitoring
- Alternatives development
- Enhanced situational awareness
- Partner sharing/planning
- Contingencies

## We're going to recover:

- Prioritize
- Communicate
- Lessons learned acted upon
- Partner debriefs

## Emergency/disaster (Black Sky):






- Real time Situational Awareness
- Work your plan
- Adjust and reconfigure
- React to unanticipated elements
- Monitor cascading failures
- Work partner synergies
- Mobilize surge resources





# HARVEY, CORPUS CHRISTI

## NHC, NWS data with open source feeds, alerts and images

Corpus Christi, TX     Help |  tx360@swanisland.net

### Breaking News

- Port of Corpus Christi closed after drilling ship breaks from dock, sinks tugboat**  
The Port of Corpus Christi has been indefinitely shut down after an oil drilling ship broke from i...  
47 minutes ago • Mon Aug 28 2017 11:21:00 AM • publi...
- Gov. Abbott tours damage in Corpus Christi**  
Ripped sails of boats whip in the wind, damaged by Hurricane Harvey, Saturday, Aug. 26, 2017, i...  
58 minutes ago • Mon Aug 28 2017 11:10:00 AM • publi...

### Local News Outlets

- Celebs send their thoughts to Houston**  
As Hurricane Harvey continues to devastate the Houston area, Beyonce, Ellen DeGeneres, Drak...  
1 minute ago • Mon Aug 28 2017 12:07:15 PM • publi...
- Harvey 2017 Live Coverage: Gov. Greg Abbott speaks in Corpus Christi about Harvey's devastation**  
Follow live coverage of Hurricane Harvey as the Texas Gulf coast recovers from high winds, he...  
3 minutes ago • Mon Aug 28 2017 12:04:49 PM • publish...
- 'Cajun Navy' headed to Houston to offer Harvey help, report says**

### Evacuations & FEMA

- The Latest: White Oak Bayou residents face ponder evacuation: CORPUS CHRISTI, Texas (AP) -- The...**  
<https://goo.gl/fb/Ng55kc>  
@NewsSyndicator  
yesterday • Sun Aug 27 2017 12:55:24 AM • published by
- RT @CorpusChristiPD: There are no checkpoints or restrictions on residents returning to Corpus Christi after the voluntary evacuation. #H...**  
yesterday • Sat Aug 26 2017 9:37:08 PM • published by t
- Hurricane Harvey -- Evacuation Corpus**

### Video & Photo

- National Strike Force response after Hurricane Harvey**  
25 minutes ago • Mon Aug 28 2017 11:43:39 AM • publi...
- National Strike Force response after Hurricane Harvey**  
25 minutes ago • Mon Aug 28 2017 11:43:38 AM • publi...
- National Strike Force response after Hurricane Harvey**  
25 minutes ago • Mon Aug 28 2017 11:43:37 AM • publi...
- Segovia-Iglesia del Corpus Christi-31**

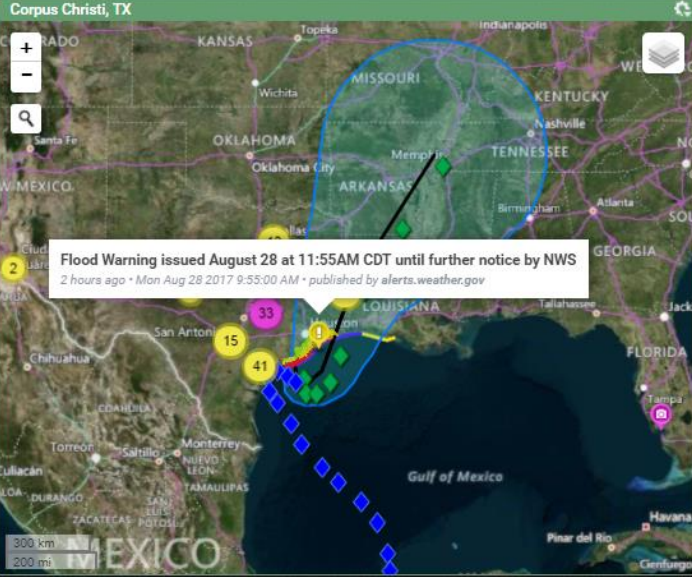
### Power & Utilities

- I want to play comp but worried that hurricane harvey will/power outage etc. #pray4me**  
22 minutes ago • Mon Aug 28 2017 11:45:48 AM • publi...
- @energyinsights #Harvey**  
<https://twitter.com/CNPalerts/status/902227320794218500>  
1 hour ago • Mon Aug 28 2017 10:53:30 AM • published
- @savagepotato101 Our crews will keep working. This is an unprecedented situation but we are committed to working through it. #Harvey**

### Twitter & Reddit

- [Video] - Inside the post-Harvey recovery in Corpus Christi (/r/FOXauto)**  
24 minutes ago • Mon Aug 28 2017 11:44:26 AM • publi...
- @NBCNews: PHOTOS: U.S. Coast Guard members assess damage done by Harvey in Corpus Christi <https://t.co/gOyDplh4Mo> (/r/newsbotbot)**  
1 hour ago • Mon Aug 28 2017 10:44:37 AM • published
- RT @Caller\_Jules: Business 35 in #Rockport in Aransas County post-#Harvey #stwxw**  
[http://nbs.twimg.com/ext\\_tw\\_video\\_thu](http://nbs.twimg.com/ext_tw_video_thu)

### Corpus Christi, TX




Flood Warning issued August 28 at 11:55AM CDT until further notice by NWS  
2 hours ago • Mon Aug 28 2017 9:55:00 AM • published by alerts.weather.gov

### Emergency Services & Government Alerts

- RT @TxDOT\_CRP: Surge wall, ferry access limited to Harvey recovery crews. Public enters Port Aransas on SH 361 NB from Corpus Christi til f...**  
1 hour ago • Mon Aug 28 2017 10:49:31 AM • published l
- @WillKeener1070 Thank you. JC Elliott is free for all Corpus Christi residents. I'm wondering if those drivers may...**  
<https://twitter.com/i/web/status/902224115855224833>  
1 hour ago • Mon Aug 28 2017 10:39:26 AM • published l
- @WillKeener1070 Would it be possible**

### Corpus Christi Evacuation Zones



Stephanie Bundage  
Senior Counsel  
CenterPoint Energy

*READINESS FOR RESILIENCE*





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# RESILIENT SCHOOLS INITIATIVE

JULY 2019

## What is this initiative?

- This initiative will **provide community and educational continuity** by improving the energy and infrastructure resiliency of strategically placed K-12 facilities throughout the city. These facilities will operate as a **Refuse of Last Resort** during a major storm or other region-wide disruptive event to be used by the community, city officials, law enforcement, medical, fire personnel, and any other first-responding organizations.

## Who will benefit?

- Local community, city officials, law enforcement, medical and fire personnel, **K-12 students** and their **parents**

## Why is this needed?

- Safe haven locations during un-planned events serve to provide shelter as well as help communities organize and recover faster. Additionally and in particular, resilient schools can provide the following;
  - Allows children to get back in the classroom sooner,
  - Gives many children the ability to have daily meals.
  - Provides continuous learning. Each day a school stays closed, delays learning and could affect test scores.
  - Allows parents the opportunity to get back to their jobs sooner which all helps the city recover faster.

## Potential Partners

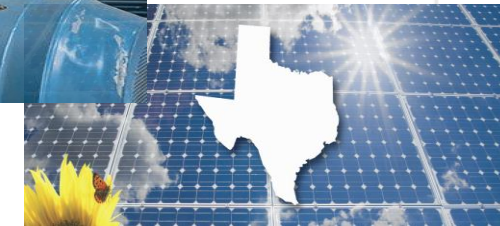
- City of Houston
- CenterPoint Energy Competitive Businesses
- Houston Independent School District
- Harris County
- Various technology vendors
- Others (private industry)

## Estimated Cost and Timeline

- A general estimate of \$2-5 MM per school is needed
- Approximate timeline is 4-7 years

## Collaborative Opportunities

- Incorporation of Smart Cities within Resilient Schools plan
- Use of wide ranging technologies (solar, energy storage, microgrids) enables collaboration with many partners



Cate McNaught  
Emerging Applications Market  
Development Manager,  
Carrier Networks  
Corning Optical Communications

*READINESS FOR RESILIENCE*



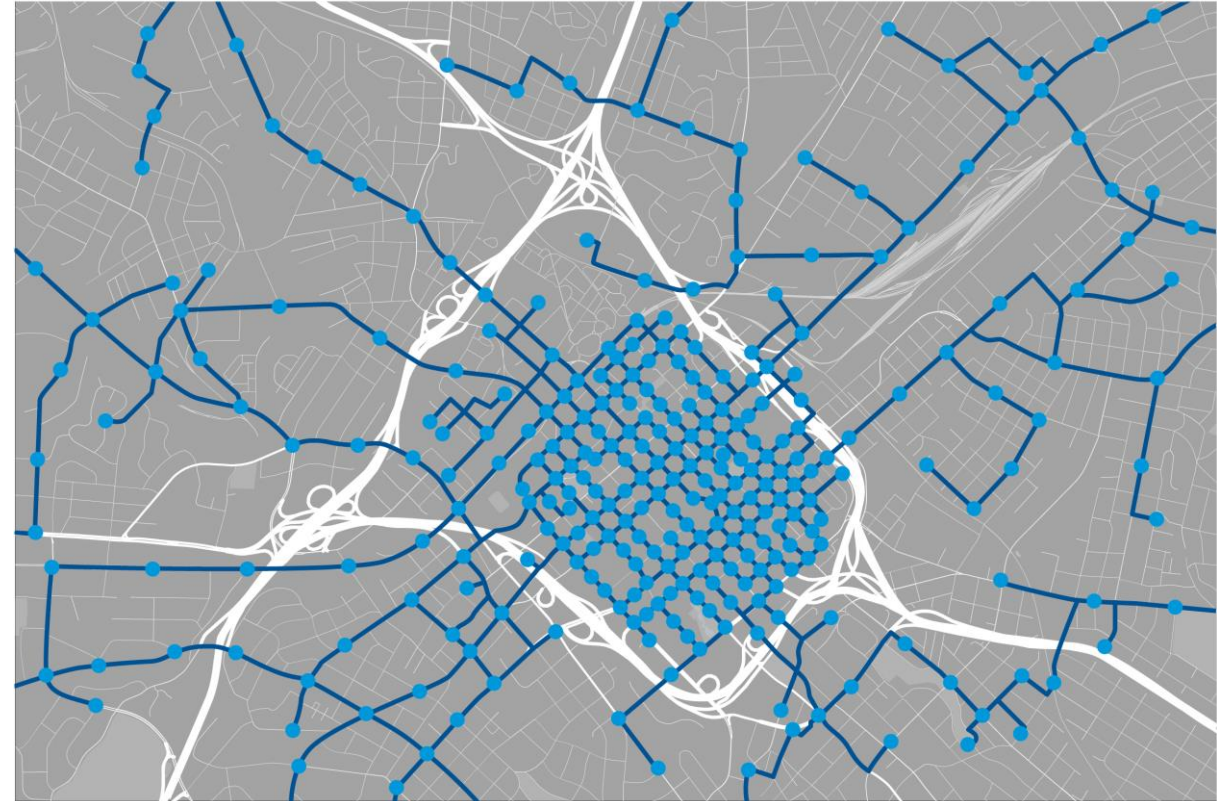
# Optical Fiber Networks - A Smart City Foundation

## Current State



Charlotte, NC: hypothetical views

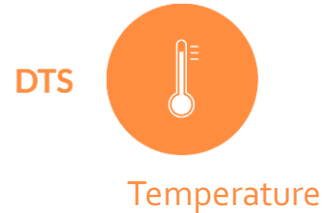
## Future State



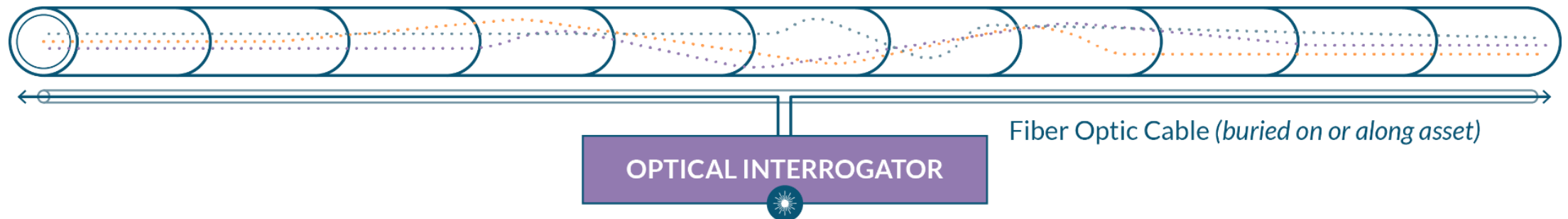
Charlotte, NC: hypothetical views

Fiber network proliferation provides foundation for many applications

# What is Distributed Fiber Optic Sensing?



- Monitoring of fiber optic cables from a single location via pulsed laser light
- 24/7 Continuous Monitoring – over long continuous distances
- 1,000's of sensing points – sub-meter resolution
- Passive sensor: No power along asset
- Monitors temperature, strain and/or vibration
- Multiple applications possible in a single system
- Upgradeable technology - without replacing sensor





# Potential Fiber Optic Sensing Applications in the Smart City

Smart Grid

Road & Infrastructure  
Monitoring

Asset / Utility Monitoring & Protection

Perimeter  
Security

Intelligent Traffic

- Speed monitoring
- Vehicle Identification/accident avoidance
- Autonomous Autos/Trains

Emergency Response

Bryan Bagley  
Project Manager  
Affiliated Engineers, Inc.

*READINESS FOR RESILIENCE*



# Hurricane Ike: September 13, 2008

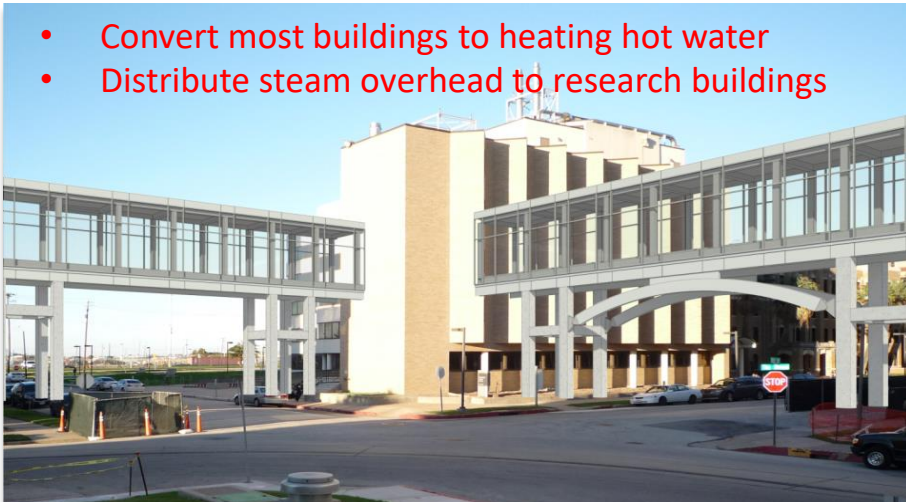


ISS017E015752



# A Three Step Solution

- Convert most buildings to heating hot water
- Distribute steam overhead to research buildings



- New elevated East Plant

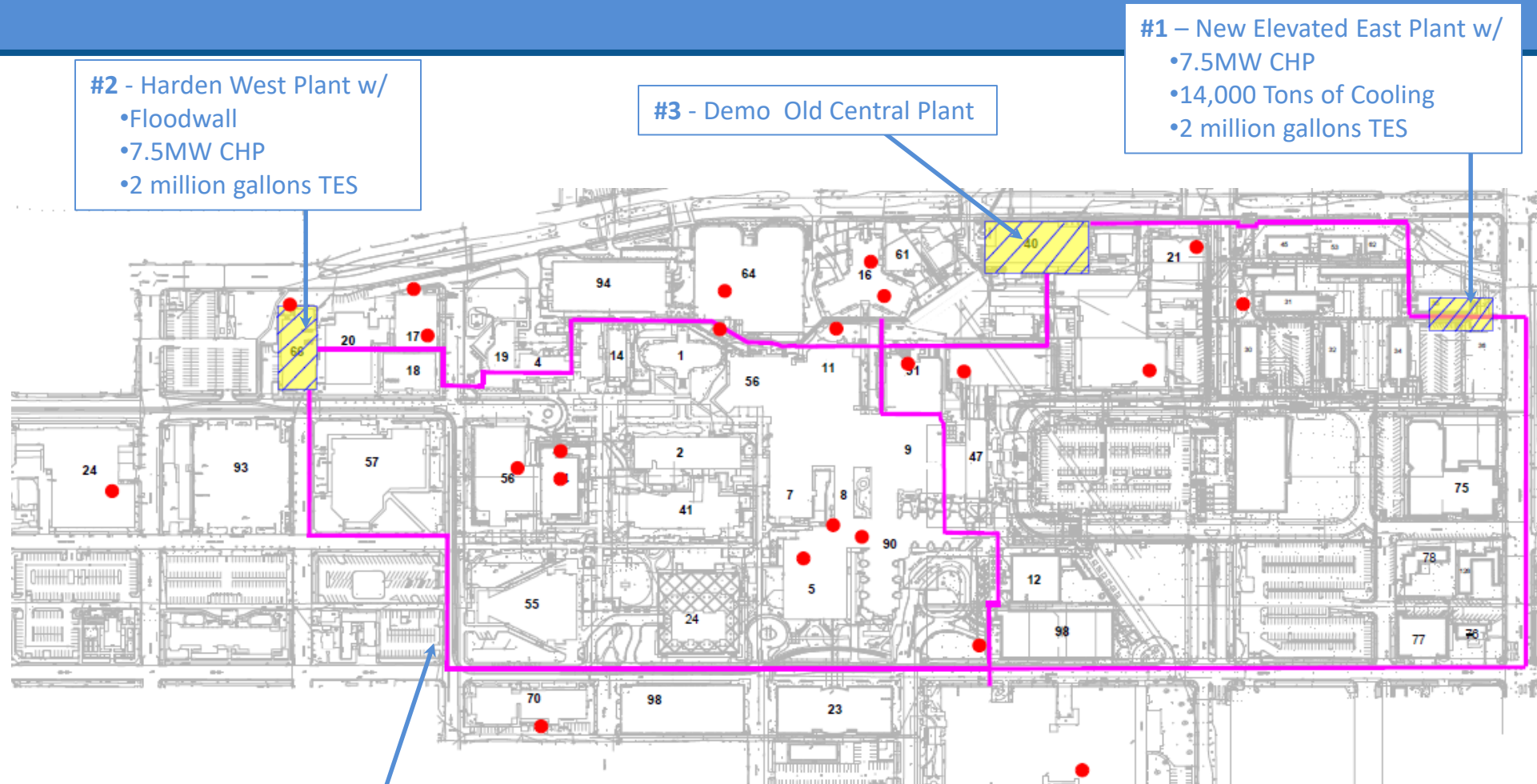


- New floodwall protects West Plant



- 15 mW of on-site CHP

# Mitigation Plan



#2 - Harden West Plant w/  
•Floodwall  
•7.5MW CHP  
•2 million gallons TES

#3 - Demo Old Central Plant

#1 – New Elevated East Plant w/  
•7.5MW CHP  
•14,000 Tons of Cooling  
•2 million gallons TES

Hot Water Distribution System

**Legend**

- Thermal Distribution Main Loop
- Emergency Generators
- ▨ Plants

# Introducing the Smart Cities **Activator**

Readiness for Resiliency Workshop – Houston  
July 9, 2019

Philip Bane, CEO  
[Philip.Bane@smartcitiescouncil.com](mailto:Philip.Bane@smartcitiescouncil.com)

Smart**Cities**Council  
LIVABILITY | WORKABILITY | SUSTAINABILITY



# Agenda

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The need for Smart Cities Activator

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How Activator helps government

---

How to get involved

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Our cities face massive challenges...

Congestion

Crime

Equity

Food

Pollution

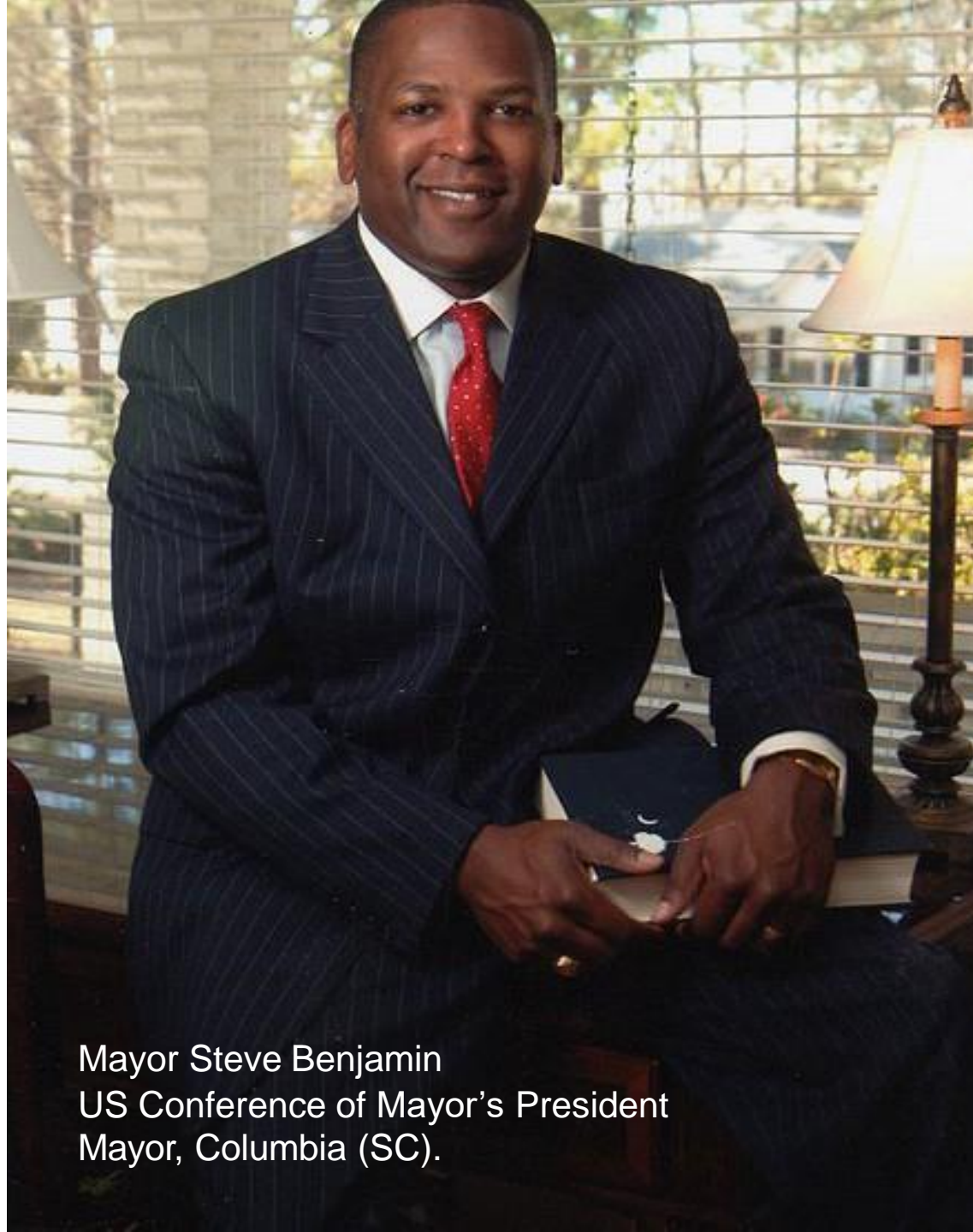
Poverty

Energy

Water

... including **paying for it all**





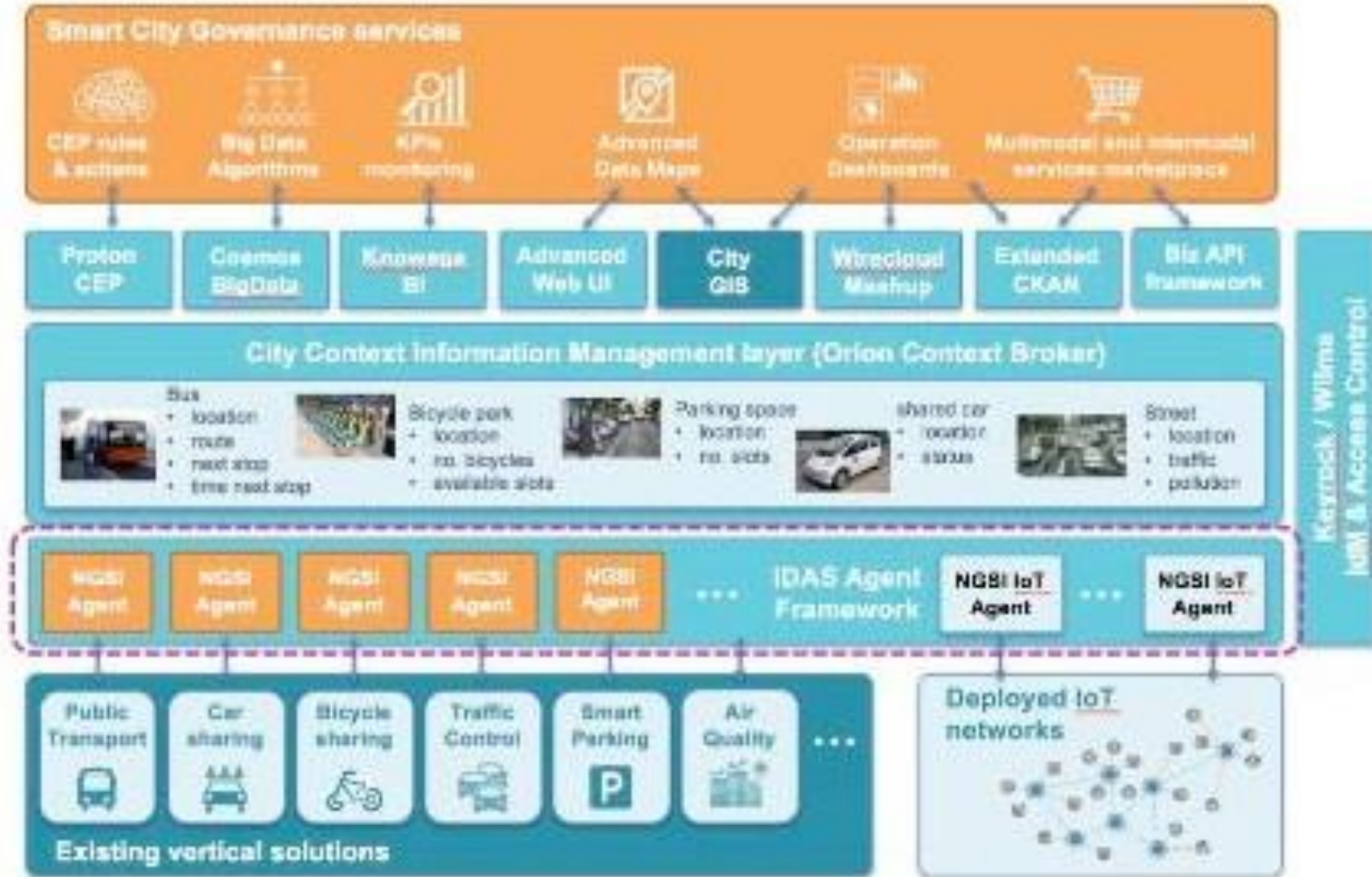
Mayor Steve Benjamin  
US Conference of Mayor's President  
Mayor, Columbia (SC).

*“No fully developed smart city exists anywhere in the country and there are no clear standards or financing strategies for their formation.”*

*US Conference of Mayor's  
Institute on Smart Cities*

# FIWARE Reference Architecture

But smart city projects are enormously complex

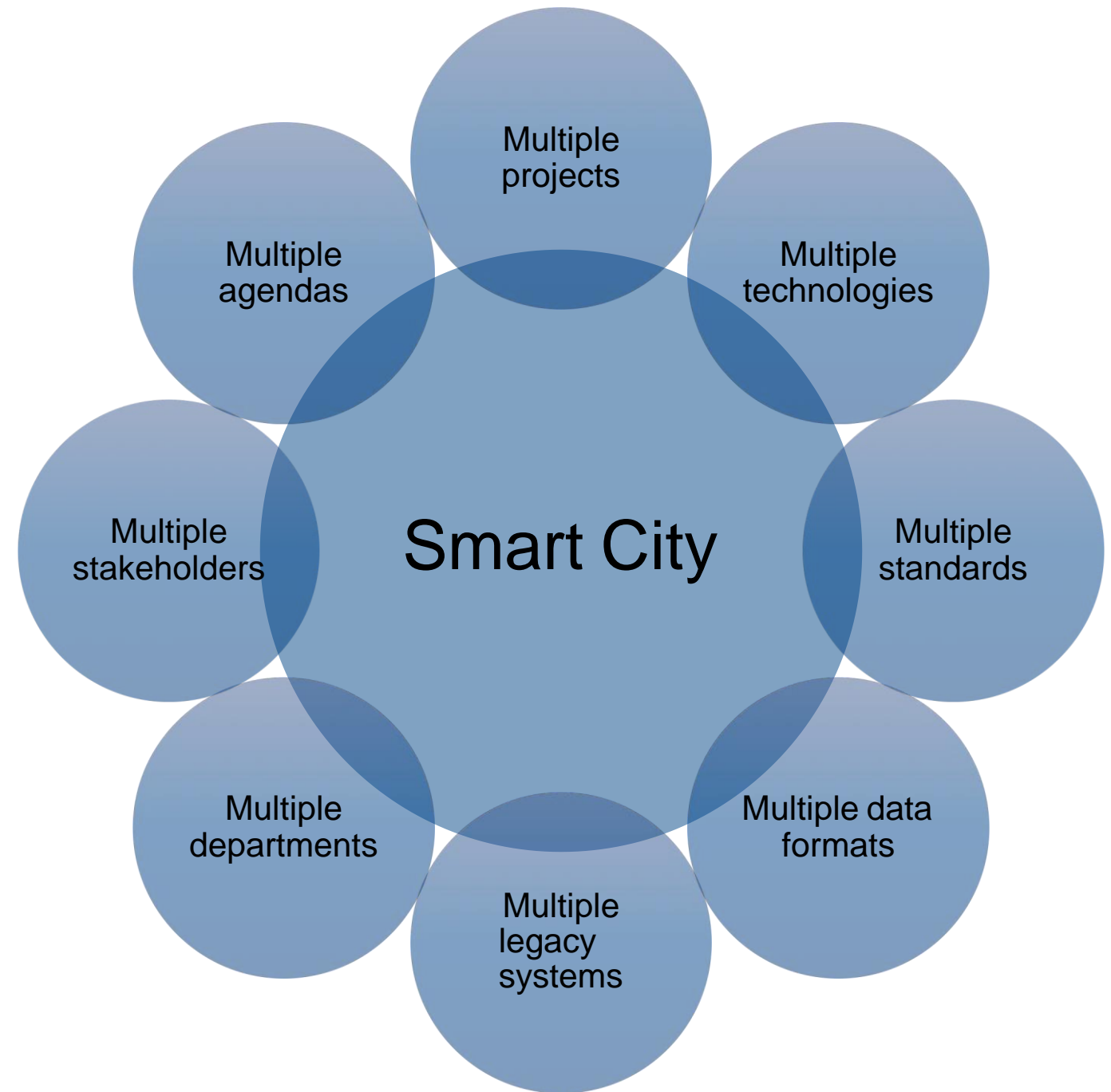




**Technically** complex

**Legally** complex

**Socially** complex



Where does  
government  
find...

## **The skills...**

- ...to scope massive technology projects?

## **The access...**

- ...to best practices and best standards?

## **The advice...**

- ...from cities that have gone before?

## **The tools...**

- ...to plan collaboratively with stakeholders?

## **The money...**

- ...to pay for the upfront costs?

# Agenda

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The need for Smart Cities Activator

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**How Activator helps government**

---

How to get involved

---

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Activator addresses  
government needs



## Activator Discover

- Powerful input tools to capture the needed data
- Instant access to best practices

## Activator Plan

- Collaborative tools for multi-stakeholder planning
- Templates from leading experts

## Activator Exchange

- Trade lessons learned with peer cities

## Activator Finance (coming soon)

- Rocket Mortgage for cities – fill in one form, get introductions to multiple lenders



# Activator Discover

Build your own forms or  
use those from experts

## Gather data

- From departments, contractors, stakeholders
- Input forms can use structured data to allow powerful analytics and dashboards

The screenshot displays the 'Stakeholder Engagement' form in the Activator Discover application. The form is titled 'Stakeholder Engagement Questions' and is currently on 'Step 2 of 2'. It contains four questions, each with a text input field and a point value:

- Question 1:** 'List the utilities you will invite to a Smart Cities Readiness Workshop (electricity, water, gas). [2 Points]'. The input field contains 'Southern California Edison, Palmdale Water District, LA Water Works, So Cal Gas, Waste Management, Sewer, Recycled Water Authority'. A dropdown menu is open above the field, showing 'City-utility partnerships are essential. [Show More]'.
- Question 2:** 'List the organizations representing residents or neighborhoods you will invite. [1 Points]'. The input field contains 'AVAQMD, Neighborhood Watch, Palmdale School Districts, HOAs, Partners Academy, NAACP, Chambers of Commerce,'.
- Question 3:** 'List the organizations representing workers you will invite. [1 Points]'. The input field contains 'Chambers of Commerce, Trade Unions, BIA'.
- Question 4:** 'List the organizations representing tourism you will invite. [1 Points]'. The input field contains 'Board of Trade, (Curtis)'.

On the right side of the interface is a 'Dashboard' sidebar with two main sections: 'Sections' and 'Dashboard'. The 'Sections' section lists 'Welcome, Instructions and Help', 'Information and Communications Technology (ICT)', and 'Governance'. The 'Dashboard' section shows 'Stakeholder Engagement' with a progress bar and a summary: 'Questions completed: 12 of 17' and 'Potential points earned: 13'. Below this, there are links for 'Project Priorities' and 'Smart City Plans and Progress'.

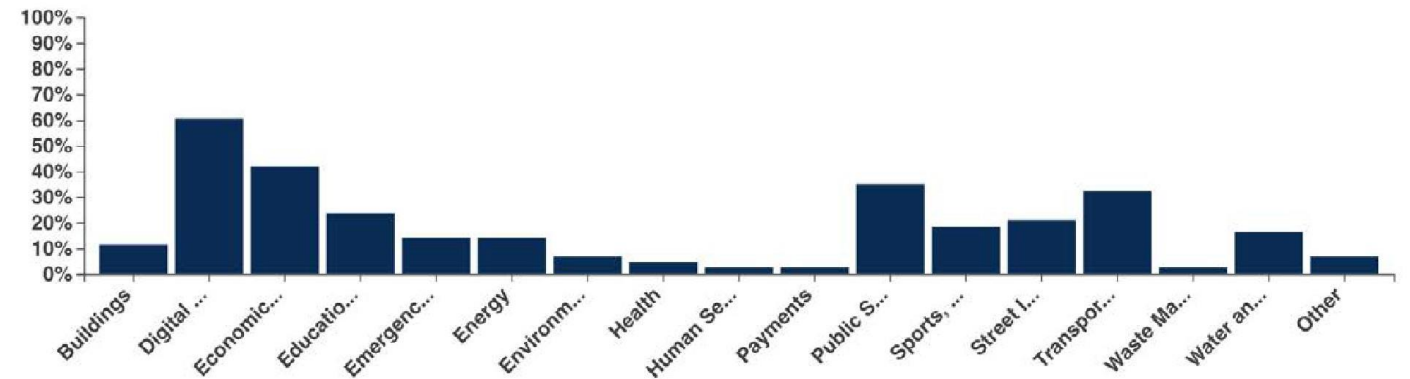
# Activator Discover

Build your own  
dashboards or use  
those from experts

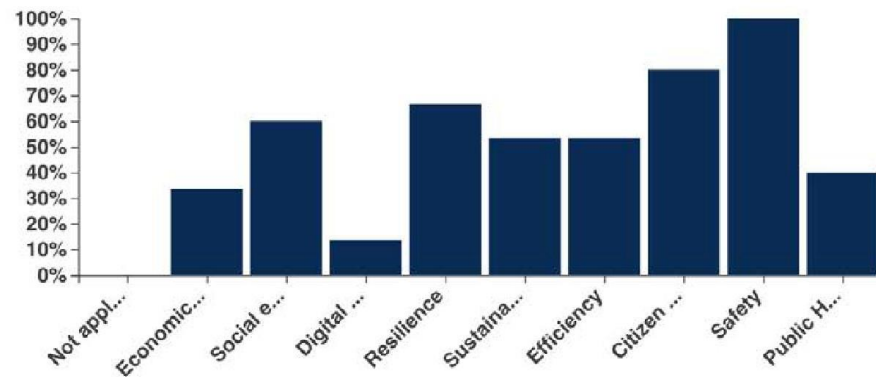
## Dashboards monitor progress

- Track progress, spot trends, uncover issues across one or many projects

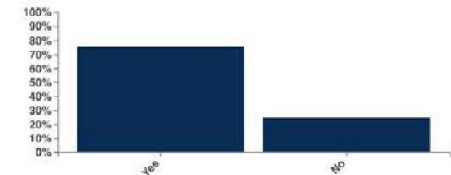
Entities Top Priority Areas



Aspects of long-term vision for Public Safety



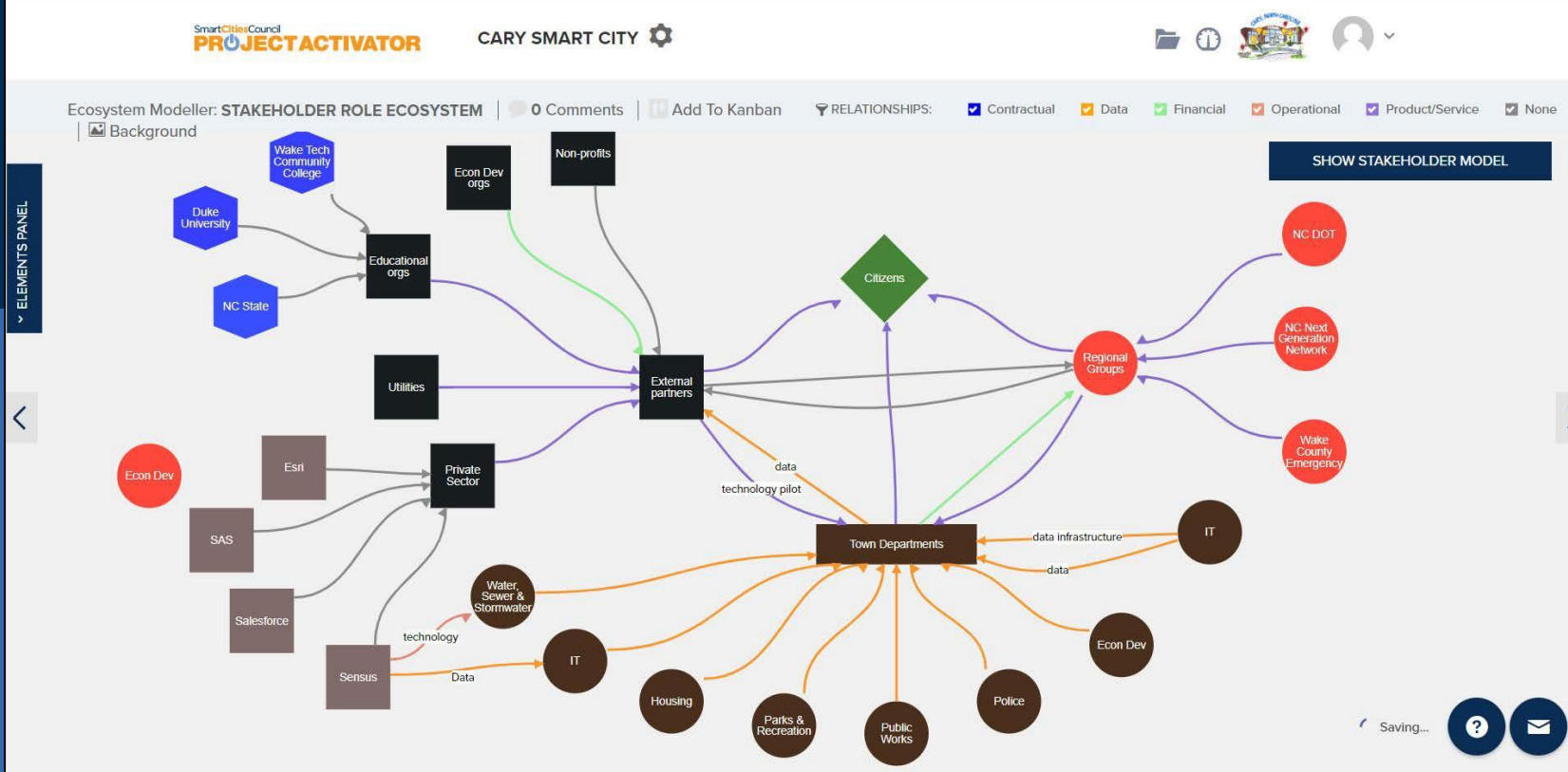
Entities that have smart city projects underway but not yet complete



# Activator Discover

## Map your ecosystem

- Projects involve multiple stakeholders: city departments, business, utilities, universities, contractors, lenders, neighborhoods, etc.
- Activator maps this ecosystem and its inter-relationships



# Activator Plan

Build your own  
templates or use  
those from experts

## Use proven project templates

- Embed and enforce best practices, procedures, approvals, standards
- Link knowledge resources to any step for just-in-time learning
- Work simultaneously with others
- Centralized, standardized, replicable, scalable

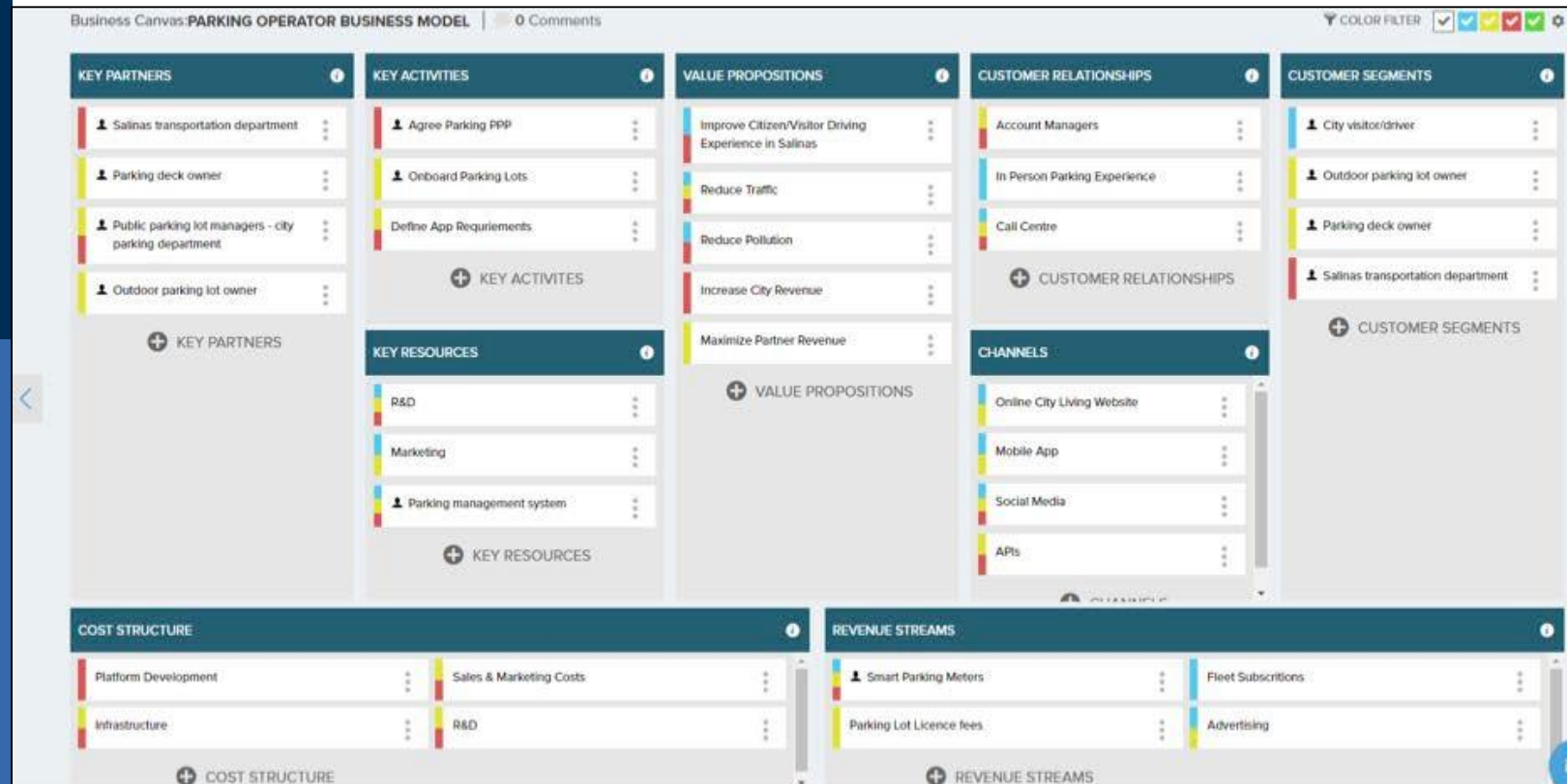




# Activator Plan

## Two dozen planning modules

- Business canvas, SWOT, problem statements, use case diagrams, user/customer journey, product/service offerings, etc.
- Apply proven private-sector techniques to public-sector planning





# Activator Exchange

August, 2019

## Learn from and network with other cities

- **Post** summary data about your own projects
- **Find** cities working on similar initiatives
- **Access knowledge resources** such as guides, RFPs, contract language, joint buying opportunities, standards, references, procedures, processes, reference architectures, policies, etc.
- **Access the Readiness Network** – a global community of smart city practitioners



Activator is  
already in use

## 2018 Readiness Challenge

- Online applications were Activator data intake forms
- Entrants get free use of Activator for the next year
- 200+ smart city projects entered to date

## Innovative Governance Program

- **Virginia** (62 agencies, 139 cities/counties, >50 universities and boards)
- Process is to discover, engage and then plan all activity in Activator with goal for collaborative planning across multiple stakeholders (cities, counties, utilities, executive agencies, universities, others.)
- Repeat with economic development, transportation, public safety (a replicable process)



# 2019 Users of Private Sector version of Activator





# Getting started

## **Start** – First Year with Council's Readiness Program – Innovative Governance using Resilience as the focus:

- Discover how local government are managing resilience (who, what, why)
  - Engage all stakeholders
  - Plan and prioritize use cases
  - Learn what is needed to manager resilience collaboratively (webinars/workshops)
  - Learn lessons for next program
  - Replicate process
- ***Alternatively/Together*** – Smart Cities Pilots - replicate state wide pilots and publish planning templates for all Texas cities and counties to use

# Introducing the Smart Cities **Activator**

Readiness for Resiliency Workshop – Houston  
July 9, 2019

Philip Bane, CEO  
[Philip.Bane@smartcitiescouncil.com](mailto:Philip.Bane@smartcitiescouncil.com)

Smart**Cities**Council  
LIVABILITY | WORKABILITY | SUSTAINABILITY

# Resilience Rebuilding Funding Options

*Campbell Delahoyde, Program Manager, National Association of State Energy Officials*

*Shawn Strange, PMP, Disaster Recovery Specialist, Texas General Land Office*

*Mitchell Osburn, Mitigation Branch Director, Federal Emergency Management Agency, TRO*

*Matt Hochstein, Vice President of Client Services, Hagerty Consulting*

**READINESS FOR RESILIENCE**



# RESILIENCY FUNDING OPPORTUNITIES

CAMPBELL DELAHOYDE



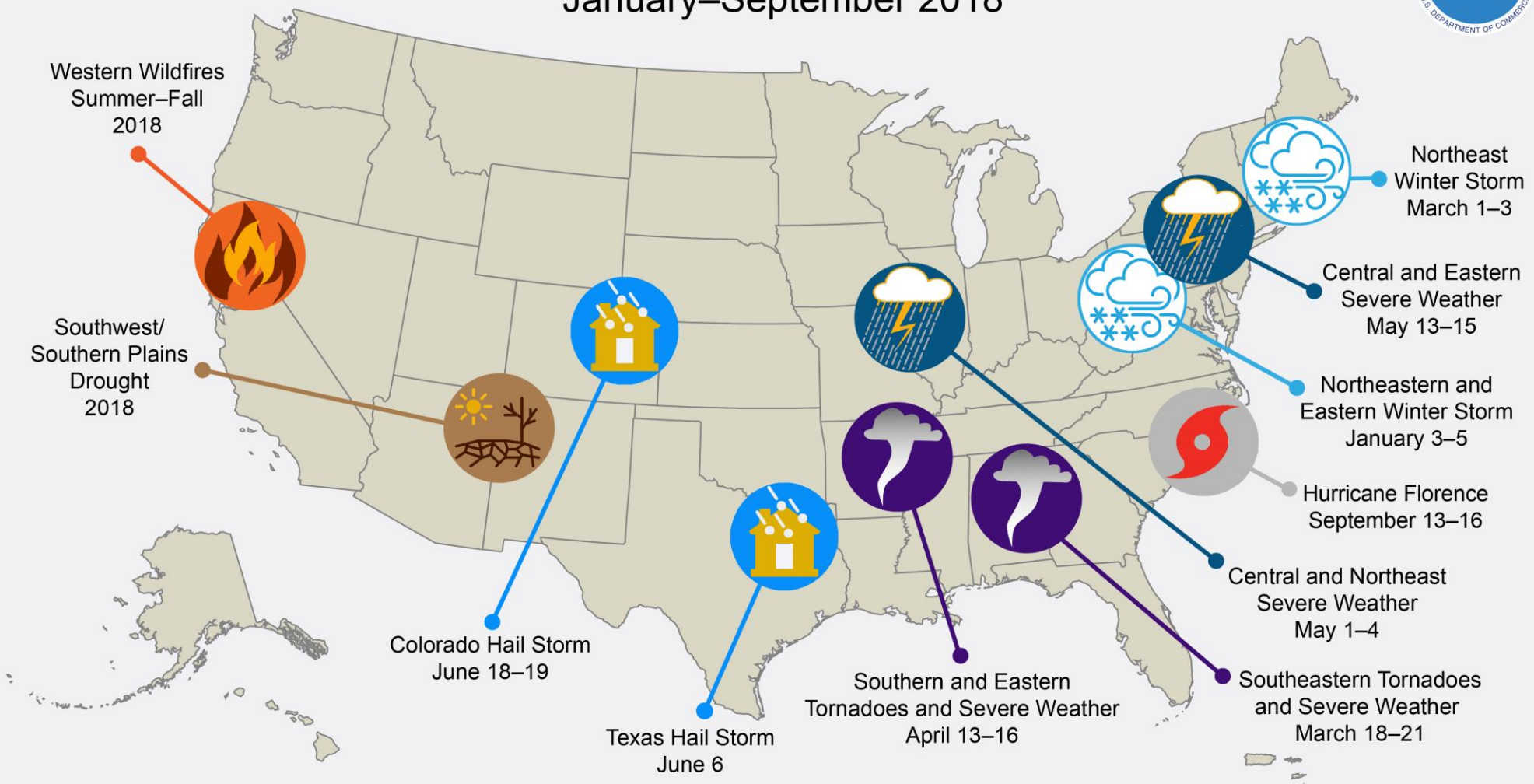
# ABOUT NASEO AND STATE ENERGY DIRECTORS

- NASEO is the only national organization whose membership includes the governor-designated energy directors and their offices – *over 3,500 state energy professionals* – from each of the 56 states, territories, and District of Columbia
- NASEO engages with federal energy policy and regulatory officials and private sector energy organizations on behalf of the states. NASEO's structure includes six regions and various topical energy committees
- State Energy Directors and their offices have broad policy and program responsibility over all energy sectors, with over **80 percent** having direct access to the governor and/or relevant cabinet secretary
- State Energy Directors advise and support their governors and state legislators with **50 percent** of the State Energy Directors serving as the governor's energy advisor, and others function in an expert supporting role
- NASEO addresses resilience through energy initiatives, and partners with the federal government through the U.S. Department of Energy (DOE), FEMA, the U.S. Department of Homeland Security, the U.S. Environmental Agency (EPA), among others, to promote resilience through:
  - **Energy security for critical infrastructure, facilities, and homes**
  - **System-wide energy efficiency**

WHY RESILIENCE?

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# U.S. 2018 Billion-Dollar Weather and Climate Disasters January–September 2018



*This map denotes the approximate location for each of the 11 separate billion-dollar weather and climate disasters that impacted the United States from January–September 2018.*

**Source:** National Oceanic and Atmospheric Administration's National Centers for Environmental Information. U.S. Billion-Dollar Weather and Climate Disasters: Overview. <https://www.ncdc.noaa.gov/billions/>. Accessed on October 12, 2018.



**Prevent or minimize future damage and costs of disasters**



**Significant financial benefits from resilience investments**



**Combine local priorities with energy considerations**



**Complex and expansive energy networks touch all aspects of our lives, are often overlooked**



**Enable quicker, more efficient, and less complicated responses during emergencies**

**WHY INVEST IN RESILIENCE?**



# HURRICANE HARVEY DISASTER RECOVERY FUNDING AND FINANCE INVENTORY



# FUNDING AND FINANCE INVENTORY: FEDERAL SOURCES

- **Low Interest Disaster Loan Program—Small Business Administration (SBA)**
  - **Target Applicants:** Homeowners and renters in declared disaster areas
  - **Key Program Features:**
    - Loans cover losses not fully covered by insurance or other means. Up to \$200k to repair or replace property to pre-disaster condition or up to building code.
    - Loan increases may be available to make improvements that protect the property from future disasters (retaining walls, seawalls, sump pumps, safe rooms, storm shelters, elevation and relocation of utilities).
    - Local governments may wish to examine and update building codes to ensure rebuilt homes are built to be resilient and/or energy-efficient to the extent possible.
    - Eligible recipients may also request complementary mitigation loans; granted in addition to the approved disaster loan up to 20%/\$2 million of the property

# FUNDING AND FINANCE INVENTORY: FEDERAL SOURCES (CONTINUED)

- ***Economic Adjustment Assistance (EAA) Disaster Recovery Program—Economic Development Administration, U.S. Department of Commerce***
  - **Target Applicants:** District Organization of an EDA-designated Economic Development District; Indian Tribe or a consortium; State, county, city, or other political subdivision of a State; institution of higher education or consortium; or public or private non-profit organization or association acting in cooperation with officials of a political subdivision of a State
  - **Key Program Features:**
    - Supports financial resilience and economic recovery, strategic planning, and public works construction. Funds may be used for basic emergency home repairs to enable sheltering-in-place.
    - Eligible emergency work may include utilities essential for water, hot water, HVAC, and food preparation, as well as securing and weatherproofing properties.
    - EEA funds are flexible, and can be applied toward both strategic planning and public works/infrastructure
    - Projects and efforts can be hazard-agnostic, long as efforts address direct consequences of relevant disaster

# FUNDING AND FINANCE INVENTORY: FEDERAL SOURCES

- **Community Development Block Grant-Disaster Recovery (CDBG-DR)--U.S. Department of Housing and Urban Development (HUD)**
  - **Target Applicants:** Eligible States, cities, and counties: state agencies, non-profits, economic development agencies, and businesses.
  - Funds are based on unmet recovery needs. **Key Program Features:**
    - CDBG-DR funding can supplement recovery assistance programs administered by FEMA, SBA, and USACE. MUST include local citizen participation. Grantee's Action Plan must be posted for public comment.
    - CDBG-DR funds may be used to improve structures beyond their original condition, including funds to improve longevity or lower operating costs using green building techniques, including Energy Star-Certified Housing Units.
    - Can support resiliency for energy infrastructure through public-private partnerships with demonstrable benefits



# FUNDING AND FINANCE INVENTORY: FEDERAL/STATE SOURCES

- ***Partial Repair and Essential Power for Sheltering (PREPS)—Texas General Land Office, FEMA***
  - **Target Applicants:** Homes that sustained less than \$17,000 in FEMA verified loss. FEMA determines an applicant's eligibility for the PREPS program.
  - **Key Program Features:**
    - Supplements emergency sheltering when communities are faced with needs that significantly exceed existing capacity. Provides immediate, temporary repairs. As a Hurricane Harvey Public Assistance program, FEMA pays for 90 percent of the expenses, and the GLO will use up to \$75,000,000 of the CDBG-DR Harvey allocation to cover repairs performed on homes.
    - \$20,000 cap, +25% for Access and Functional Needs
    - Funds may be used for basic, emergency home repairs to enable sheltering-in-place.
      - Eligible emergency work may include utilities essential for backup power, water, hot water, HVAC, and food preparation, as well as securing and weatherproofing properties.
    - State will identify and pay contractors, ensure compliance with all local, state, and federal codes

# DEEP DIVE: DISASTER RECOVERY REFORM ACT OF 2018 (DRRA)

- ***Pre-Disaster Hazard Mitigation Grant Program/ Building Resilient Infrastructure and Communities (BRIC) Program—FEMA***
  - **Target Applicants:** States, Territories, federally-recognized tribes and local communities
  - **Key Program Features:**
    - Planning and project grants support implementation of a sustained pre-disaster natural hazard mitigation program and public awareness-raising efforts. Local communities may sponsor applications on behalf of homeowners, businesses, and nonprofits and then submit the applications to their State Emergency Management Agency.
    - Funds can support mitigation, resilient infrastructure projects, planning, and program management costs. The "Resilient Infrastructure Competitive Funding" project type provides the opportunity to advance capital projects on a community level, ready for investment that will reduce risks, prevent loss of life and leads to significant savings by reducing damage from future disasters and lowering flood insurance premiums.
    - 6% set-aside from the Disaster Relief Fund

# NASEO & BRIC



Through BRIC, FEMA seeks “to invest in projects that drive risk reduction and build capability for communities and is consistent with the three overarching strategic goals in FEMA's 2018-2022 Strategic Plan: Build a Culture of Preparedness, Ready the Nation for Catastrophic Disasters, and Reduce the Complexity of FEMA.”



Energy-related pre-disaster hazard mitigation projects (electricity and fuels system resilience, energy dependent critical infrastructure, building codes and enforcement) can and have been proven to reduce community risk and should be considered more for Stafford PDM funds. State Energy Offices can serve as the advocate, conduit, and bridge for energy resilience opportunities and state emergency management agencies and communities

## ENERGY PROJECT AREAS FOR CONSIDERATION



Expanded and explicit inclusion of physical energy system mitigation and protection actions;



Identification of critical facilities and augmentation of their energy assets; and



Adoption, implementation, and enforcement of up-to-date state or locally-mandated disaster-resistant codes and standards for buildings.



# NASEO BRIC ENGAGEMENT STRATEGY



STATE ENERGY  
OFFICES



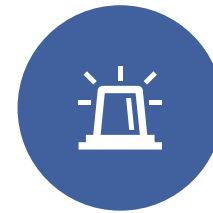
AFFILIATES & PARTNERS



U.S. DEPARTMENT OF  
ENERGY



FEMA



STATE AND LOCAL  
EMERGENCY  
MANAGEMENT  
AGENCIES



COMMUNITIES &  
CITIZENS

# ADDITIONAL RESILIENCE FUNDING SOURCES

- *Tax Relief through the Internal Revenue Service (IRS)*
- *Texas Property Assessed Clean Energy (TX-PACE)—  
Texas PACE Authority*
- *National Coastal Zone Management and  
Enhancement Program— National Oceanic and  
Atmospheric Administration (NOAA)*
- *Public Transportation Emergency Relief Program—  
Federal Transportation Administration (FTA), U.S.  
Department of Transportation*

THANK YOU!

Questions?

- Campbell Delahoyde ([cdelahoyde@naseo.org](mailto:cdelahoyde@naseo.org))
- Sandy Fazeli ([sfazeli@naseo.org](mailto:sfazeli@naseo.org))





# Community Development Block Grants

## Texas General Land Office **Community Development & Revitalization**

“We work to rebuild communities, to put Texans back in their homes, and to help businesses recover after the trauma of disaster.”

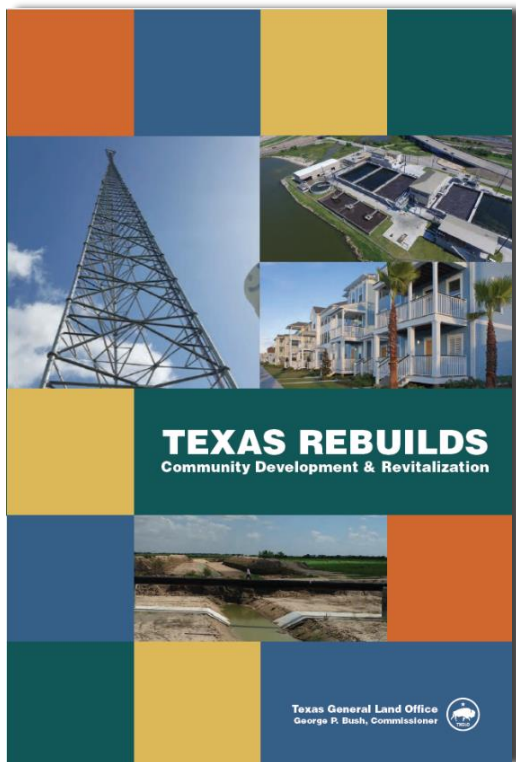
***George P. Bush***

*Texas General Land Office Commissioner*



# Community Development & Revitalization

*Since 2011, GLO-CDR is implementing projects and programs across Texas, utilizing more than **\$13 billion** in HUD CDBG-DR funds.*



## **These funds are helping Texans to recover from:**

- Hurricanes Rita, Ike, Dolly and Harvey;
- 2011 Wildfires; and
- The 2015/2016 Storm and Flood Events

## **CDBG - Mitigations Funds (\$4.3 Billion)**

- HUD Federal Register Notice pending

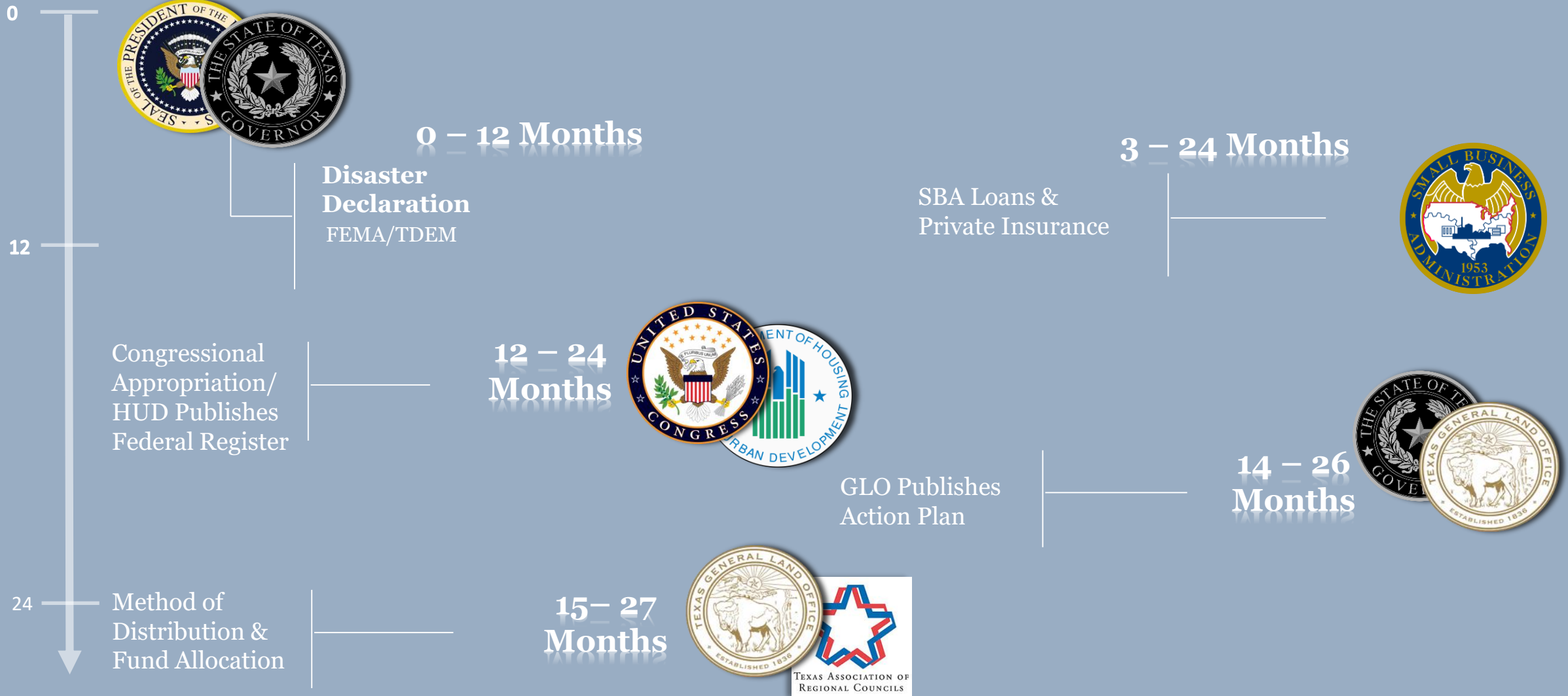
## **2018 CDBG - Disaster Recovery Funds (\$46.4 Million)**

- HUD Federal Register Notice pending





# Funding Timeline





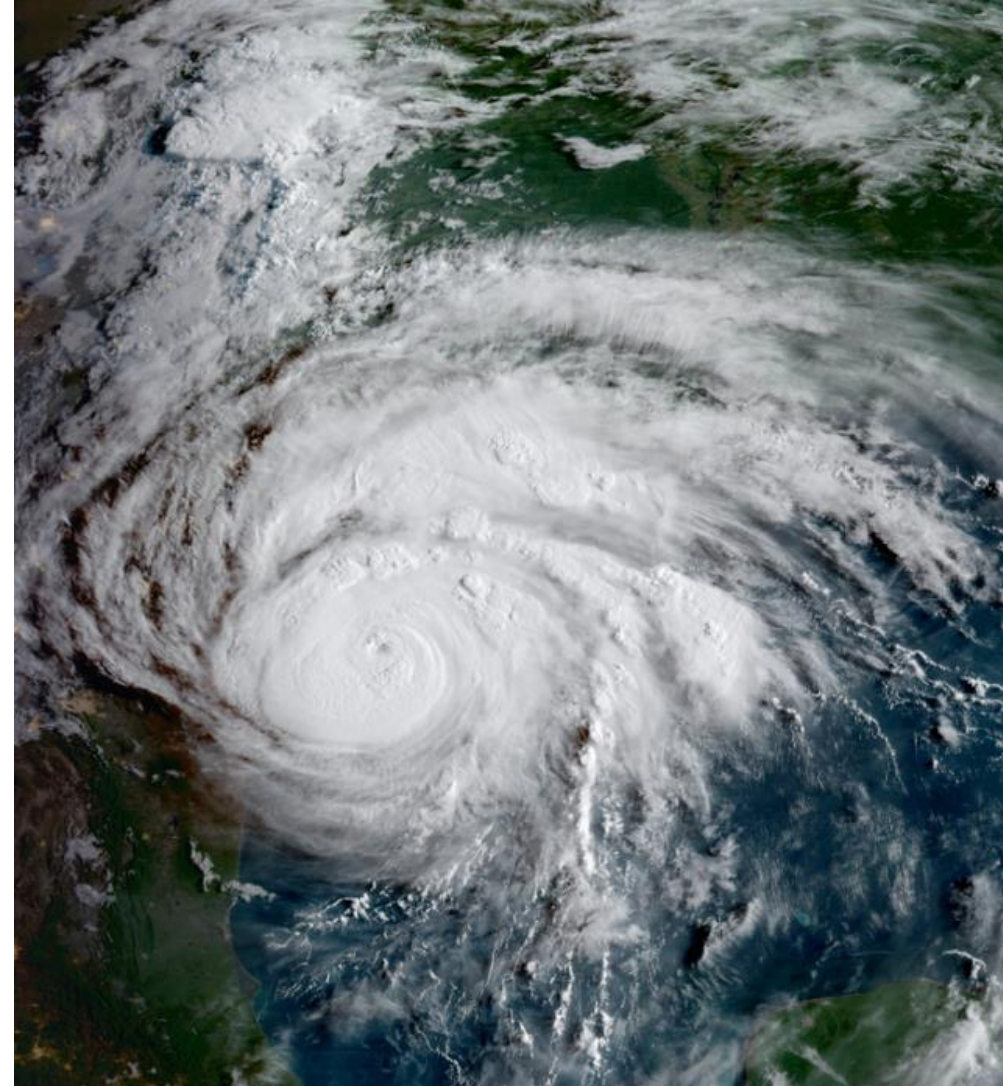
# CDBG-DR Harvey Recovery

## Harris County & City of Houston:

- \$1.23 and \$1.27 Billion

## Program Allocations:

- Homeowner Assistance: \$1.3 B
- Local Buyout/Acquisition: \$275 M
- Homeowner Reimbursement: \$100 M
- Affordable Rental: \$487 M
- Local Infrastructure: \$413 M
- Economic Revitalization: \$100 M
- State Planning: \$137 M

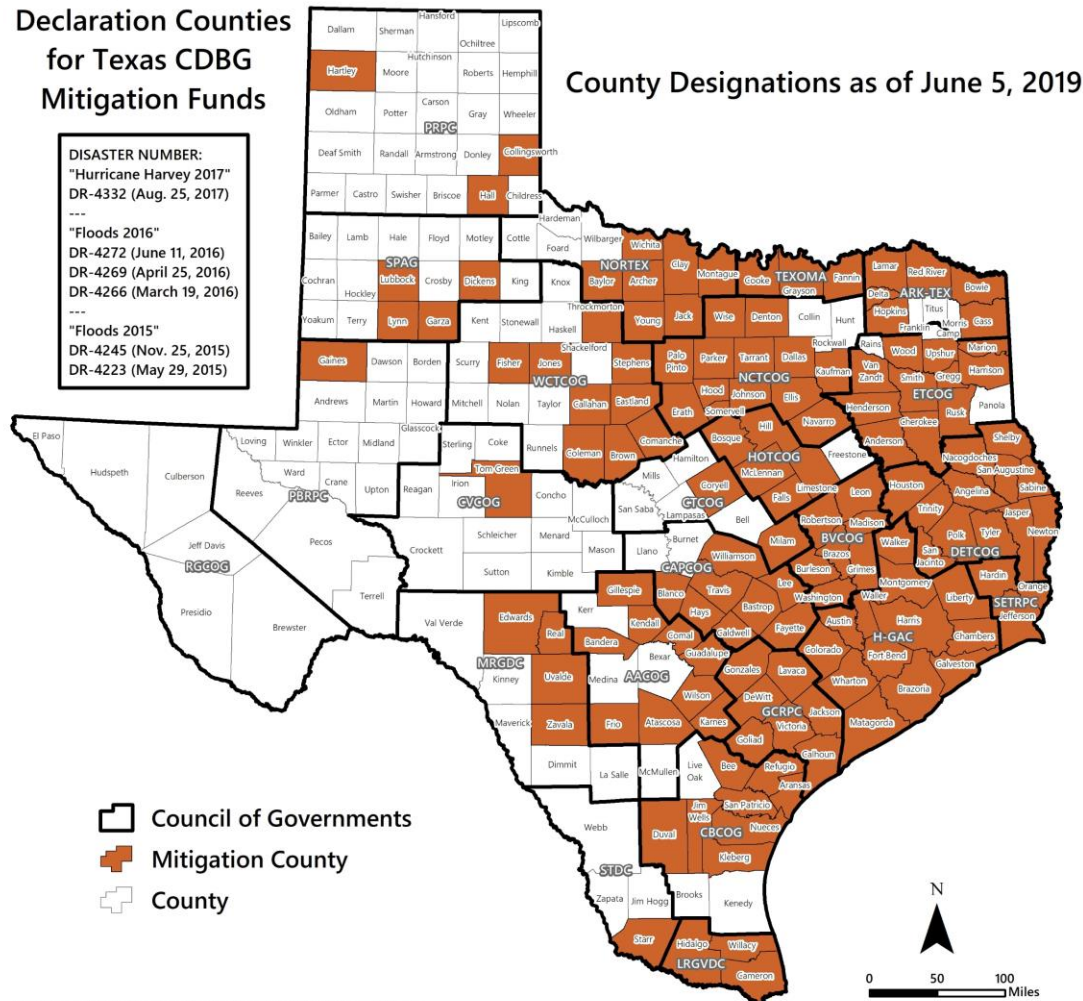




# CDBG-DR Mitigation Funding

- **\$4.3 billion**
  - 2015 Floods, 2016 Floods, and Hurricane Harvey
  - 140 Counties Eligible
- **HUD Federal Register Notice pending**
- **Mitigation Stakeholder Input**

Federal/Presidential  
Declaration Counties  
for Texas CDBG  
Mitigation Funds





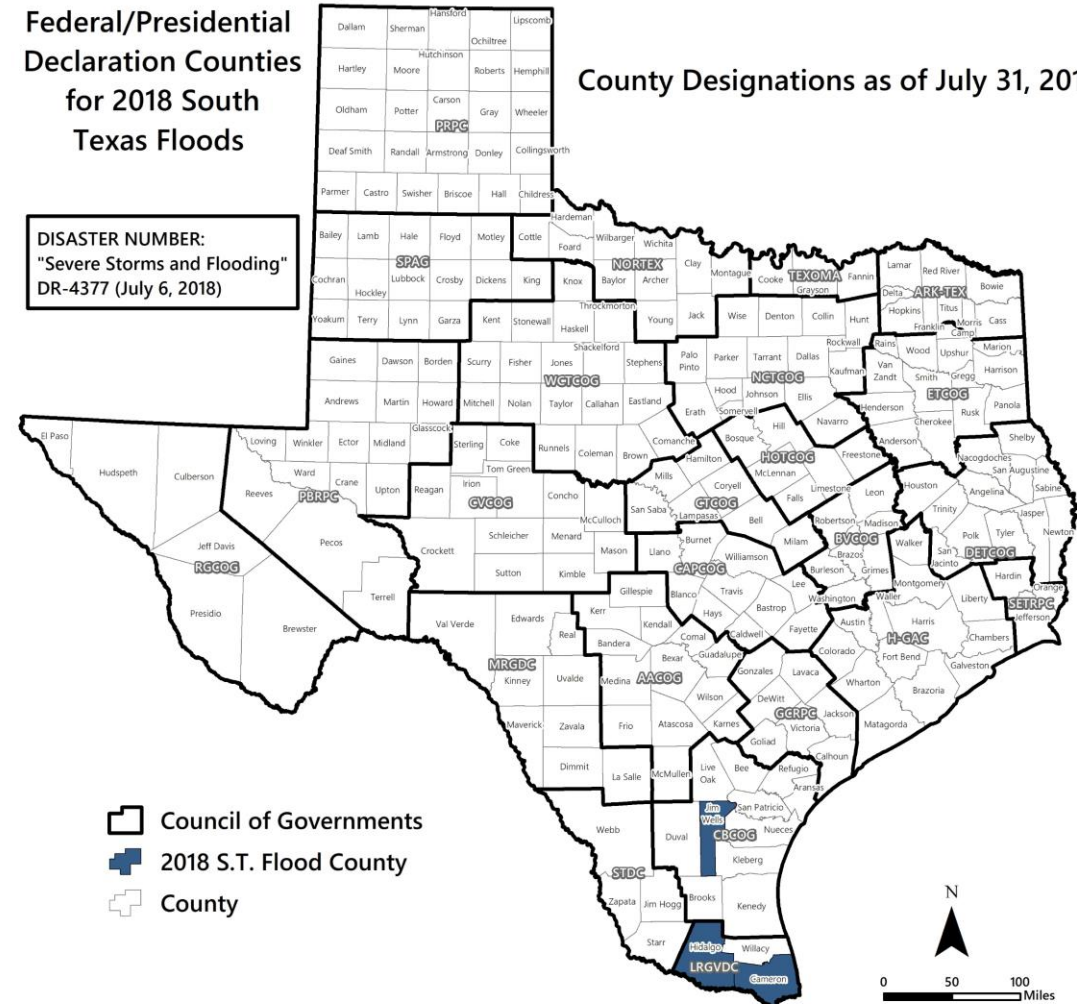


# CDBG-DR 2018 Funding

- **\$46.3 million**
  - Cameron, Hidalgo, Jim Wells Counties
- **HUD Federal Register Notice pending**

Federal/Presidential Declaration Counties for 2018 South Texas Floods

County Designations as of July 31, 2018





# Procurement Guidance

## Must Follow Provisions of:

- 2 CFR § 200.318 – 326

## High Level Details:

- More stringent law or regulation will apply.
- Documented procurement procedures.
- Distinction between methods of procurement.
- Review [recovery.texas.gov](http://recovery.texas.gov) website for Procurement/Contracting Resources







# Procurement Guidance – State Laws

## Must Review Provisions of:

- **Chapter 252:** Construction Bidding Procedures → Municipal
- **Chapter 262:** Construction Bidding Procedures → County
- **Texas Government Code – Chapter 2253:** Public Work Performance and Payment Bonds
- **Uniform Grant Management Standards:** Texas Comptroller of Public Accounts
- **Conflict of Interest:** Texas Government Code Chapter 573 and Local Government Code Chapter 171



\*More stringent law or regulation will apply.



# Survey & Resources

## **Online Survey (10-15 Minutes)**

[www.surveymonkey.com/r/GLO\\_Mitigation](http://www.surveymonkey.com/r/GLO_Mitigation)

## **Website**

[recovery.texas.gov](http://recovery.texas.gov)

## **Email**

[cdr@recovery.texas.gov](mailto:cdr@recovery.texas.gov)

## **Resources**

**“Procurement & Contracting for Local Governments” on our Website**

# FEMA

## 406 Mitigation for Public Officials

July 2019



FEMA

# Topics of Relevance

- Guiding Policy and Program Overview
- Objectives and Key Criteria for Eligibility
- Work flow to a proposal and examples of HM 406 Mitigation
- How FEMA determines Cost Effectiveness
- Common misconceptions interpreting FEMA 406
- Special Considerations



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# 406 Genesis & Statutory Authority

**Section 406 (e) of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act)** describes the **Public Assistance (PA)** program and provides funding for the repair, restoration, and replacement of damaged facilities, and for related mitigation measures.

The regulations governing 406 Hazard Mitigation in the PA program are contained in **Title 44 of the Code of Federal Regulations (CFR)**, Public Assistance Project Administration. **Part 206** of the Code outlines the PA program procedures, eligibility and funding, including general guidelines for Section 406 mitigation.

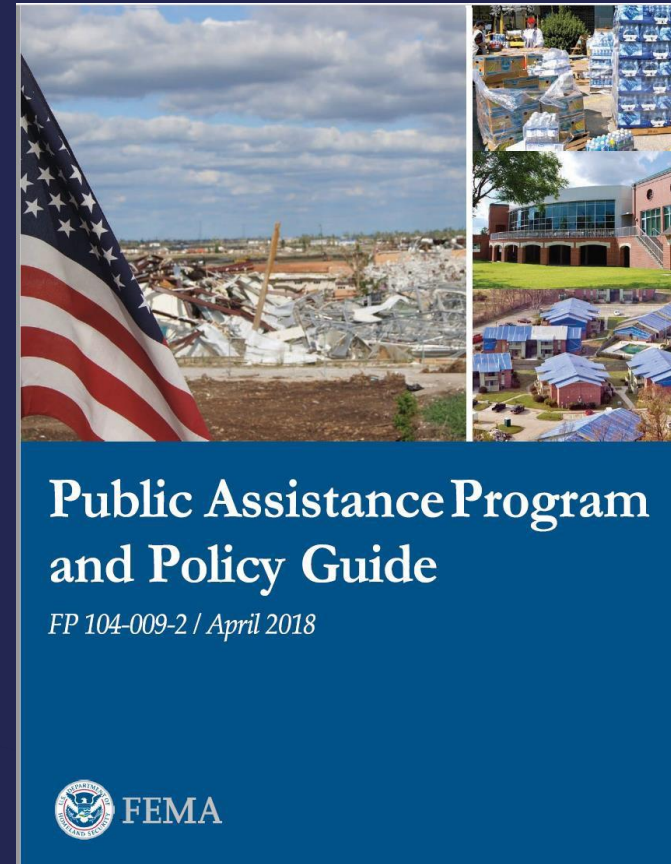


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# 406 Mitigation Guiding Document

The Public Assistance Program and Policy Guide (PAPPG), Version 3, is the guiding document for the PA recovery program, including 406 Mitigation.



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# Objective and Criteria for Eligibility

**406 Mitigation Objective:** Reduce or eliminate future damages to facilities impacted by the disaster with cost effective modifications, additions or relocation.

**Criteria for Eligibility:**

- Must be *technically feasible*
- *Reduce or prevent future damage* to eligible PA projects from a similar disaster in the future
- Must be *cost effective* according to FEMA Policy
- Compliant with all environmental and historic preservation laws
- All state and local codes triggered by a 406 proposal are included in evaluation



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# Criteria for Eligibility: PA Permanent Work Facilities

## Emergency Work

- A. Debris Removal
- B. Emergency Protective Measures

} Not Eligible for 406 Funding

## Permanent Work

- C. Roads and Bridge Work (including culverts and appurtenant facilities)
- D. Water Control Facilities (irrigation canals, channels and sedimentation basins)
- E. Buildings and Equipment (police/fire stations, schools, hospitals, contents)
- F. Utilities (storm and sanitary sewers, water treatment and delivery systems)
- G. Parks, Recreation, and Other Facilities (pools, mass transit, docks, beaches)



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## How do we get to a 406 Mitigation Proposal

- **Mitigation Opportunities:** May be identified during
  - Exploratory Call
  - Recovery Scoping Meeting (RSM)
  - Site Inspection (SI)
- **Mitigation Alternatives:** May be provided to the Applicant based on the type of damage and options observed on the Site Inspection.
- **Hazard Mitigation Proposal (HMP):** Proposed (conceptual not designed) enhancement to the facility to reduce or eliminate future damages that has a written scope of work and itemized costs.



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# How do we get to a 406 Proposal?

Observe  
Exploratory  
Call and  
Review Notes

Attend RSM  
and introduce  
406

Attend SI if  
necessary

Write HMP in  
coordination  
with applicant  
and submit to  
PA through  
Grants Manager

Make any edits  
to HMP if  
necessary and  
work with PA  
to award grant  
including 406



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# Examples of 406 Mitigation Projects

## Drainage improvements



Storm Drain outfall protection with  
geo-pavers  
(ArmorLoc) & rip rap



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# Examples of 406 Mitigation Projects

## Erosion Control



Slope protection at box culvert entrance

The willow cuttings planted throughout the embankment lend root cohesion and stability to the structural earth wall.



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# Examples of 406 Mitigation Projects

## Elevation



Emergency generator elevated above flood levels at the University of Texas Medical Branch, Hurricane Ike (Galveston, TX, 2008).



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# Examples of 406 Mitigation Projects

## Floodwalls\*



Typical masonry floodwall with engineered closures, which protected the Oak Grove Lutheran School in Fargo, ND from flooding in 2001 (source: Flood Control America, LLC)



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# Examples of 406 Mitigation Projects

## Wind Retrofits



Cables were attached to prevent the cowl from blowing off. Typhoon Paka (Guam, 1997)



This condenser had supplemental attachment straps to hold it in place during Typhoon Paka (Guam, 1997)



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## Examples of 406 Mitigation Projects Roof Covering Modification



Modified Bitumen Roof covering instead of single ply for resiliency against higher wind speeds in Coastal areas



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## How FEMA determines Cost Effectiveness

Every dollar spent on mitigating must prove to reduce future losses related to damages from future similar events.

$$= \frac{\text{406 Hazard Mitigation Proposal (HMP) Costs}}{\text{Cost to restore the facility (and sometimes contents*)}} ?$$



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# How FEMA determines Eligible, Cost Effective 406 Mitigation Funding

There are three ways Cost Effectiveness can be established (based on criteria outlined in PAPPG V.2., PAGE99).

- **15%:** Mitigation measures may amount up to 15% of the total eligible cost of the eligible repair work (by site).
- **100% (Appendix J):** Certain mitigation measures have been pre-determined to be cost effective, as long as the mitigation measure does not exceed 100% of the eligible cost of the eligible repair.
- **BCA:** A Benefit Cost Analysis may be performed for mitigation proposals that fall outside the predetermined cost effective measures.

## Section 406 Hazard Mitigation

FEMA evaluates proposed mitigation measures for cost-effectiveness, technical feasibility, and compliance with EHP laws, regulations, and EOs. In addition, FEMA ensures that the mitigation does not negatively impact the facility's operation or surrounding areas, or create susceptibility to damage from another hazard.

Mitigation measures must be cost-effective. FEMA considers mitigation measures to be cost-effective if any of the following criteria are met:

- The cost for the mitigation measure does not exceed 15 percent of the total eligible repair cost (prior to any insurance reductions) of the facility or facilities for which the mitigation measure applies.
- The mitigation measure is specifically listed in Appendix J: Cost-Effective Hazard Mitigation Measures, AND the cost of the mitigation measure does not exceed 100 percent of the eligible repair cost (prior to any insurance reductions) of the facility or facilities for which the mitigation measure applies.
- The Recipient or Applicant demonstrates through a FEMA's acceptable benefit-cost analysis (BCA) methodology that the measure is cost-effective. FEMA's BCA software 5.2.1 provides appropriate BCA methodologies.

Many mitigation measures that do not meet the first two requirements above prove to be cost-effective based on a BCA. If the mitigation measure is not cost-effective based on the first two criteria, FEMA, the Recipient, and the Applicant will work together to develop a BCA to determine whether it is cost-effective.

A BCA is based on a comparison of the total eligible cost for the mitigation measure to the total value of expected benefits.

Benefits include reductions in:

- Damage to the facility and its contents
- The need for emergency protective measures
- The need for temporary facilities
- Loss of function
- Casualties (typically included only for earthquake, tornado, and wildfire mitigation)



## Section 404 Hazard Mitigation Grant Program

The Recipient manages HMGP and is responsible for soliciting applications from State, Tribal, and local government agencies. Projects submitted to the Recipient must be in accordance with the Recipient's Hazard Mitigation Plan, address severe detrimental impacts, and have the greatest potential to reduce future losses. Eligible projects include acquisition of hazard-prone property, retrofitting existing buildings and facilities, elevation of flood-prone structures, infrastructure protection measures, and hazard mitigation planning. State, Tribal, and local government agencies should direct questions regarding HMGP to the State Hazard Mitigation Officer: <http://www.fema.gov/state-hazard-mitigation-officers>.



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# How FEMA determines Eligible, Cost Effective 406 Mitigation Funding

## PAPPG, Appendix J:

Appendix J of PAPPG includes criteria and several pages of mitigation treatments that have been **pre-determined** to be cost effective up to **100%** of the repair costs of the damaged element. It is organized by facility type.

Base the 100% on the actual damage being mitigated at the facility, not the overall costs of the Project.



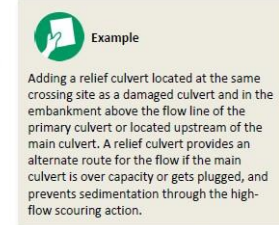
# FEMA

## APPENDIX J: COST-EFFECTIVE HAZARD MITIGATION MEASURES

FEMA considers the following mitigation measures to be cost-effective if the measures do not exceed 100 percent of the eligible repair cost (prior to any insurance reductions). The mitigation measures must meet all eligibility requirements described in [Chapter 2.VII.C: Hazard Mitigation](#). There may be instances where these measures are required by [codes or standards](#). In such cases, FEMA first evaluates whether the work is eligible as a code or standard upgrade (See [Chapter 2.VII.B](#)).

### I. Drainage Structures:

A. Replace the structure with multiple structures or a larger structure. The Applicant may use existing State, Territorial, Tribal, or local drainage criteria for sizing replacement culverts. The Applicant must consider replacement structures with regard to a total drainage system and cannot upgrade structures without a watershed [hydrology study](#) with an emphasis on downstream effects and National Flood Insurance Program regulations.



B. For the purpose of erosion control, add properly designed entrance and exit structures, such as a headwall, wingwalls, flared aprons, or energy dissipation measures to increase efficiency and help to minimize scour and erosion. Depending on the severity of erosion, solutions for bank protection may include gabion baskets, rip rap, cast-in-place concrete, crushed stone or rock, grouted rip rap<sup>395</sup>, sheet-piling, geotextile fabric, or similar measures to control erosion. Alternatively, the use of vegetation or a combination of vegetation and construction materials such as live fascines, vegetated geogrids, live cribwalls, brushmattresses, root wads, or similar measures are eligible. The Applicant should consider using green infrastructure techniques such as bioswales, bioretention, rain gardens and similar techniques that may be used in public drainage systems.

### C. Culverts:

1. Where the alignment of a culvert is inconsistent with existing water flow, realign the culvert vertically or horizontally or relocate the culvert to improve hydraulics and minimize erosion and scour. The Applicant must consider realignment of structures with regard to a total drainage system and cannot replace structures without a watershed [hydrology study](#) with an emphasis on downstream erosion effects.

<sup>395</sup> Projects involving grouted rip rap may be subject to an environmental assessment and may not be allowable in all instances.



# How FEMA determines Eligible, Cost Effective 406 Mitigation Funding

## Benefit Cost Analysis (BCA):

When the applicant is proposing mitigation where the cost is more than 15% of the damaged element (and it's not listed in Appendix J), OR it is listed in Appendix J but the cost is over 100% of the repair, a Benefit Cost Analysis can be performed to determine if the proposal is cost effective.

Items that can be included in the BCA:

- Category A & B costs from current and past events related to the facility being mitigated.
- Users of the facility where the loss of function impacts them (e.g. roads: traffic counts, treatment plants/utilities: customers).
- Historic damages and frequency at the site that will be mitigated and can be documented.
- Expected Damages, with appropriate analysis and documentation.



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## Who proposes the 406 Mitigation Proposal

- The Hazard Mitigation Proposal is the **Applicant's** proposal and the **Applicant's** responsibility to complete if approved.
- **Incentive:** Federal Share is 90% on DR 4332 TX.  
(404 Mitigation, known as HMGP has a 75% Federal Share)



FEMA

# Common misconceptions interpreting 406 Mitigation

- **All 406 Hazard Mitigation proposals are eligible up to 100% of the damaged element.**
  - No: Only those items listed on PAPPG, Appendix J, have been predetermined to be cost effective up to 100% of the cost of repair.
- **All Mitigation in an Engineered project is eligible for 406 Funding**
  - No: Only the Project enhancements that reduce or eliminate eligible damage and can be determined to be cost effective are eligible for 406 Funding.
  - Other considerations:
    - Codes & Standards (see 44 CFR, 206.226 (d))
    - Best Construction Practices
    - Improved Project (see page 4, )
- **The cost basis for eligible 406 funding is the overall Project \$ amount.**
  - No: The cost basis for eligible funding is the estimate from the CRC for the site/element being mitigated. A Project may have up to 50 sites.



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## Common misconceptions interpreting 406 Mitigation (II)

- **406 Mitigation proposals must be an integral part of the damaged element.**
  - No: In some instances, an eligible mitigation measure may not be part of the damaged facility. FEMA will consider these exceptions on a case-by-case basis.
- **406 Mitigation funds may not be applied to an Improved Project.**
  - Funds recommended for mitigation measures may be approved for an improved project if the original facility and its function will be restored and the mitigation work is still needed, is technically feasible, and will be performed as part of the overall project.
- **Any proposal less than 15% of the damages is eligible 406 Mitigation.**
  - No: The mitigation proposal must directly reduce the potential of future, similar disaster damages to the eligible facility.
  - The Hazard Mitigation Proposal (HMP) has several elements that need to be articulated in writing, including why/how it will work.



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## Common misconceptions interpreting 406 Mitigation (III)

- **If the mitigation was installed prior to FEMA site visit, it is ineligible.**
  - No: The Applicant may implement mitigation measures after the incident occurs but before the incident is declared or before FEMA has the opportunity to evaluate the measure for eligibility. In these cases, the mitigation work may be eligible if it is cost effective and compliant with EHP laws, regulations and Executive orders.
- **A Reinforced Concrete Pipe (RCP) is the hydraulic equivalent of a same size Corrugated Metal Pipe (CMP).**
  - No. Installing a same size CMP in place of a RCP can significantly reduce hydraulic capacity. If the State DOT cannot provide a hydraulic equivalent table when switching from RCP to CMP, an H&H should be performed to insure proper drainage.



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## Common misconceptions interpreting 406 Mitigation (IV)

- **If the permanent work is complete, add on 406 mitigation is not eligible.**
  - No: There are two types of eligible, “add on” 406 Mitigation.
    - 1) If the Applicant implements mitigation measures after the PA-funded repair is complete, the mitigation work may be eligible, however, FEMA will not provide PA funding for any duplicative work.
    - 2) If the previously complete permanent work was completed during emergency response, and could be considered Emergency Protective measures, 406 Mitigation may be eligible at the site. The 406 Mitigation should be cost effective and technically feasible. These types of sites will be considered on a case by case basis. Additional write ups to separate the emergency work from permanent repairs may be necessary.
- **The Hazard Mitigation Proposal can fund an engineering study to come up with a Hazard Mitigation Proposal.**
  - No: **Funding for engineering is contingent on having a cost effective Mitigation proposal.**



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## Summary

- 406 Mitigation is a PA program which comes from Section 406 of the Stafford Act. Public Assistance Program and Policy Guide (PAPPG) is the primary guiding document.
- All eligible, permanent work projects (Cat C-G) are eligible for consideration of 406 Mitigation funding subject to criteria outlined in PAPPG.
- The type of Mitigation being proposed is used to determine whether the proposal is considered cost effective using the 15% or 100% Rule. The estimated cost of restoring pre-disaster condition is the cost basis for evaluating cost effectiveness.
- FEMA Public Assistance, Mitigation staff or the Applicant may write an HMP.
- The Federal share at the Hurricane Harvey disaster for 406 Mitigation is 90%



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## Questions?



Contact:

Mitchell Osburn  
Mitigation Branch Director  
[mitchell.osburn@fema.dhs.gov](mailto:mitchell.osburn@fema.dhs.gov)



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# Working Group

*Activity 1: Identify the opportunities for PPPs in each of the identified resilience project areas.*

*READINESS FOR RESILIENCE*

# Working Group

***Activity 2: Prioritize funding opportunities for identified resilience project areas.***

***READINESS FOR RESILIENCE***

# Working Group Report Out, Discussion, and Next Steps.

*READINESS FOR RESILIENCE*



# Adjourn

*READINESS FOR RESILIENCE*