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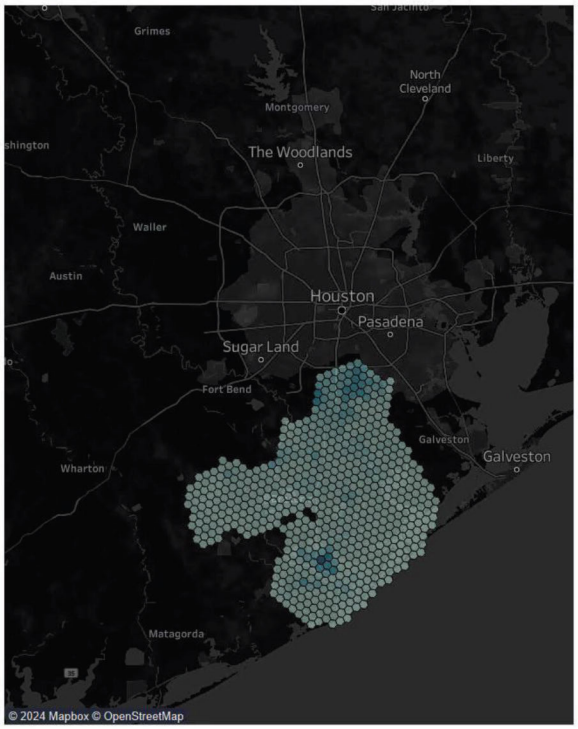
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Item Number - 70

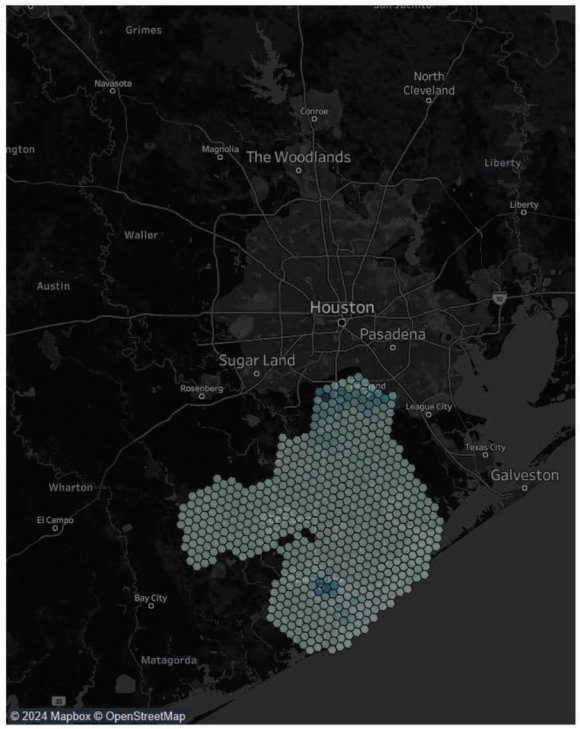
County Based Customer Impact Analysis

Brazoria County

Damage Prediction



Outage Duration



- Identify areas and circuits with:
  - higher probability of longer duration outages
  - Critical Infrastructure
  - Priority County OEM locations
- Aids in prioritizing strategic mitigation projects and aligning restoration processes

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3-Tiered Approach to Project Identification

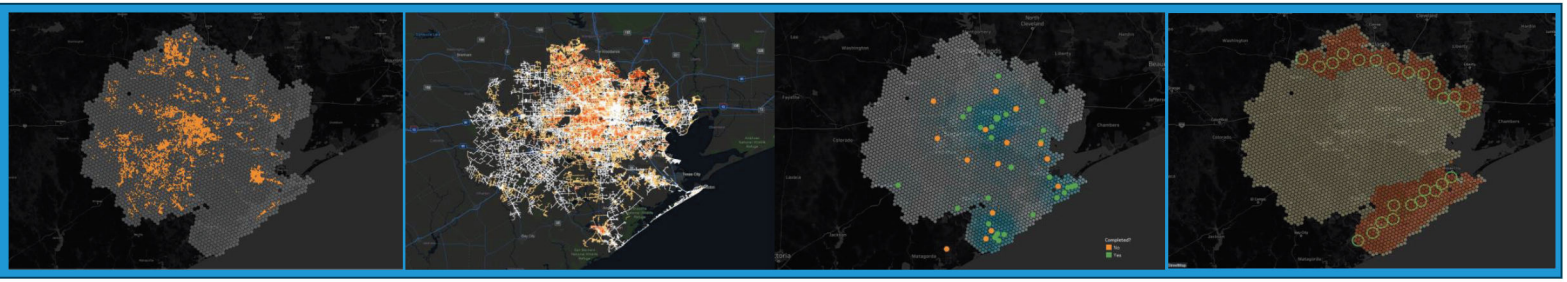
Post-Event Analysis



Industry Best Practices



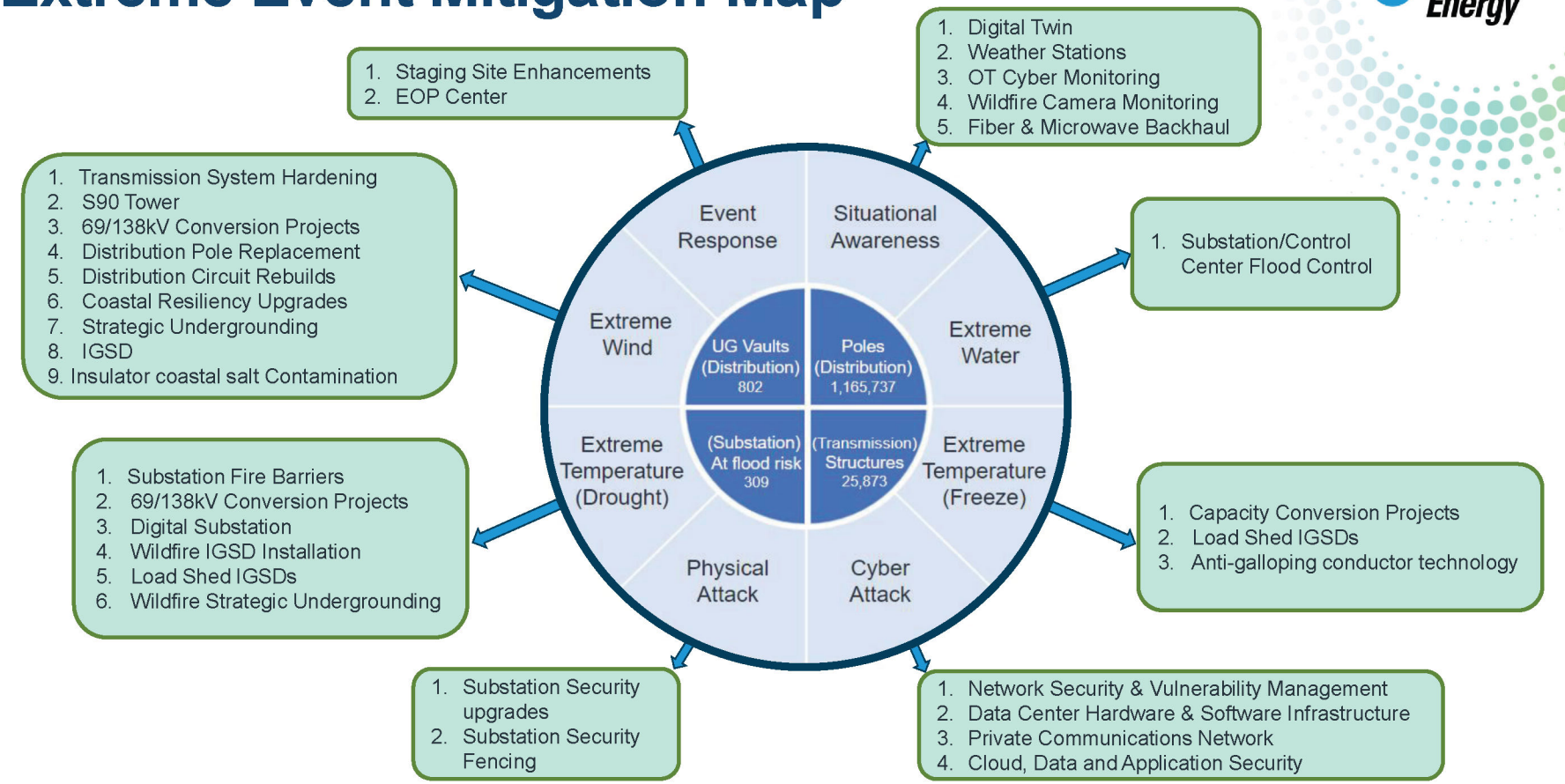
Scenario Based Modeling



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Extreme Event Mitigation Map

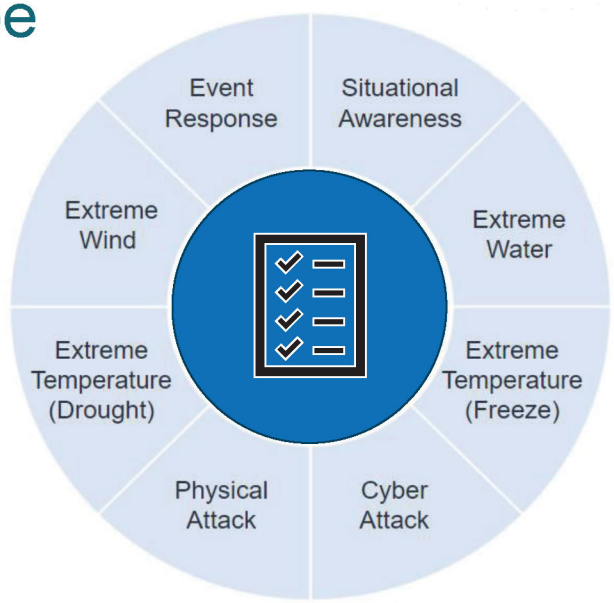


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Scenario Based Framework

Review by Event Type

a. Risk Characterization of Event Type
b. Planning and Response
c. Benchmark Events
d. Best Practice Mitigations
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g. Project Location Map
h. Explanation of Benefits



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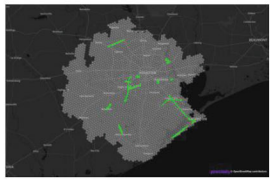
Event Types and Mitigations

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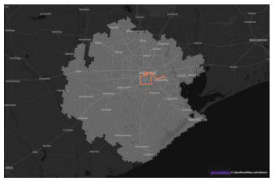
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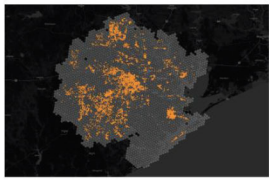
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	Wildfire Analytics	
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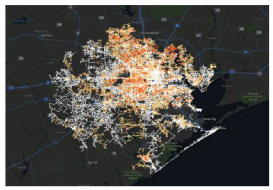
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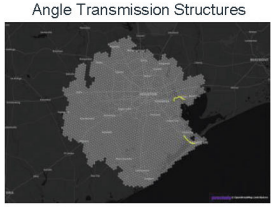

Lattice Transmission Structures

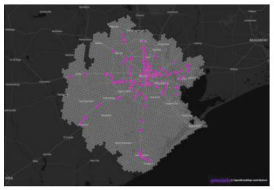

Angle Transmission Structures


Wood Transmission Structures


Distribution Pole Replacements

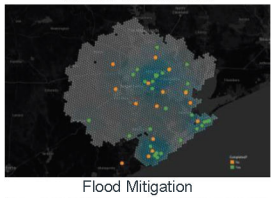

Tree Fall-in Risk


Coastal Transmission

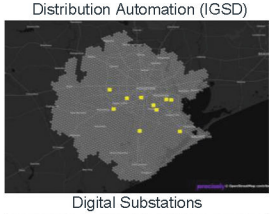

Strategic Undergrounding

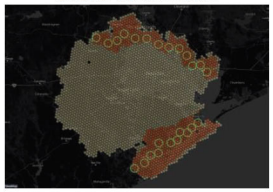

Distribution Automation (IGSD)


Coastal Contamination

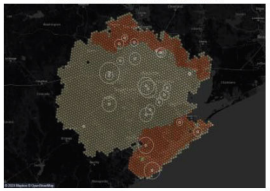

Flood Mitigation


Transformer Fire Barriers

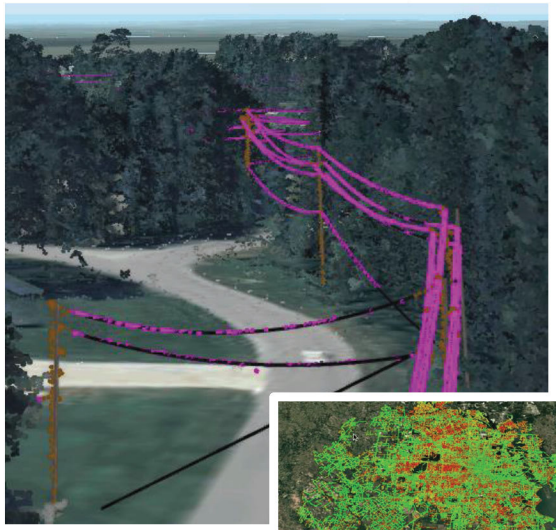

Digital Substations

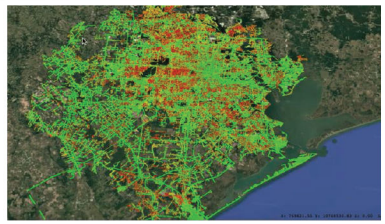

Wildfire Camera Monitoring


Wildfire Automation (IGSD)


Wildfire Strategic Undergrounding


Load Shed Automation (IGSD)





Brazoria County Take-Aways

- Communities of Concern
  - Oyster Creek
  - Freeport
  - Pearland
- Additional discussion points
  - Multiple wind directions in 15 minutes
  - Impact of building codes on damage/outages
  - Wildlife refuge impact on fire risk
  - Fire risk in the north details
  - Situational Awareness collaboration
  - Visiting with City partners

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CenterPoint® Energy

SRP 2026-28 November Update

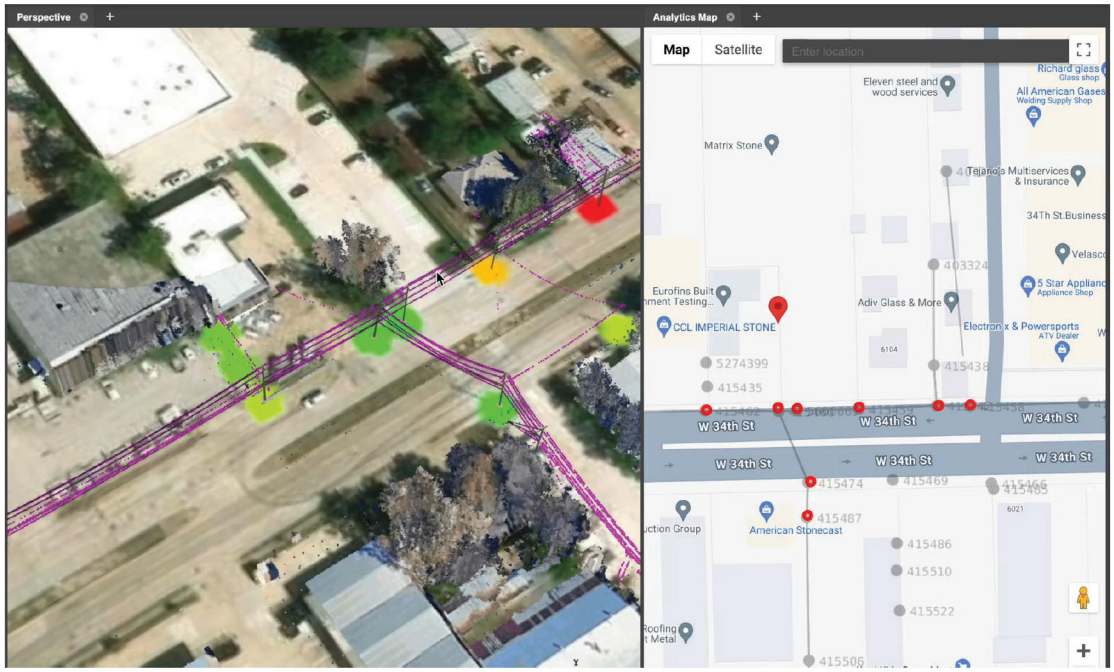
Industry Leading System Resiliency

Our mission is to build and operate the most resilient coastal grid within the country by leading the way through strategic resiliency mitigations and the best-in-class customer communications. This will be accomplished through:

- Optimization of the deployment of the most effective mitigations and processes
- Maximization of capital efficiency through leading AI tools that balance system performance and cost with customer expectations.

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Model vs Real World View



Colors indicate GIS proximity: green = match GIS location, orange = slight mismatch, red = no GIS match

Fall in Risk and Truck Accessibility



Red = fall-in circuit risk, orange = relative vegetation encroachment risk

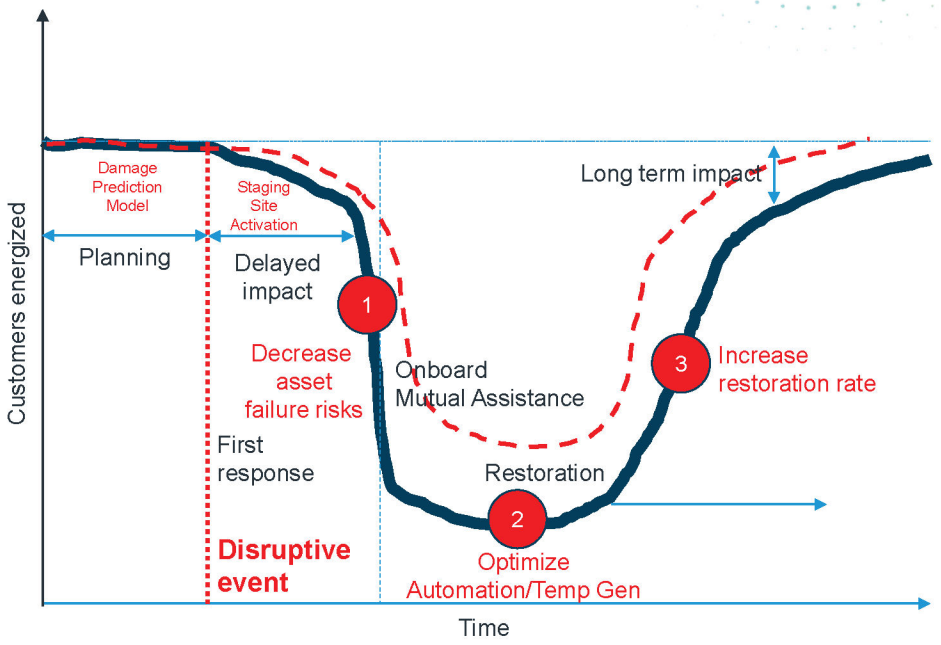


Orange = inaccessible, green = accessible

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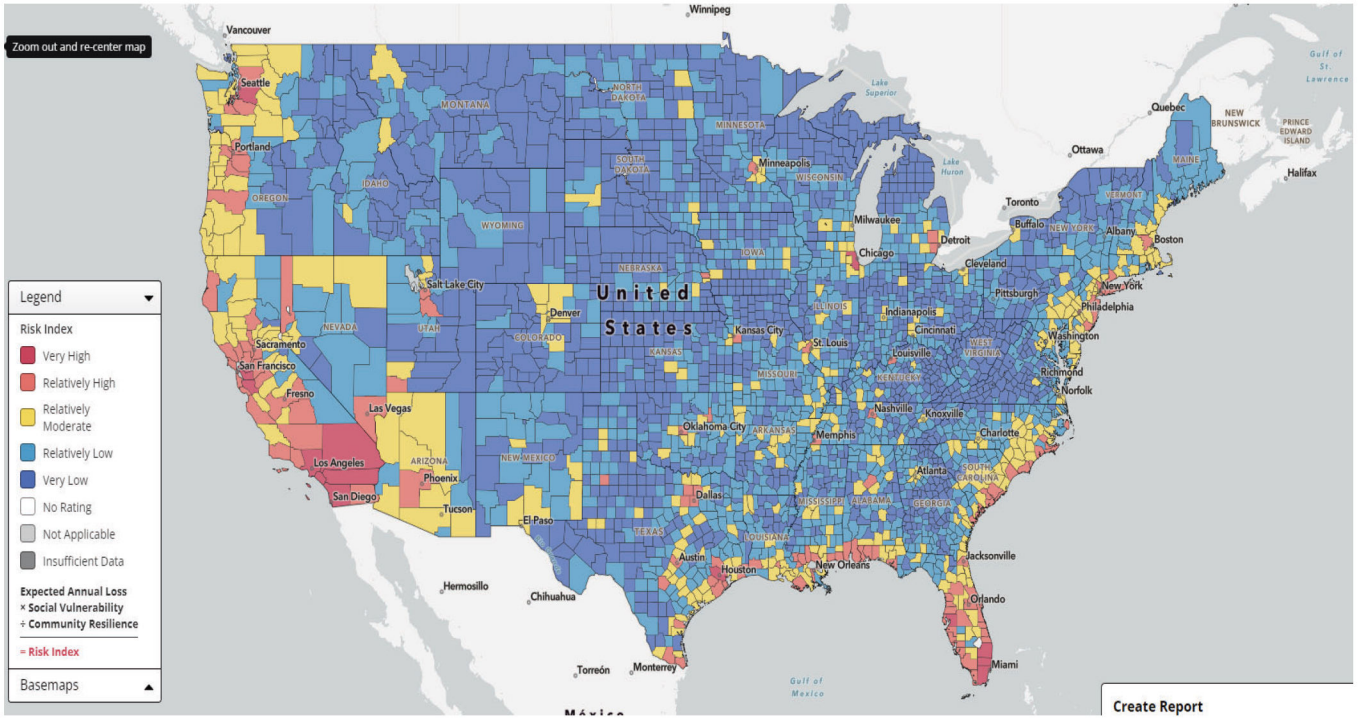
CEHE Strategy: Deploy the most effective mitigations in the least resilient locations

1. Decrease asset failure risks prioritizing less accessible locations based on criticality and total customer counts
2. Increase utilization of automated devices for a self-healing grid and optimization of temp generation
3. Reduce customer restoration times by decreasing the number of asset failures, customers affected, and time needed per asset repair.

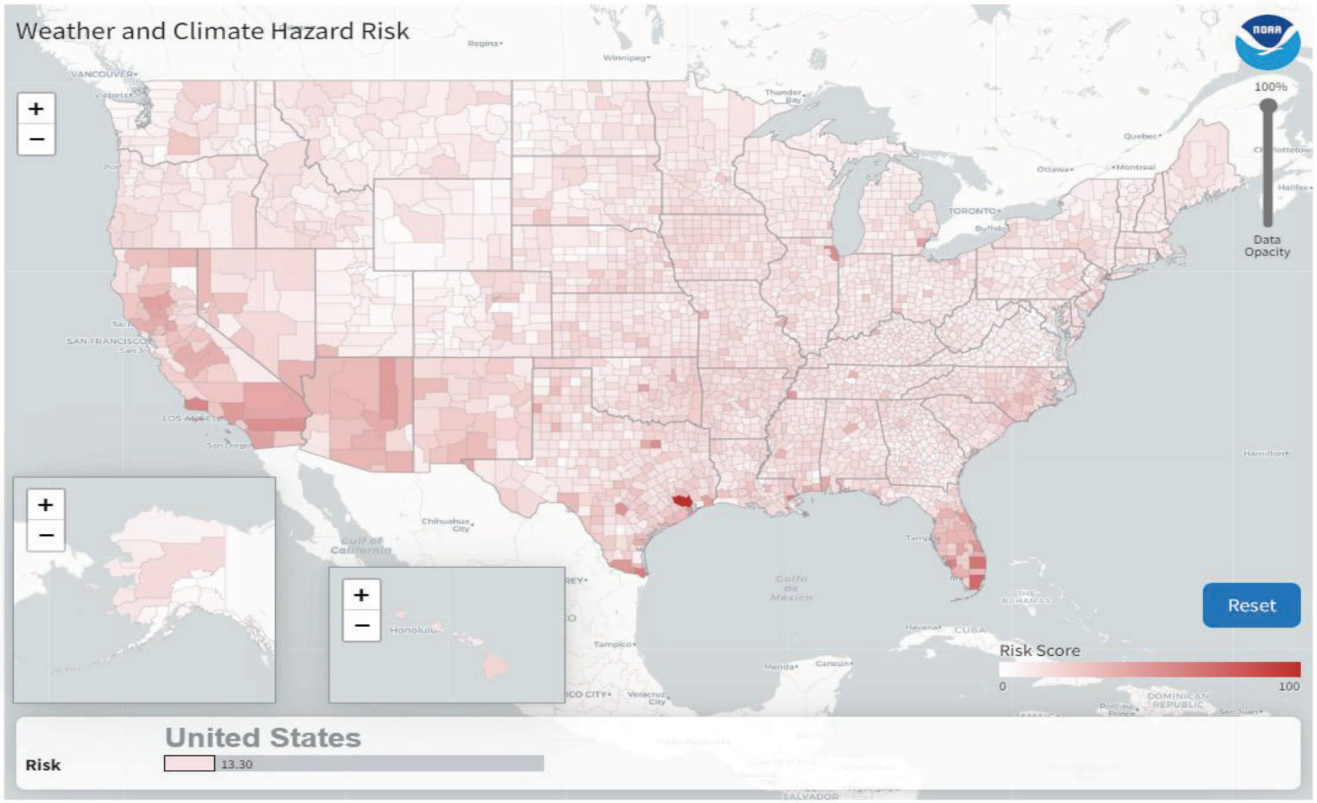


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FEMA National Risk Index Map



NOAA Weather and Climate Hazard Risk Map



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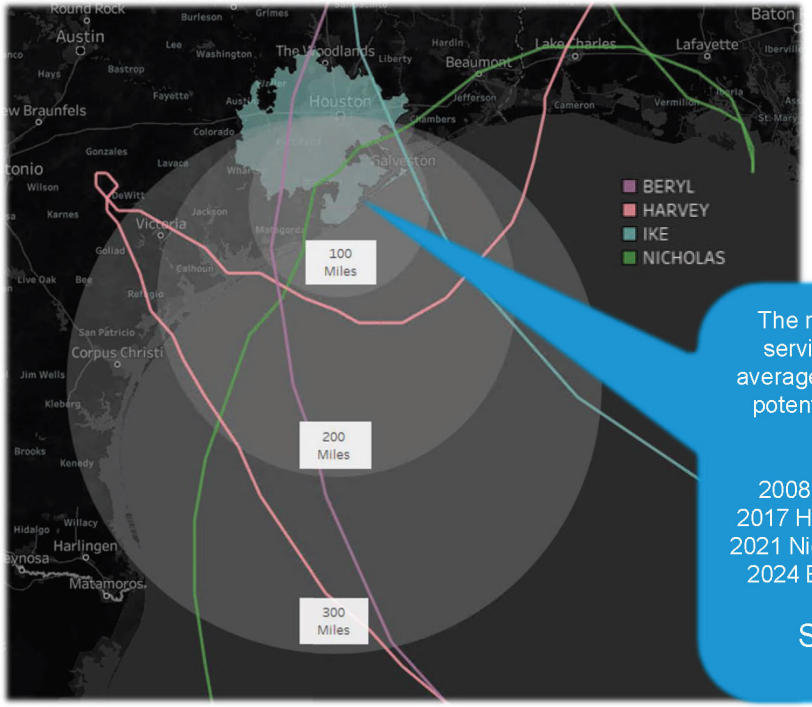
NOAA Risk and Vulnerability Summary

Data Type	Harris County	Texas	U.S.
Weather and Climate Risk			
Drought Risk	20.36	14.32	11.61
Flooding Risk	100.00	12.97	9.13
Freeze Risk	12.05	13.09	15.72
Severe Storm Risk	94.56	20.58	16.99
Tropical Cyclone Risk	100.00	6.41	4.36
Wildfire Risk	11.81	11.28	6.30
Winter Storm Risk	65.33	15.99	13.71
Flooding, Freeze, Severe Storm, Tropical Cyclone, Wildfire, and Winter Storm Risk	100.00	15.88	12.14

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Houston Area Challenges to Coastal Resiliency

- **Highest coastal Population Density and a compact area**; customers in entire service territory subject to impacts
- Of coastal areas with higher **Population Density,** the Greater Houston Area has the **highest Vegetation Density**
- Higher levels of **Population and Vegetation Density** increase non-utility asset occurrence causing failures and limit **Asset Accessibility;** a major factor in rate of customer restoration
  - Typical hurricanes: about **300 miles wide**
  - Hurricane-force winds: extend outward about **25 miles (small hurricane) to more than 150 miles (large hurricane)**. Tropical storm-force winds can extend upwards of 300 miles
  - Frequently, the **right side of a hurricane ('the dirty side") is the most dangerous** in terms of storm surge, rainfall, winds, and/or tornadoes.



The relatively small CEHE service territory results in average hurricanes having the potential to impact **100%** of assets.

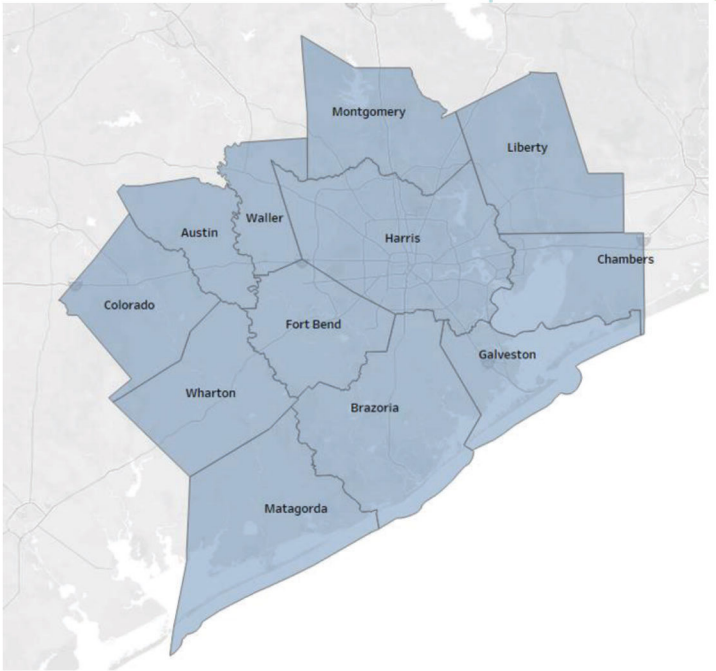
2008 Ike – 600 miles wide
2017 Harvey – 280 miles wide
2021 Nicholas – 115 miles wide
2024 Beryl – 376 miles wide

Storm track is important!

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Adjusting to Exceed Resiliency Expectations

- Incorporated 3rd party feedback for communications, smarter grid, stronger grid, and customer restoration
- Accelerate deployment of industry leading AI technologies to optimize mitigation of risks, investment decisions, and improve customer restoration decision making processes and execution
- Transitioning from a program to project based approach based using recently completed accessibility analytics
- Must increase the pace of asset deployment based on: Post-Beryl lessons learned, Greater Houston Resiliency Initiative, and PUCT report

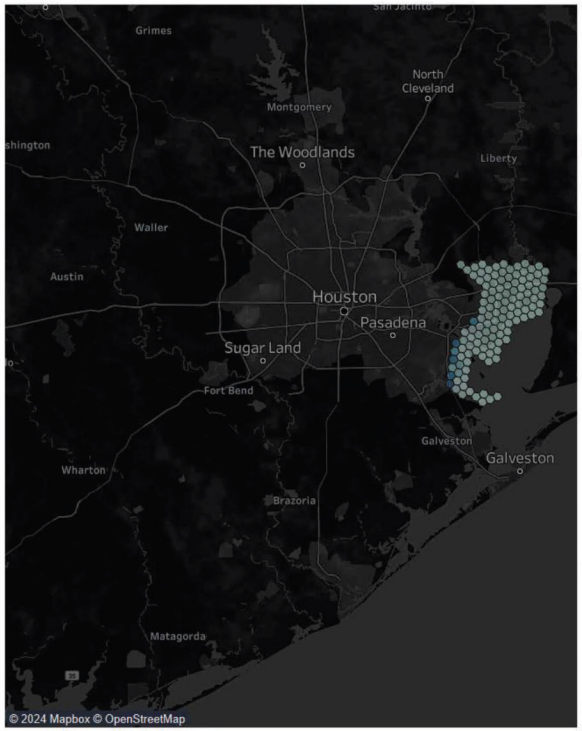


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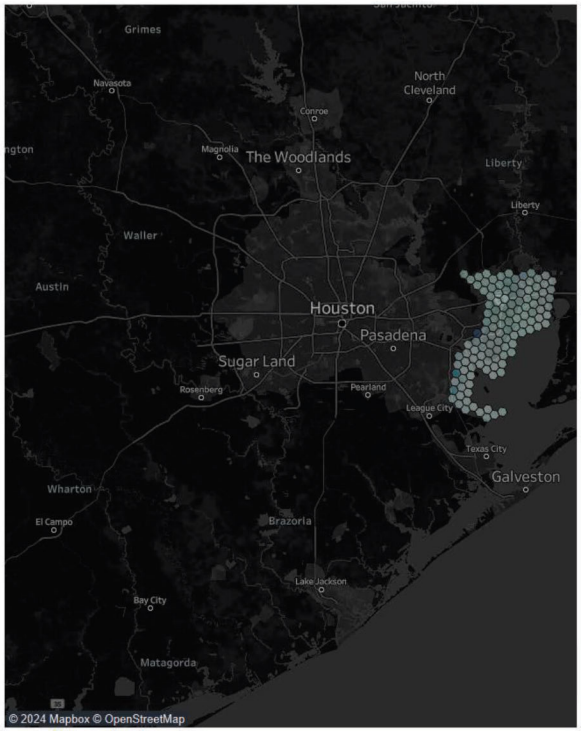
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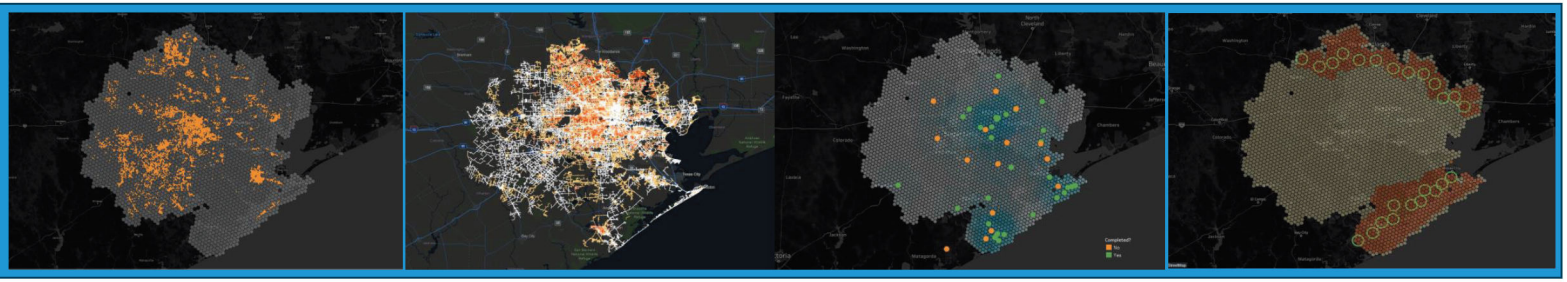
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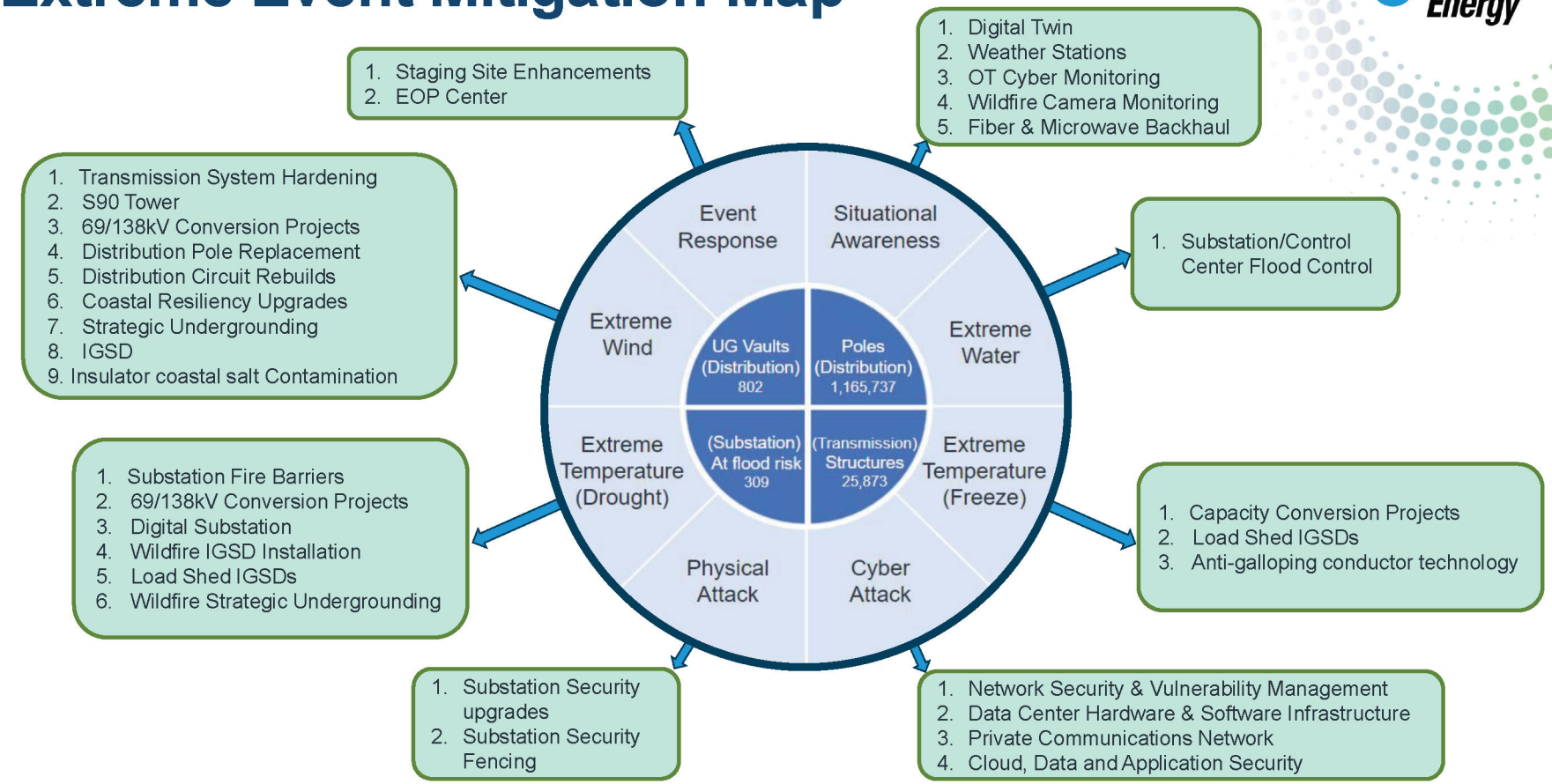
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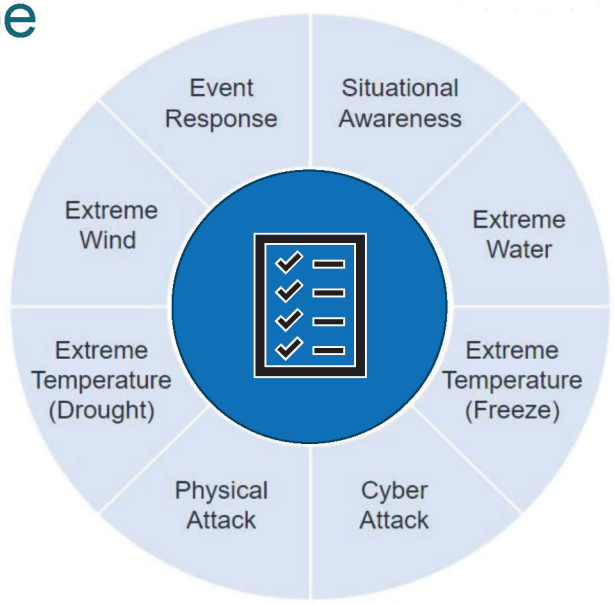


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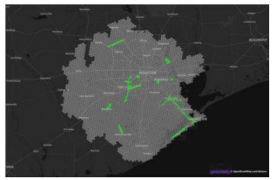
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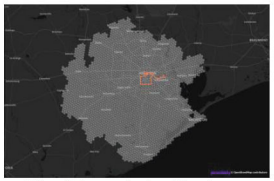
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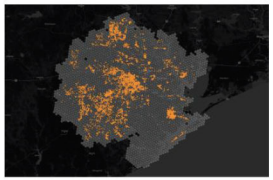
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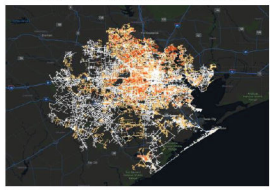
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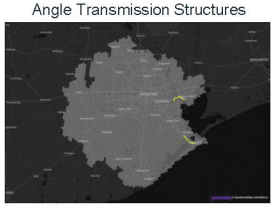

Lattice Transmission Structures

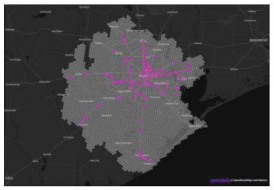

Angle Transmission Structures


Wood Transmission Structures


Distribution Pole Replacements

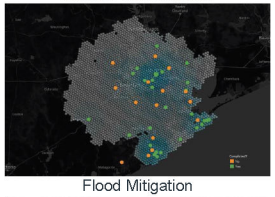

Tree Fall-in Risk


Coastal Transmission

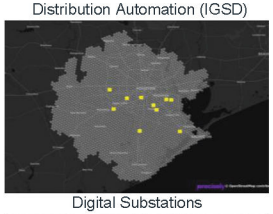

Strategic Undergrounding


Distribution Automation (IGSD)


Coastal Contamination


Flood Mitigation

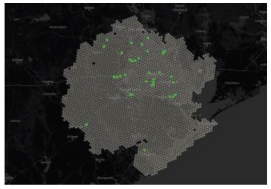

Transformer Fire Barriers

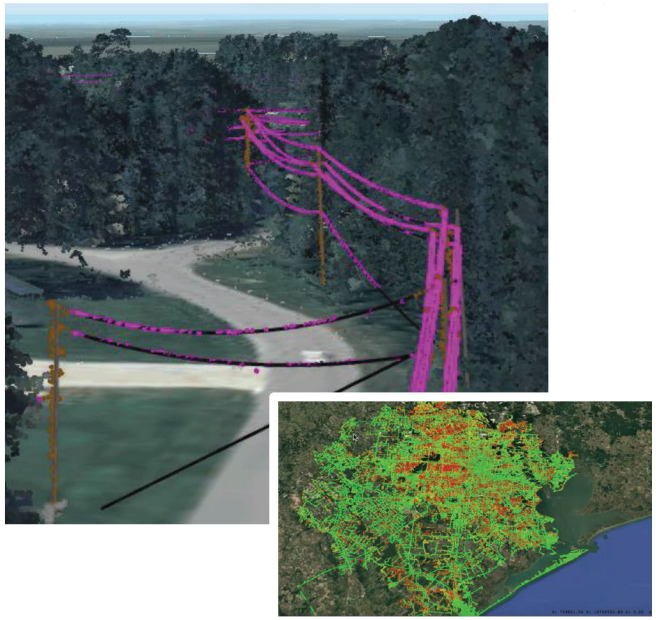

Digital Substations


Wildfire Camera Monitoring


Wildfire Automation (IGSD)


Wildfire Strategic Undergrounding


Load Shed Automation (IGSD)



Chambers County Take-Aways

- Communities of Concern
- Additional discussion points

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CenterPoint® Energy

SRP 2026-28 November Update

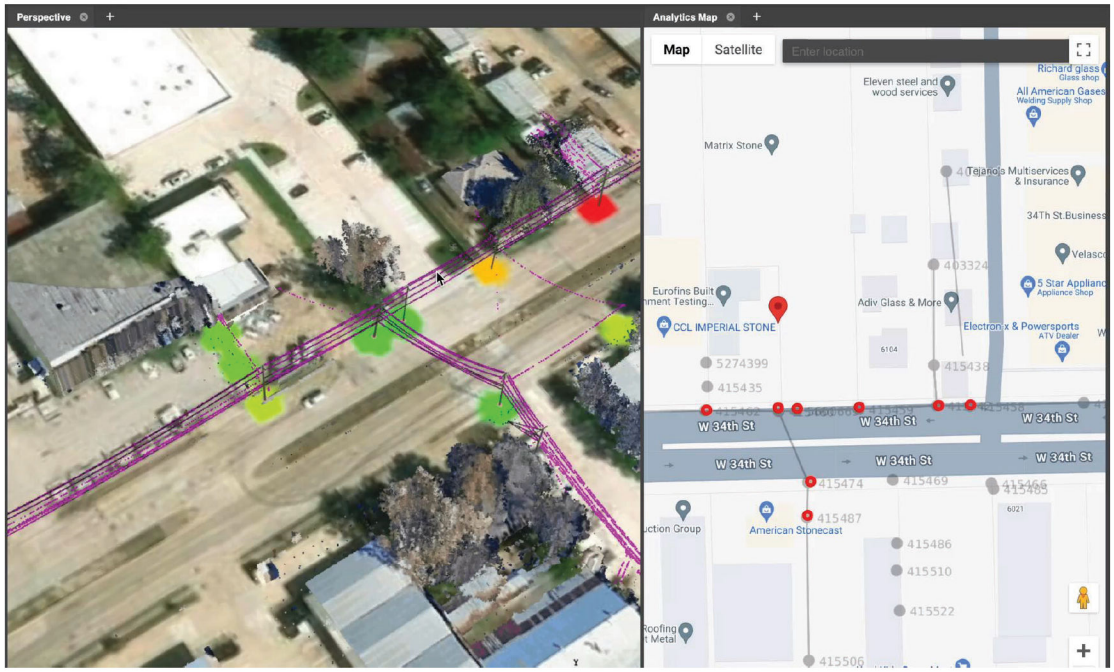
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Model vs Real World View



Colors indicate GIS proximity: green = match GIS location, orange = slight mismatch, red = no GIS match

Fall in Risk and Truck Accessibility



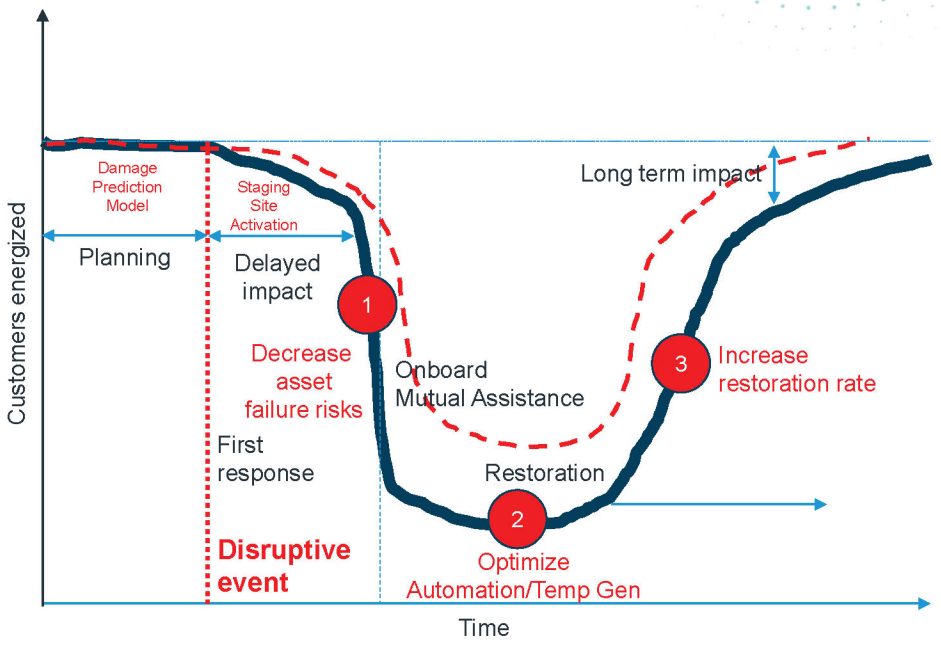
Red = fall-in circuit risk, orange = relative vegetation encroachment risk



Orange = inaccessible, green = accessible

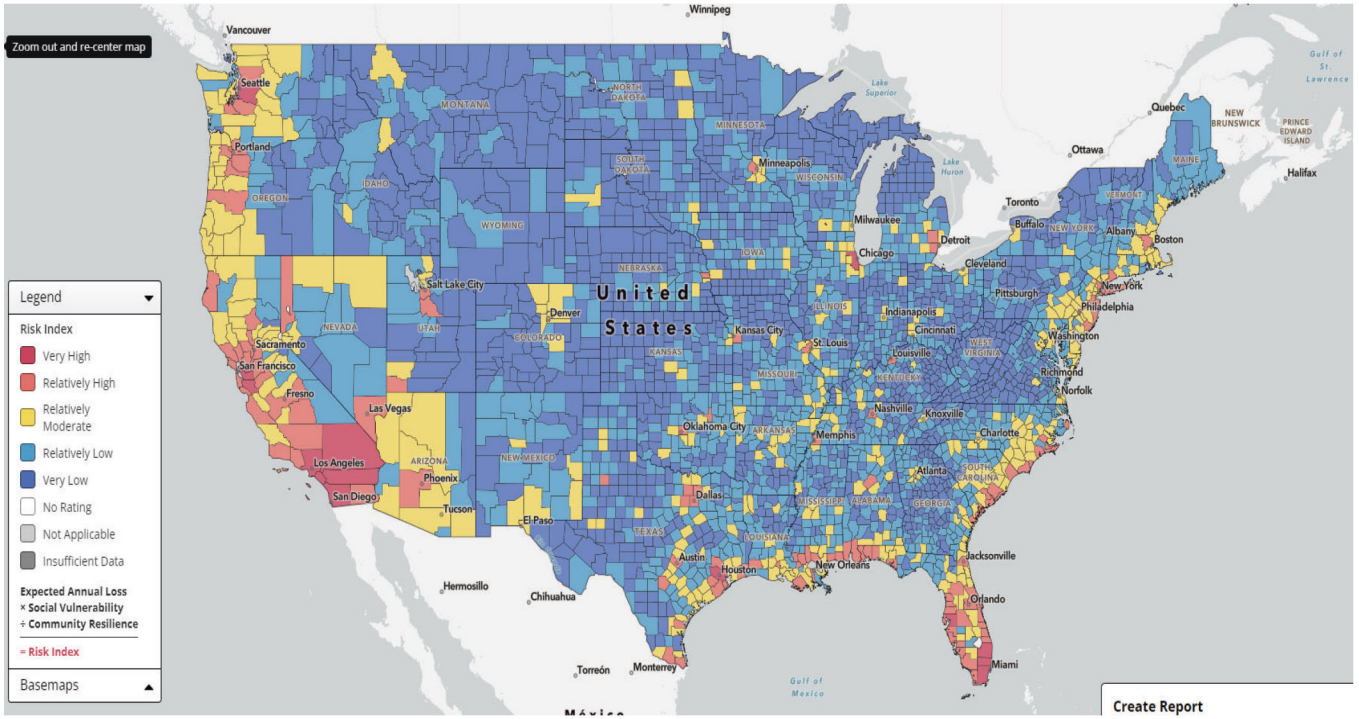
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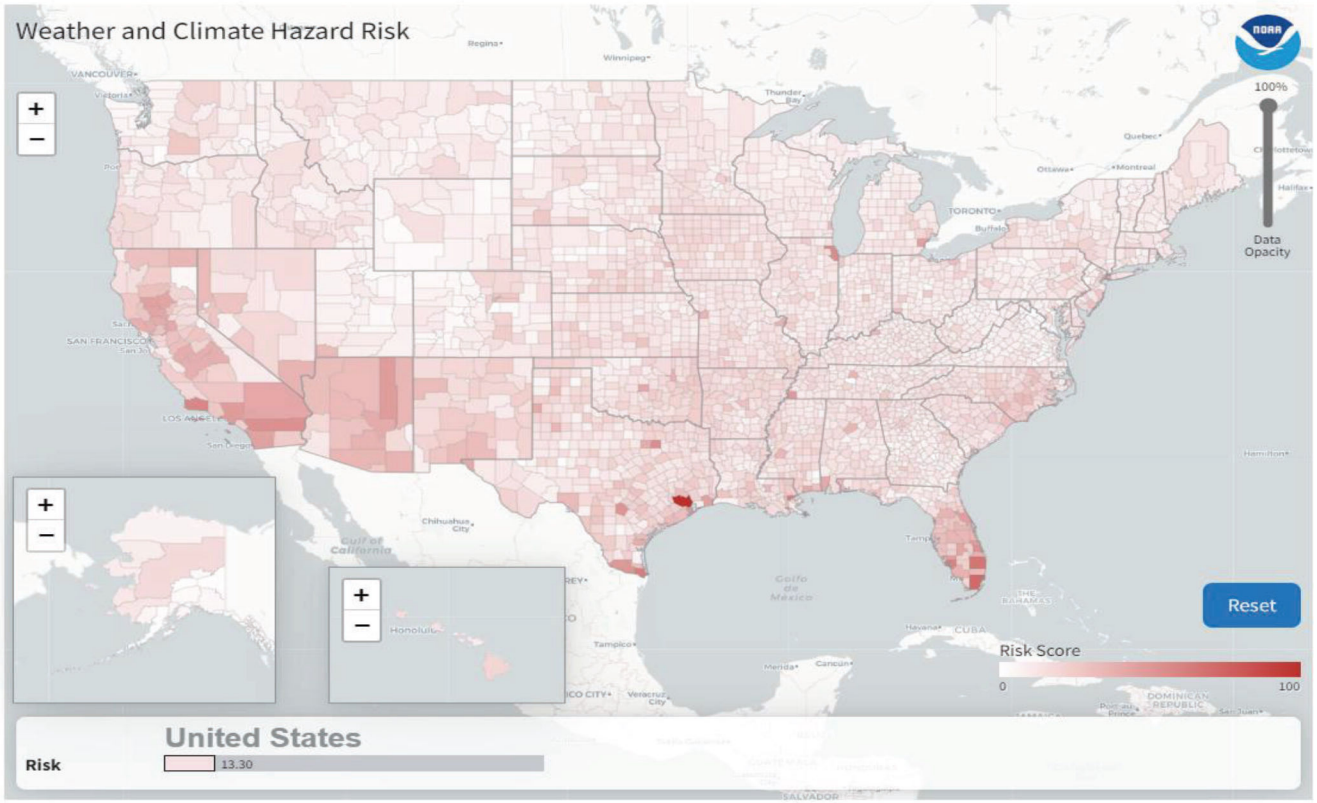


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FEMA National Risk Index Map



NOAA Weather and Climate Hazard Risk Map



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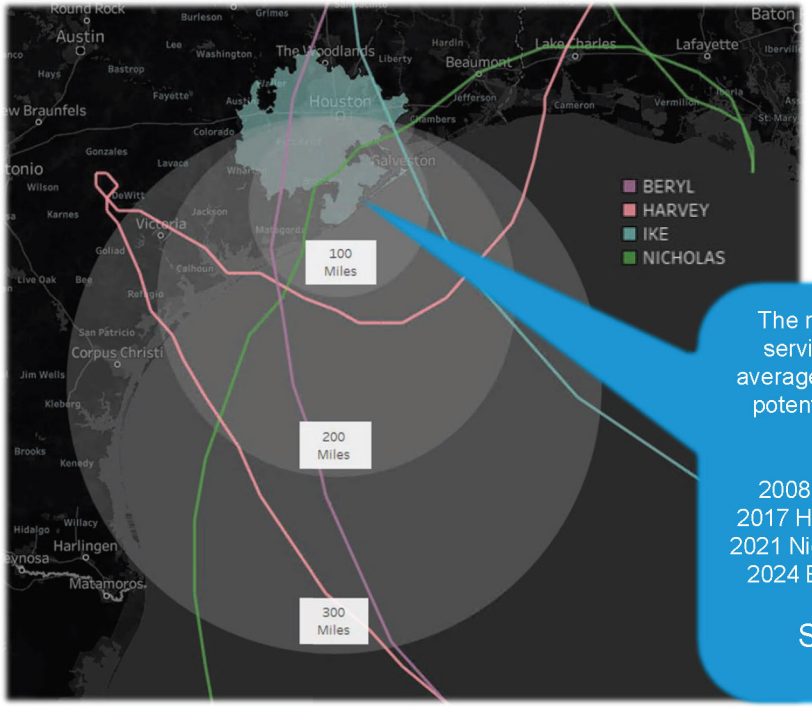
NOAA Risk and Vulnerability Summary

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Winter Storm Risk	65.33	15.99	13.71
Flooding, Freeze, Severe Storm, Tropical Cyclone, Wildfire, and Winter Storm Risk	100.00	15.88	12.14

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Houston Area Challenges to Coastal Resiliency

- **Highest coastal Population Density and a compact area**; customers in entire service territory subject to impacts
- Of coastal areas with higher **Population Density,** the Greater Houston Area has the **highest Vegetation Density**
- Higher levels of **Population and Vegetation Density** increase non-utility asset occurrence causing failures and limit **Asset Accessibility;** a major factor in rate of customer restoration
  - Typical hurricanes: about **300 miles wide**
  - Hurricane-force winds: extend outward about **25 miles (small hurricane) to more than 150 miles (large hurricane)**. Tropical storm-force winds can extend upwards of 300 miles
  - Frequently, the **right side of a hurricane ('the dirty side") is the most dangerous** in terms of storm surge, rainfall, winds, and/or tornadoes.



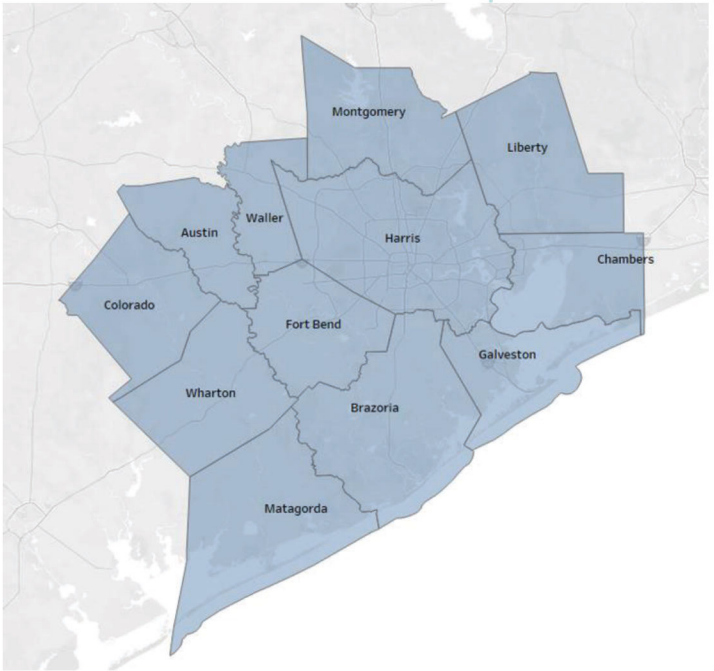
The relatively small CEHE service territory results in average hurricanes having the potential to impact **100%** of assets.

2008 Ike – 600 miles wide
2017 Harvey – 280 miles wide
2021 Nicholas – 115 miles wide
2024 Beryl – 376 miles wide

Storm track is important!

Adjusting to Exceed Resiliency Expectations

- Incorporated 3rd party feedback for communications, smarter grid, stronger grid, and customer restoration
- Accelerate deployment of industry leading AI technologies to optimize mitigation of risks, investment decisions, and improve customer restoration decision making processes and execution
- Transitioning from a program to project based approach based using recently completed accessibility analytics
- Must increase the pace of asset deployment based on: Post-Beryl lessons learned, Greater Houston Resiliency Initiative, and PUCT report

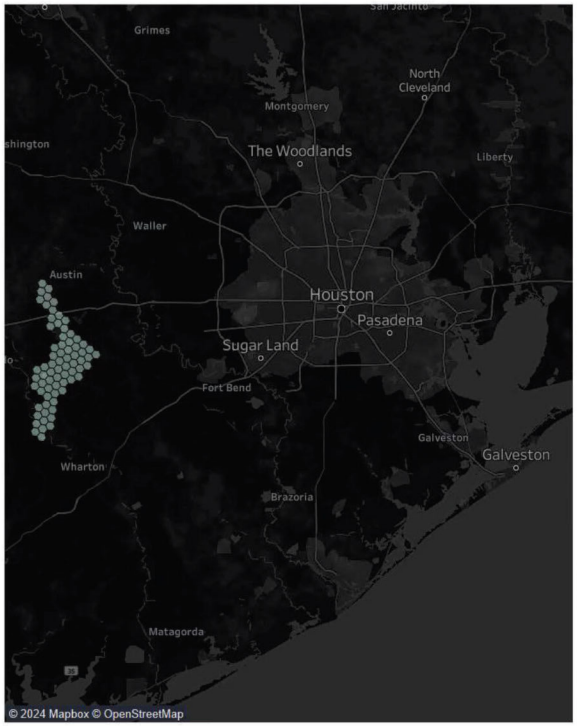


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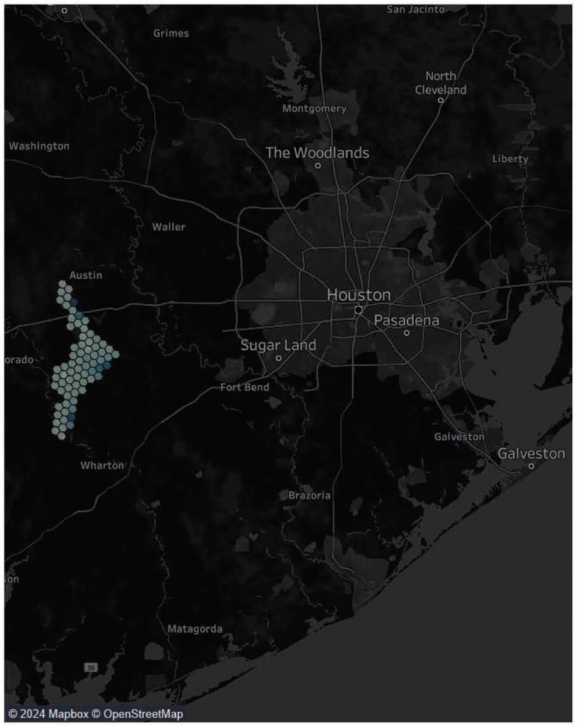
County Based Customer Impact Analysis

Colorado County

Damage Prediction



Outage Duration



- Identify areas and circuits with:
  - higher probability of longer duration outages
  - Critical Infrastructure
  - Priority County OEM locations
- Aids in prioritizing strategic mitigation projects and aligning restoration processes

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3-Tiered Approach to Project Identification

Post-Event Analysis



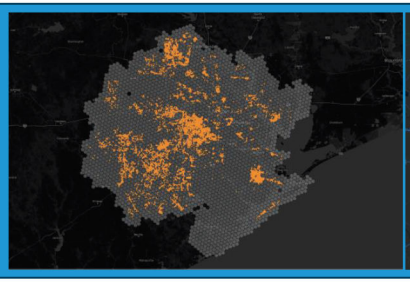
Industry Best Practices

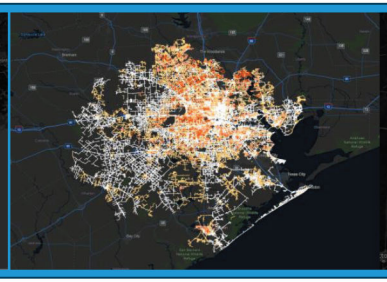


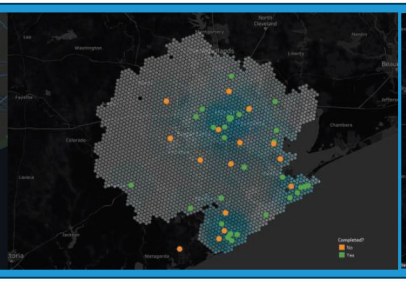




Scenario Based Modeling

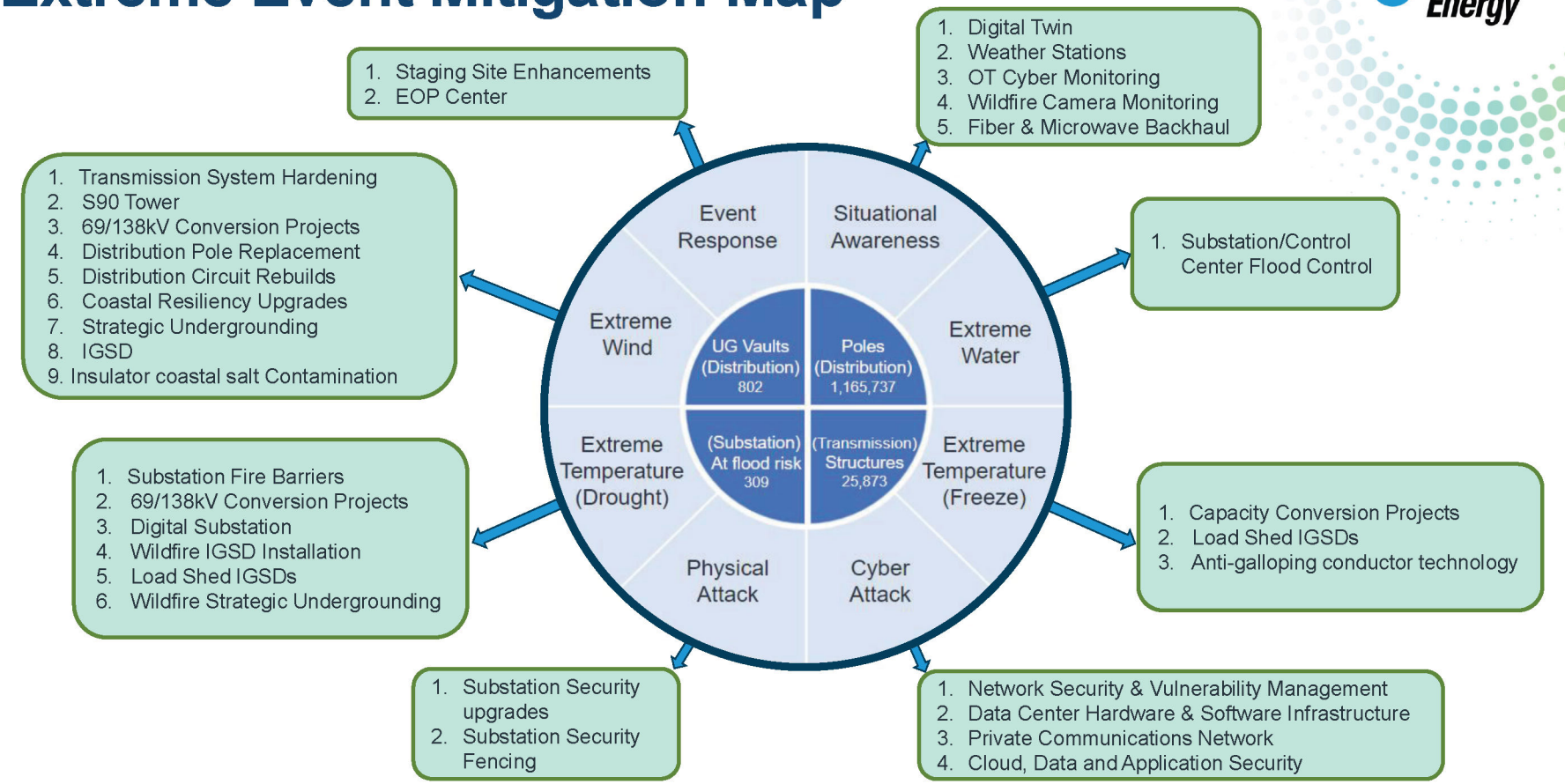








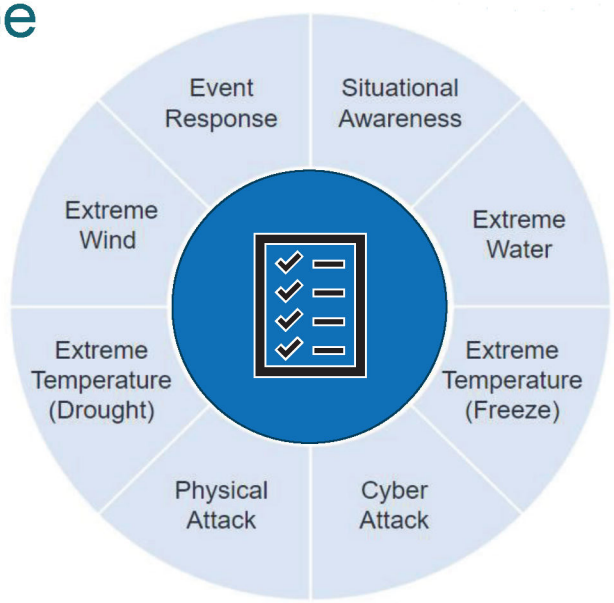
Extreme Event Mitigation Map



Scenario Based Framework

Review by Event Type

a. Risk Characterization of Event Type
b. Planning and Response
c. Benchmark Events
d. Best Practice Mitigations
e. Mitigation Prioritization
f. Project Selection Criteria
g. Project Location Map
h. Explanation of Benefits



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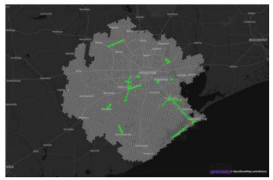
Event Types and Mitigations

Based on the different event types the following mitigations will be deployed based on the 3-tiered analysis approach

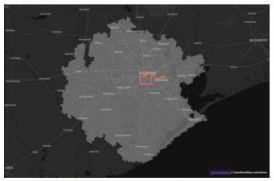
Event Class	Event Type (% assets likely affected)	Mitigation Objective
Extreme Wind	Hurricane (100%) Microburst (50%) Derecho (50%) Tornado (25%) High wind (50%)	Replace transmission structures with stronger towers or concrete/steel monopoles
		Replace select 90-degree structures with new steel monopoles
		Replace wooden structures with stronger towers or concrete/steel monopoles
		Replace or brace poles based on condition
		Replace equipment poles and reconfigure cross-arms
		Build additional transmission lines for contingency case
		Underground freeway crossings and low access spans
		Automation to reduce outage durations for customers
		Increase awareness and coastal insulation levels
Extreme Water	Hurricane (100%) Flood (80%)	Elevate facilities based on potential flood levels
Extreme Temp	Heat (Drought) (100%)	Install fire barriers to avoid cascading failures
		Replace existing circuits with higher capacity
		Enable wildfire related protection schemes
		Provide situational awareness in HFRAs
		Enable circuit segmentation schemes for HFRAs
		Enable circuit segmentation during load shed events
		Reduce ignition risk by undergrounding conductors
	Freeze (100%)	Replace existing circuits with higher capacity
		Enable circuit segmentation during load shed events
		Detect and prevent galloping conductors from icing

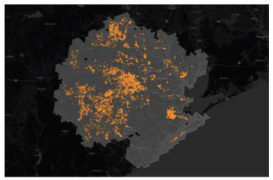
Event Class	Event Type (% assets effected)	Mitigation Objective
Physical Attack/Third Party Damage	Substation Security	Security Upgrades and Fencing
	Damage from vessels (10%)	Mitigate extended outages from 3rd party damage
	Damage from vehicles (1%)	Mitigate widespread outages from vehicle events
		Mitigate localized outages from vehicle events
		Mitigate widespread outages from vehicle events
		Reduce outage durations for customers upstream
Cyber Attack	OT Security	Enhance security of OT systems
	Secure Communications	Provide increased security for critical voice, automation and monitoring systems
	Cybersecurity Monitoring	Threat detection for evolving cyber risk
Situational Awareness	LiDAR Modeling	Provide the basis for advance modeling and project selection
	Wildfire Analytics	
	Weather Analytics	
	Galloping Detection	Early warning for transmission line galloping
Event Response	Enhance Staging Sites	Increase crew productivity and deployment speed
	Operational Enhancements	Emergency Operations Platform to support disaster recovery decision making

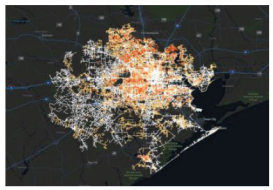
LiDAR Based Model Library Development

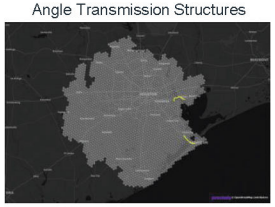

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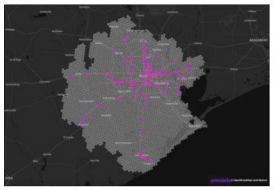

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Wood Transmission Structures


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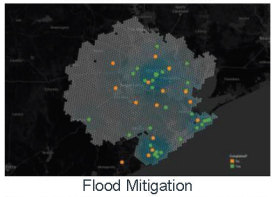

Tree Fall-in Risk


Coastal Transmission

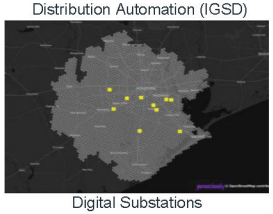

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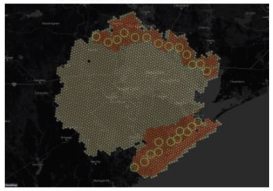

Distribution Automation (IGSD)


Coastal Contamination


Flood Mitigation

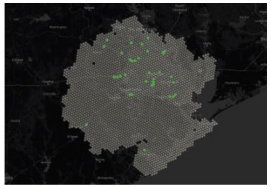

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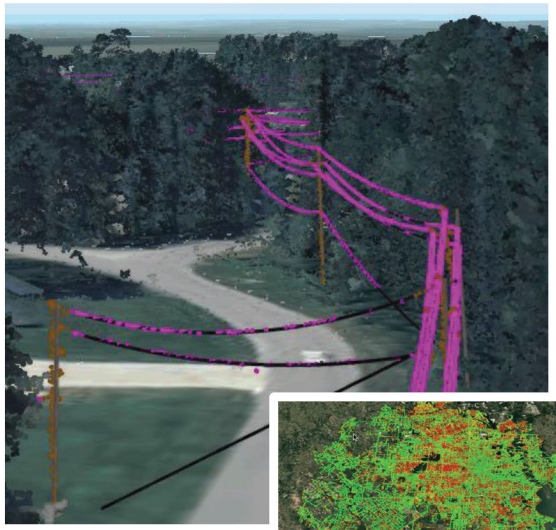

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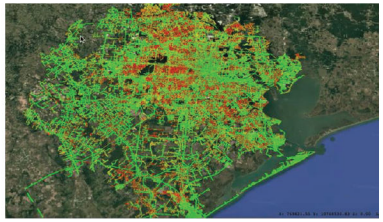

Wildfire Camera Monitoring


Wildfire Automation (IGSD)


Wildfire Strategic Undergrounding


Load Shed Automation (IGSD)





Colorado County Take-Aways

- Communities of Concern
  - FM3013 and FM1093 Eagle Lake to Sealy
  - Developing areas near rice fields
- Additional discussion points
  - Trends on meter counts
  - 1 outage can affect much of community
  - Preventative maintenance
  - Soil property modeling
  - Wind speeds at Robert Wells & Eagle Lake Airport
  - Going beyond population density shown in FEMA maps
  - Age of infrastructure
  - Forecasting the future

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CenterPoint® Energy

SRP 2026-28 November Update

Industry Leading System Resiliency

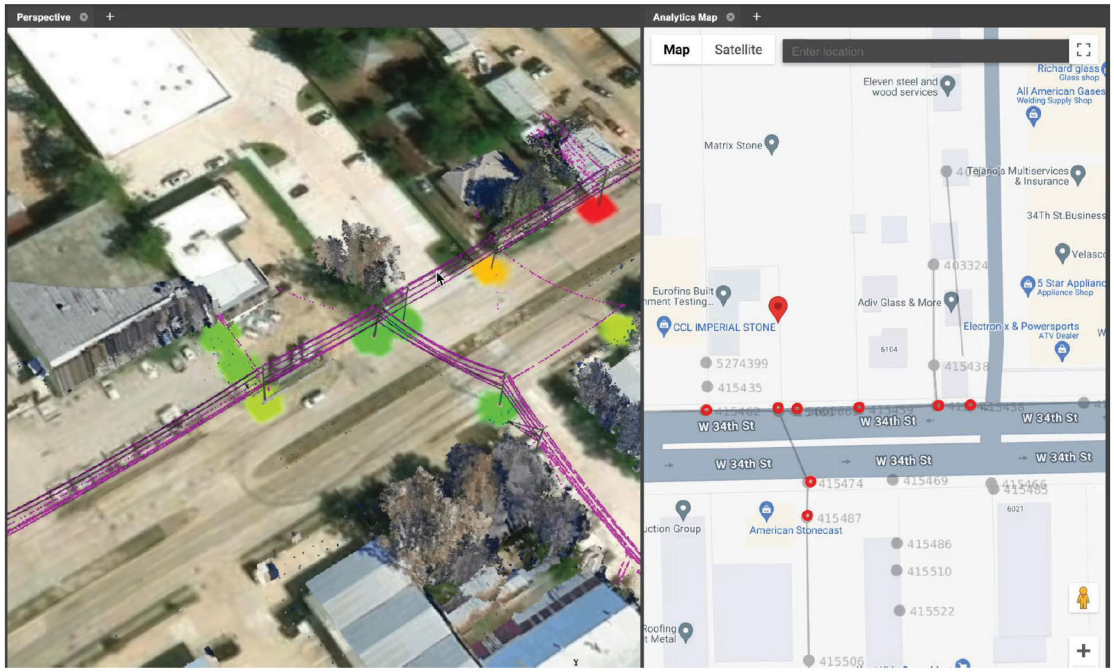
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Model vs Real World View



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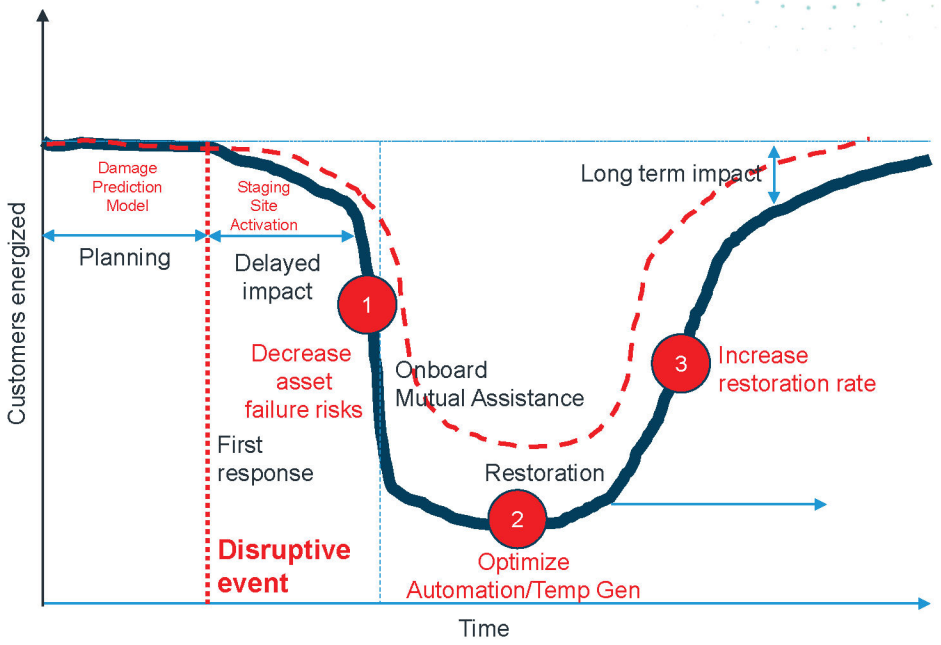


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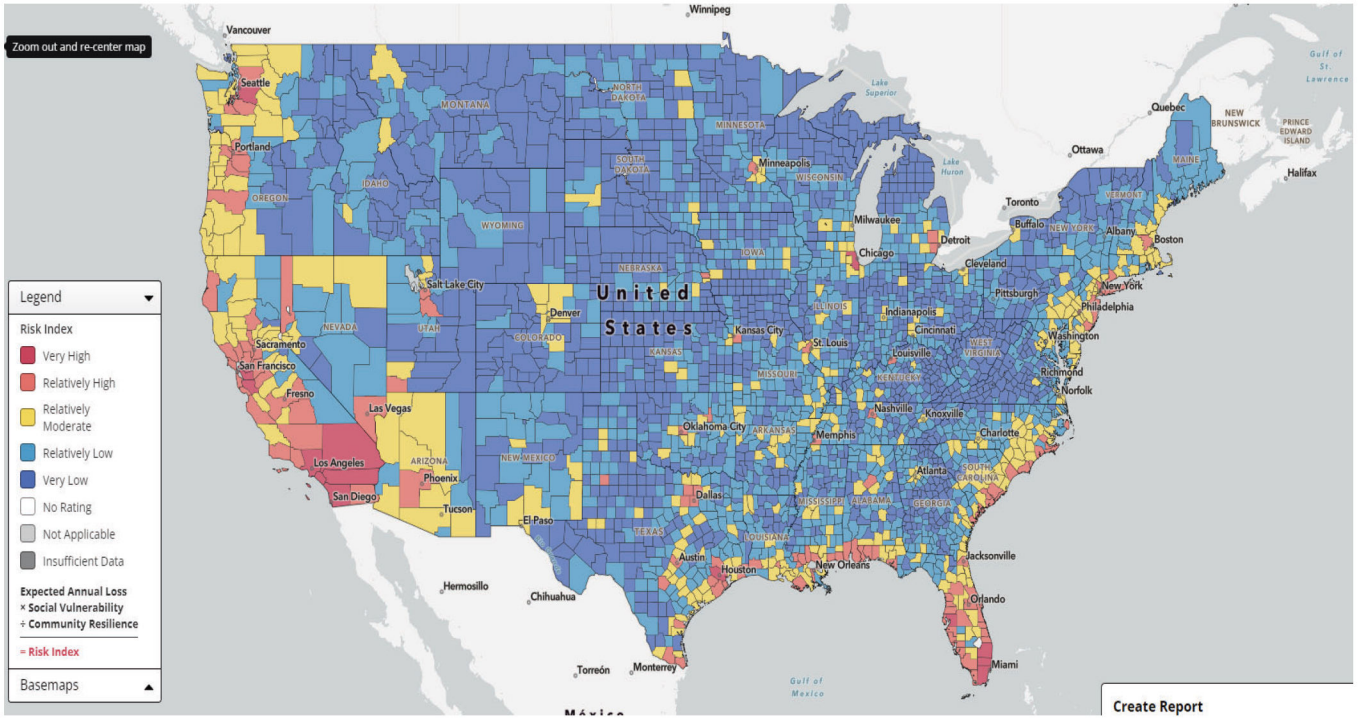
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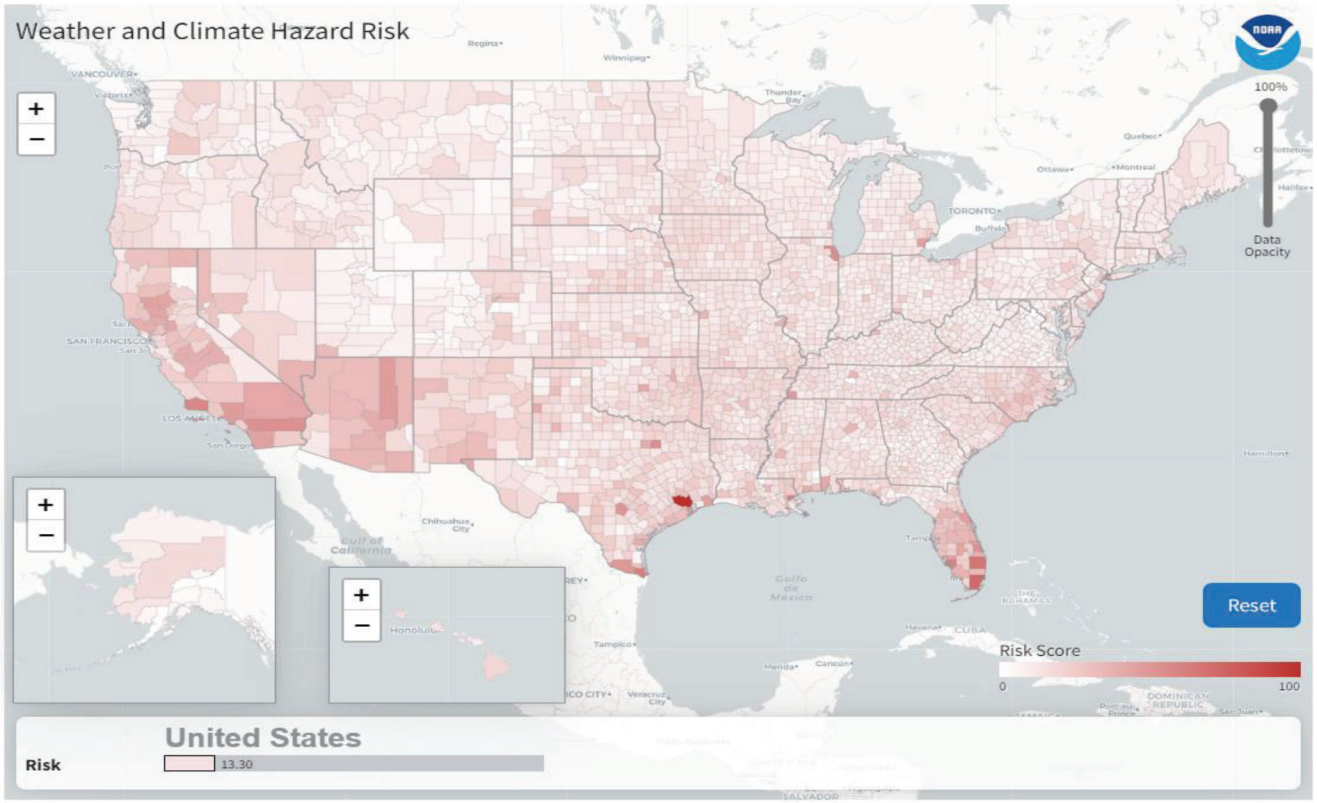


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FEMA National Risk Index Map



NOAA Weather and Climate Hazard Risk Map



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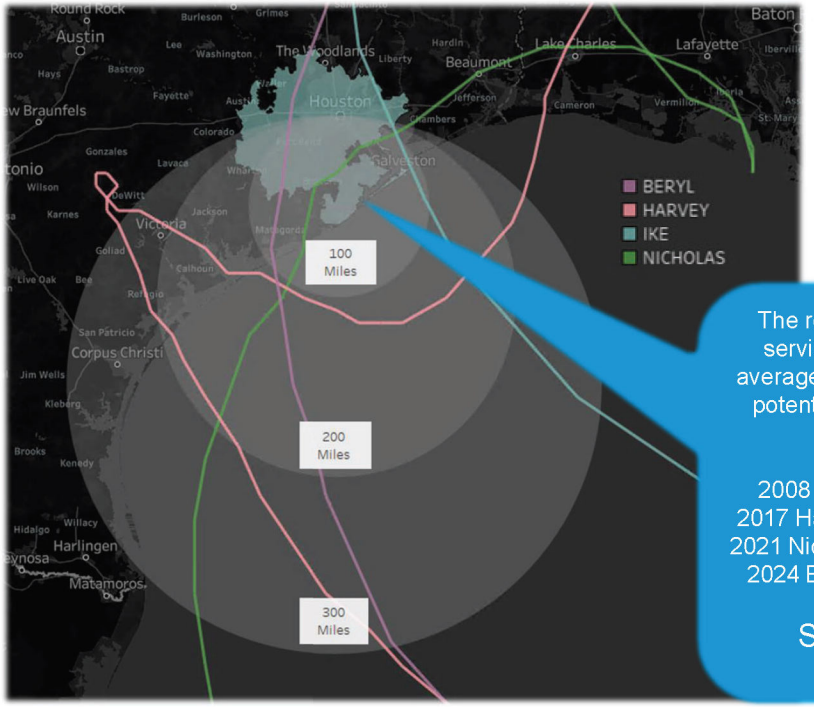
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Flooding, Freeze, Severe Storm, Tropical Cyclone, Wildfire, and Winter Storm Risk	100.00	15.88	12.14

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Houston Area Challenges to Coastal Resiliency

- **Highest coastal Population Density and a compact area**; customers in entire service territory subject to impacts
- Of coastal areas with higher **Population Density,** the Greater Houston Area has the **highest Vegetation Density**
- Higher levels of **Population and Vegetation Density** increase non-utility asset occurrence causing failures and limit **Asset Accessibility;** a major factor in rate of customer restoration
  - Typical hurricanes: about **300 miles wide**
  - Hurricane-force winds: extend outward about **25 miles (small hurricane) to more than 150 miles (large hurricane)**. Tropical storm-force winds can extend upwards of 300 miles
  - Frequently, the **right side of a hurricane ('the dirty side") is the most dangerous** in terms of storm surge, rainfall, winds, and/or tornadoes.



The relatively small CEHE service territory results in average hurricanes having the potential to impact **100%** of assets.

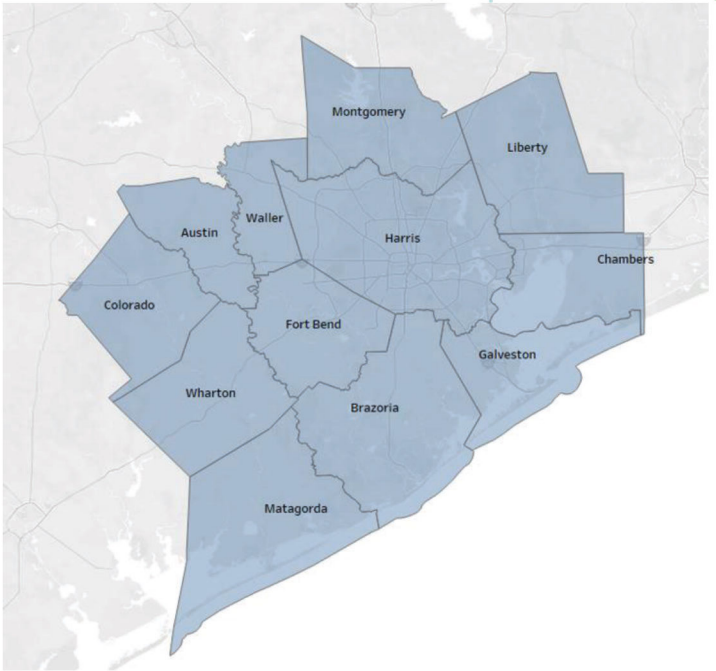
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Storm track is important!

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Adjusting to Exceed Resiliency Expectations

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- Accelerate deployment of industry leading AI technologies to optimize mitigation of risks, investment decisions, and improve customer restoration decision making processes and execution
- Transitioning from a program to project based approach based using recently completed accessibility analytics
- Must increase the pace of asset deployment based on: Post-Beryl lessons learned, Greater Houston Resiliency Initiative, and PUCT report

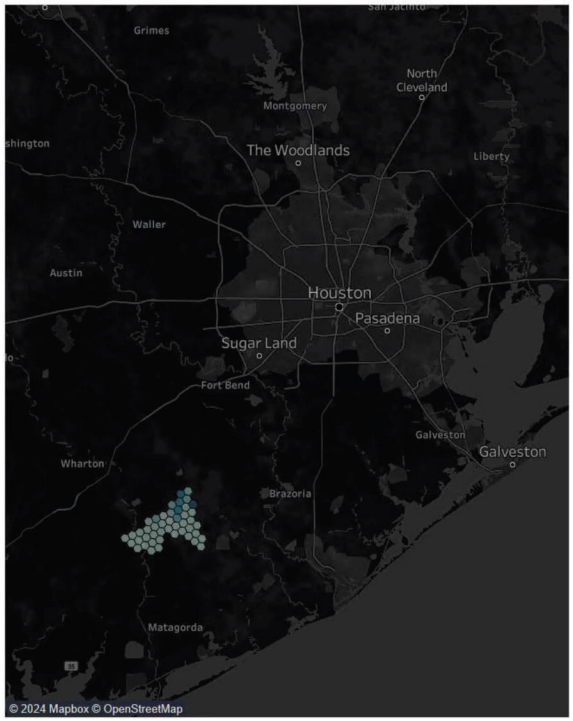


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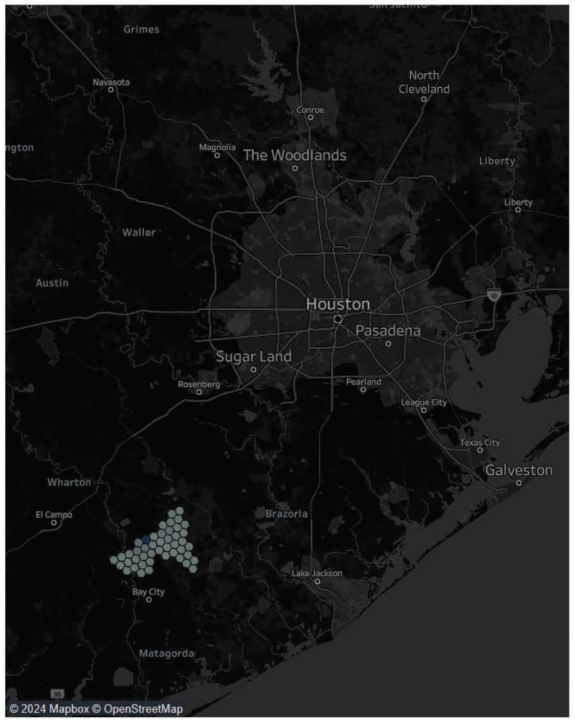
County Based Customer Impact Analysis

Matagorda County

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Outage Duration



- Identify areas and circuits with:
  - higher probability of longer duration outages
  - Critical Infrastructure
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- Aids in prioritizing strategic mitigation projects and aligning restoration processes

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3-Tiered Approach to Project Identification

Post-Event Analysis



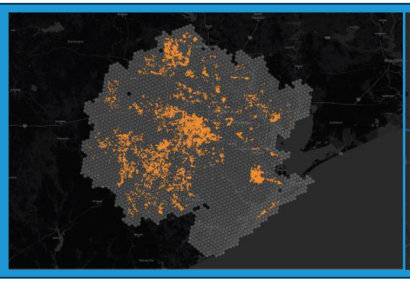
Industry Best Practices

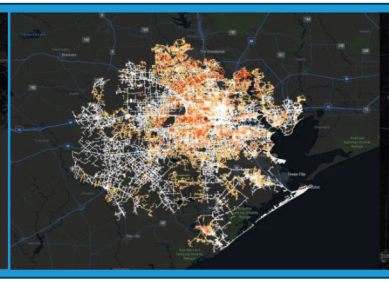


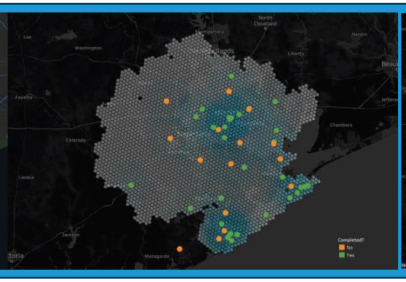




Scenario Based Modeling

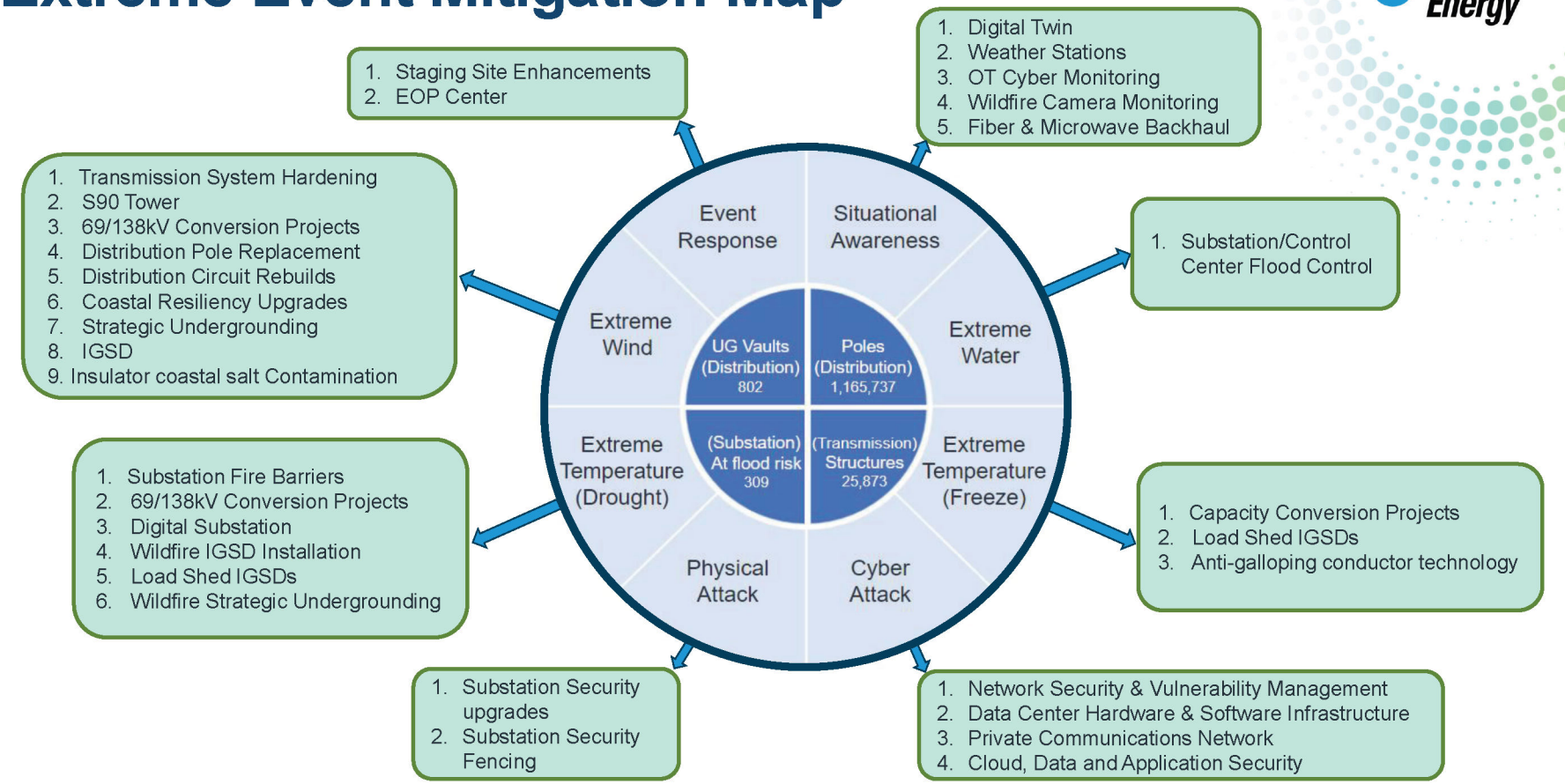








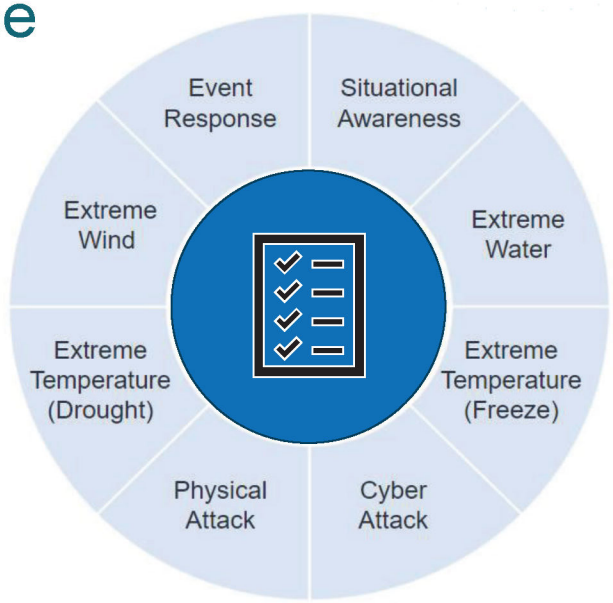
Extreme Event Mitigation Map



Scenario Based Framework

Review by Event Type

a. Risk Characterization of Event Type
b. Planning and Response
c. Benchmark Events
d. Best Practice Mitigations
e. Mitigation Prioritization
f. Project Selection Criteria
g. Project Location Map
h. Explanation of Benefits



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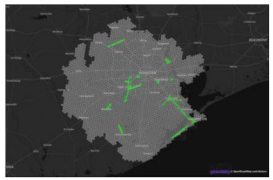
Event Types and Mitigations

Based on the different event types the following mitigations will be deployed based on the 3-tiered analysis approach

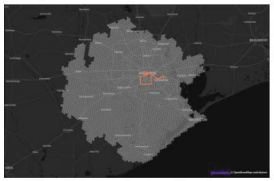
Event Class	Event Type (% assets likely affected)	Mitigation Objective
Extreme Wind	Hurricane (100%) Microburst (50%) Derecho (50%) Tornado (25%) High wind (50%)	Replace transmission structures with stronger towers or concrete/steel monopoles
		Replace select 90-degree structures with new steel monopoles
		Replace wooden structures with stronger towers or concrete/steel monopoles
		Replace or brace poles based on condition
		Replace equipment poles and reconfigure cross-arms
		Build additional transmission lines for contingency case
		Underground freeway crossings and low access spans
		Automation to reduce outage durations for customers
		Increase awareness and coastal insulation levels
Extreme Water	Hurricane (100%) Flood (80%)	Elevate facilities based on potential flood levels
Extreme Temp	Heat (Drought) (100%)	Install fire barriers to avoid cascading failures
		Replace existing circuits with higher capacity
		Enable wildfire related protection schemes
		Provide situational awareness in HFRAs
		Enable circuit segmentation schemes for HFRAs
		Enable circuit segmentation during load shed events
		Reduce ignition risk by undergrounding conductors
	Freeze (100%)	Replace existing circuits with higher capacity
		Enable circuit segmentation during load shed events
		Detect and prevent galloping conductors from icing

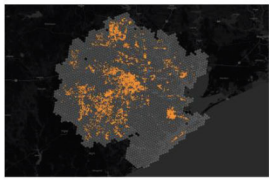
Event Class	Event Type (% assets effected)	Mitigation Objective
Physical Attack/Third Party Damage	Substation Security	Security Upgrades and Fencing
	Damage from vessels (10%)	Mitigate extended outages from 3rd party damage
	Damage from vehicles (1%)	Mitigate widespread outages from vehicle events
		Mitigate localized outages from vehicle events
		Mitigate widespread outages from vehicle events
		Reduce outage durations for customers upstream
Cyber Attack	OT Security	Enhance security of OT systems
	Secure Communications	Provide increased security for critical voice, automation and monitoring systems
	Cybersecurity Monitoring	Threat detection for evolving cyber risk
Situational Awareness	LiDAR Modeling	Provide the basis for advance modeling and project selection
	Wildfire Analytics	
	Weather Analytics	
	Galloping Detection	Early warning for transmission line galloping
Event Response	Enhance Staging Sites	Increase crew productivity and deployment speed
	Operational Enhancements	Emergency Operations Platform to support disaster recovery decision making

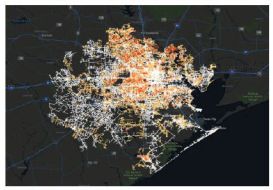
LiDAR Based Model Library Development

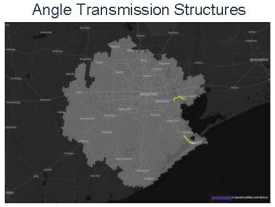

Lattice Transmission Structures

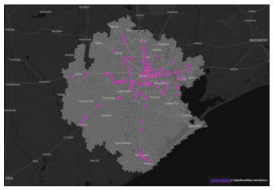

Angle Transmission Structures


Wood Transmission Structures


Distribution Pole Replacements

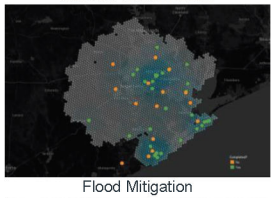

Tree Fall-in Risk


Coastal Transmission

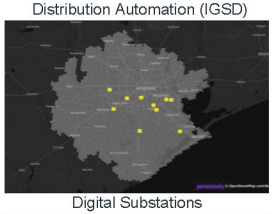

Strategic Undergrounding

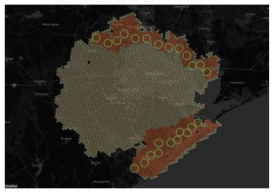

Distribution Automation (IGSD)


Coastal Contamination


Flood Mitigation


Transformer Fire Barriers

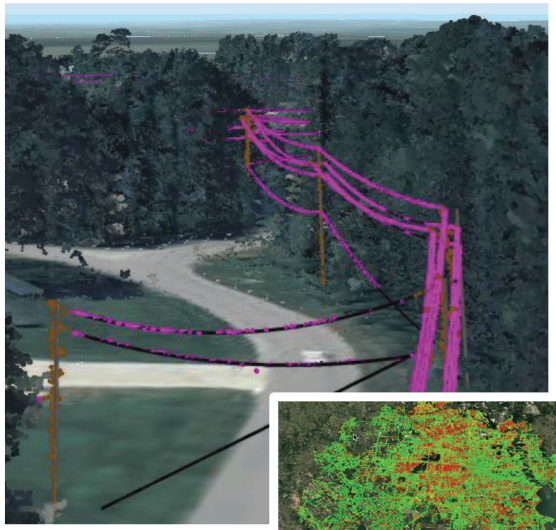

Digital Substations

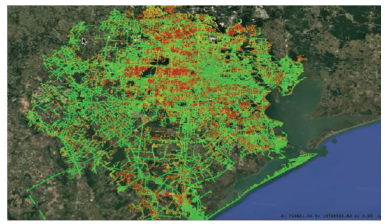

Wildfire Camera Monitoring


Wildfire Automation (IGSD)


Wildfire Strategic Undergrounding


Load Shed Automation (IGSD)





Matagorda County Take-Aways

- Communities of Concern
  - Smaller community in Pledger area
- Additional discussion points
  - Requested EOC presence in an event

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CenterPoint® Energy

SRP 2026-28 November Update

Industry Leading System Resiliency

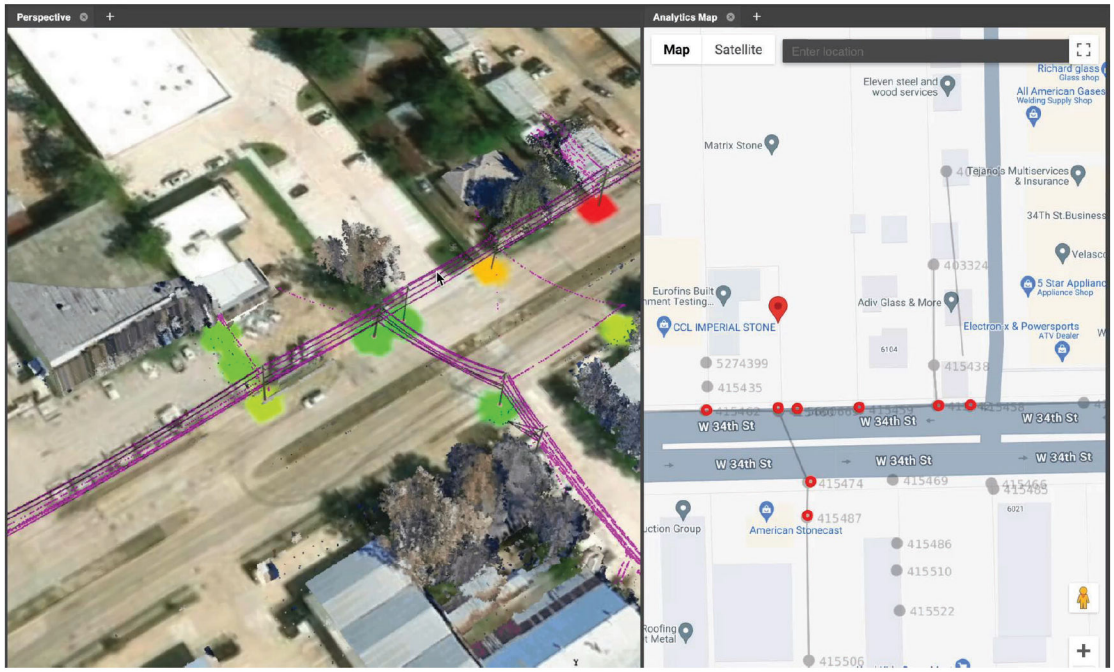
Our mission is to build and operate the most resilient coastal grid within the country by leading the way through strategic resiliency mitigations and the best-in-class customer communications. This will be accomplished through:

- Optimization of the deployment of the most effective mitigations and processes
- Maximization of capital efficiency through leading AI tools that balance system performance and cost with customer expectations.

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Model vs Real World View



Colors indicate GIS proximity: green = match GIS location, orange = slight mismatch, red = no GIS match

Fall in Risk and Truck Accessibility



Red = fall-in circuit risk, orange = relative vegetation encroachment risk

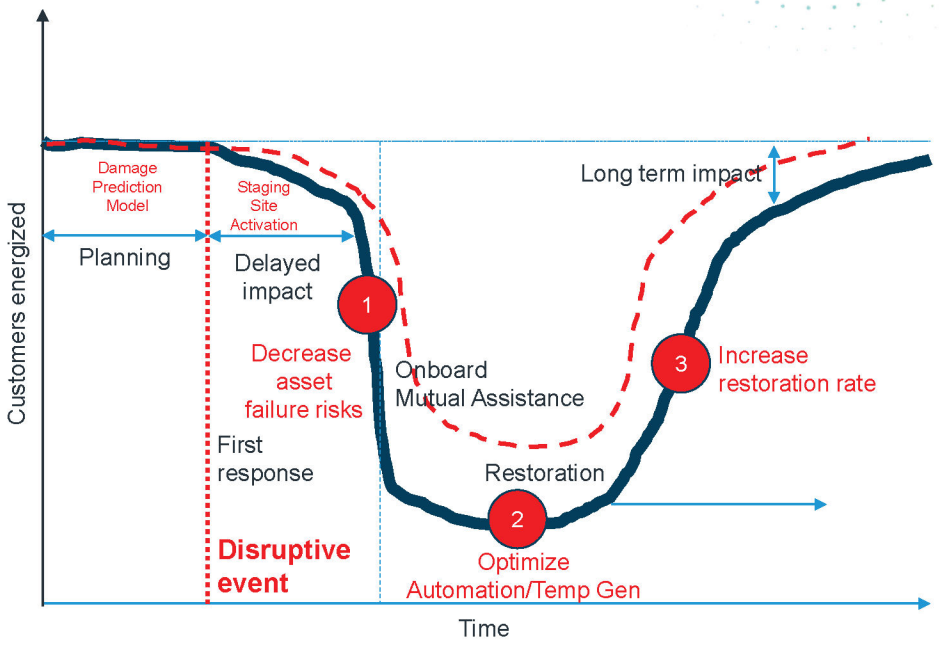


Orange = inaccessible, green = accessible

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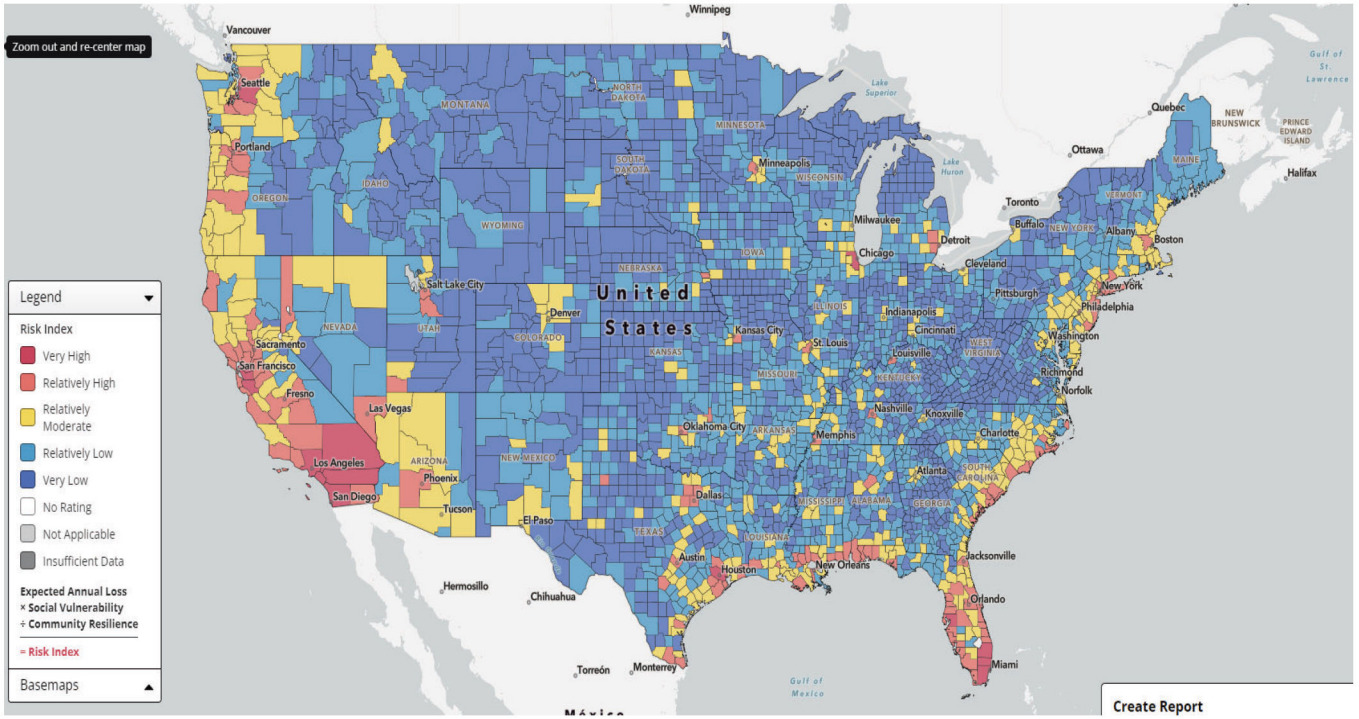
CEHE Strategy: Deploy the most effective mitigations in the least resilient locations

1. Decrease asset failure risks prioritizing less accessible locations based on criticality and total customer counts
2. Increase utilization of automated devices for a self-healing grid and optimization of temp generation
3. Reduce customer restoration times by decreasing the number of asset failures, customers affected, and time needed per asset repair.

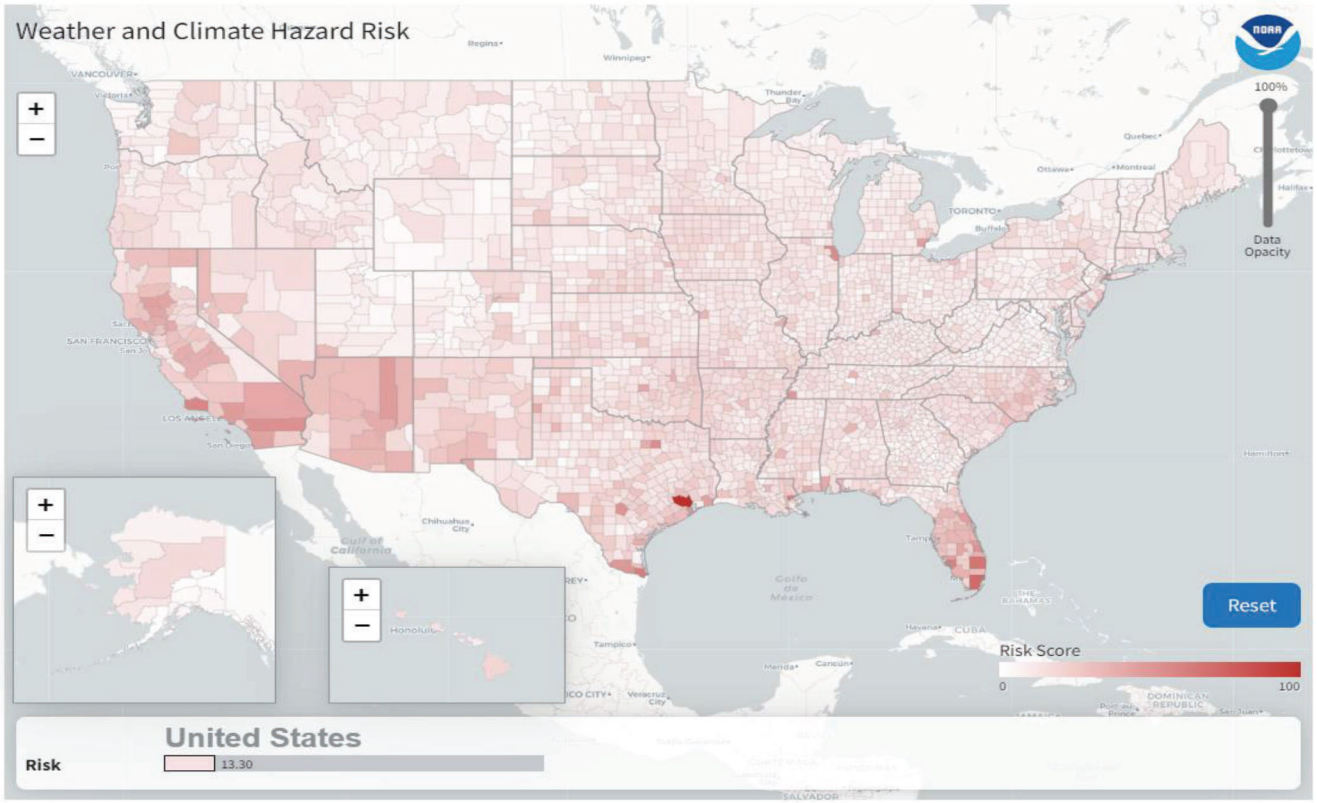


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FEMA National Risk Index Map



NOAA Weather and Climate Hazard Risk Map



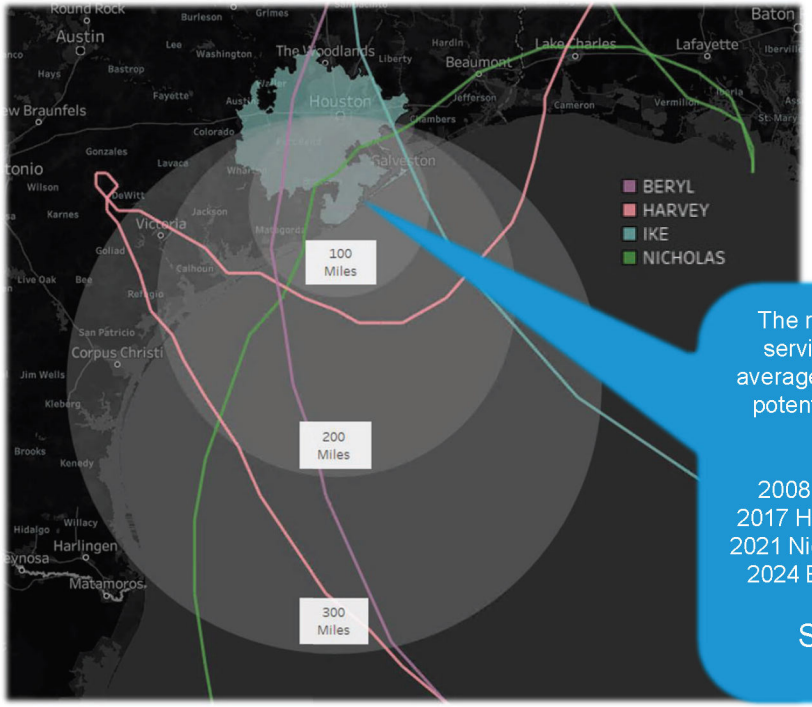
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NOAA Risk and Vulnerability Summary

Data Type	Harris County	Texas	U.S.
Weather and Climate Risk			
Drought Risk	20.36	14.32	11.61
Flooding Risk	100.00	12.97	9.13
Freeze Risk	12.05	13.09	15.72
Severe Storm Risk	94.56	20.58	16.99
Tropical Cyclone Risk	100.00	6.41	4.36
Wildfire Risk	11.81	11.28	6.30
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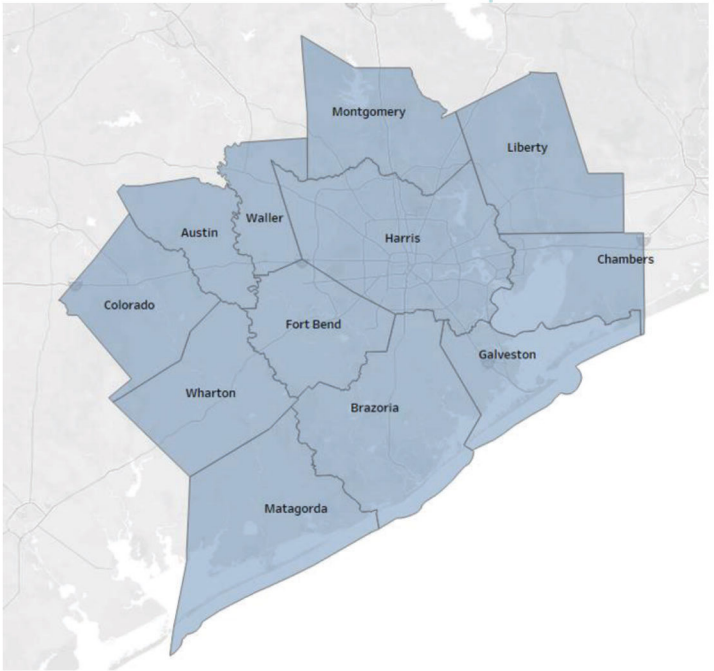
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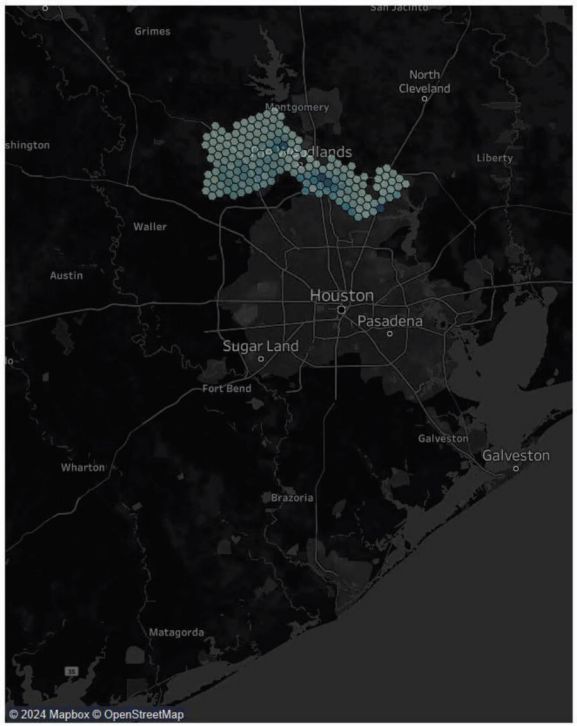


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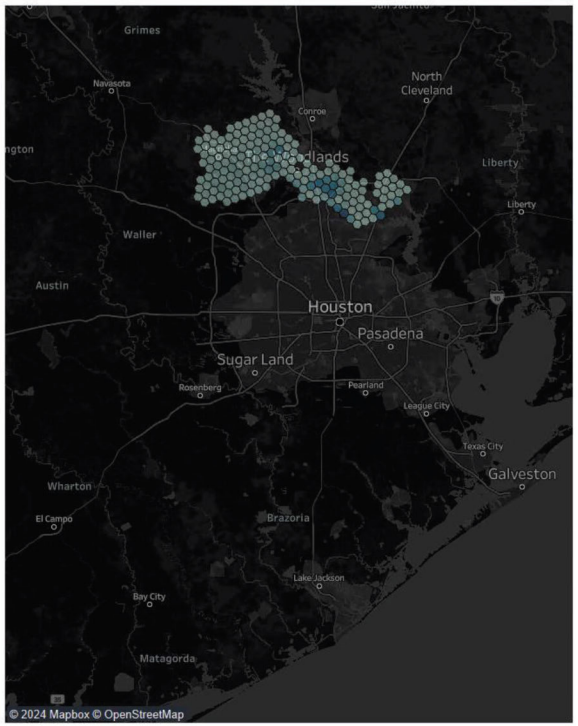
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3-Tiered Approach to Project Identification

Post-Event Analysis



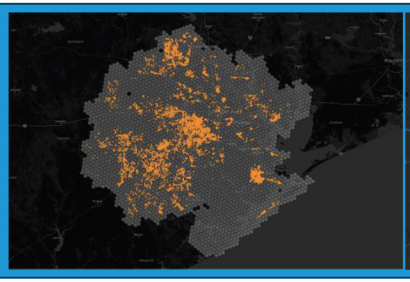
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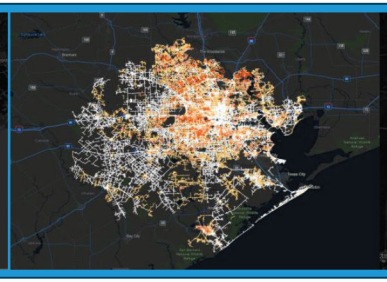


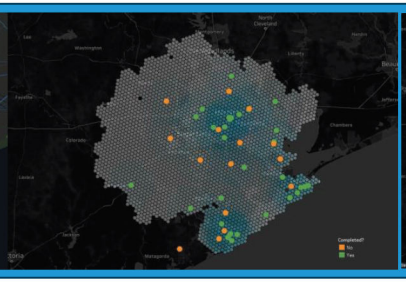




Scenario Based Modeling

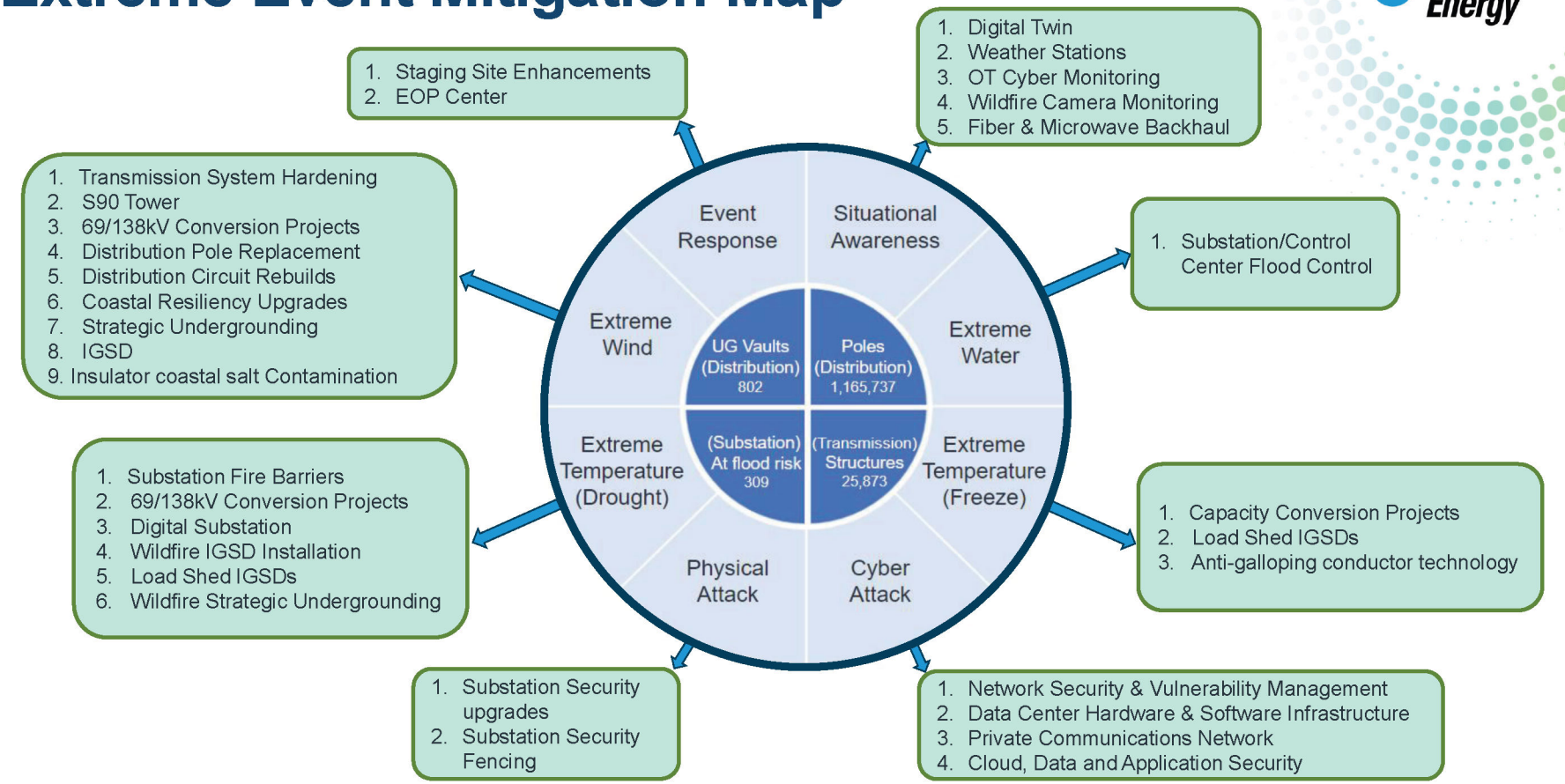








Extreme Event Mitigation Map

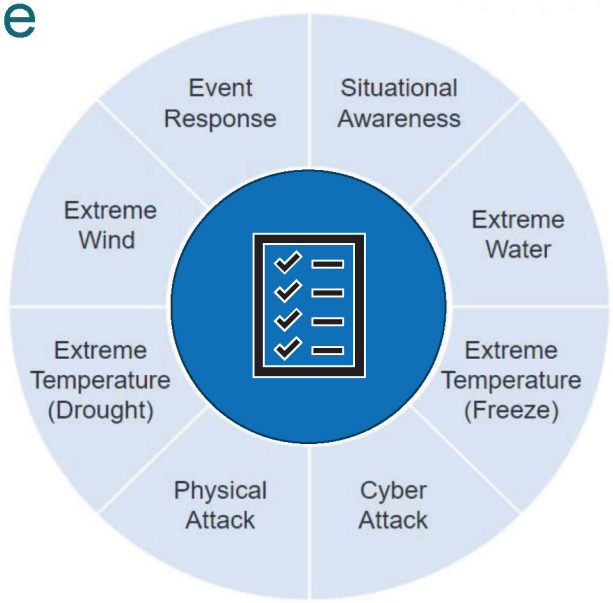


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Scenario Based Framework

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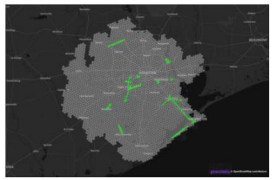
Event Types and Mitigations

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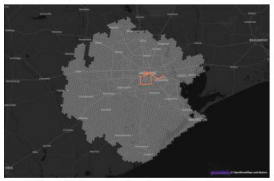
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		Replace select 90-degree structures with new steel monopoles
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		Replace equipment poles and reconfigure cross-arms
		Build additional transmission lines for contingency case
		Underground freeway crossings and low access spans
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		Enable wildfire related protection schemes
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		Enable circuit segmentation schemes for HFRAs
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		Reduce ignition risk by undergrounding conductors
	Freeze (100%)	Replace existing circuits with higher capacity
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		Detect and prevent galloping conductors from icing

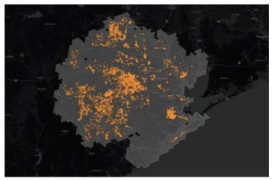
Event Class	Event Type (% assets effected)	Mitigation Objective
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		Mitigate widespread outages from vehicle events
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	Secure Communications	Provide increased security for critical voice, automation and monitoring systems
	Cybersecurity Monitoring	Threat detection for evolving cyber risk
Situational Awareness	LiDAR Modeling	Provide the basis for advance modeling and project selection
	Wildfire Analytics	
	Weather Analytics	
	Galloping Detection	Early warning for transmission line galloping
Event Response	Enhance Staging Sites	Increase crew productivity and deployment speed
	Operational Enhancements	Emergency Operations Platform to support disaster recovery decision making

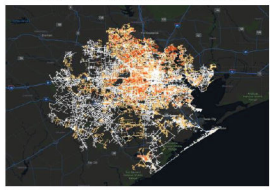
LiDAR Based Model Library Development

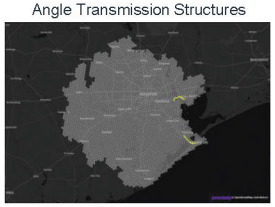

Lattice Transmission Structures

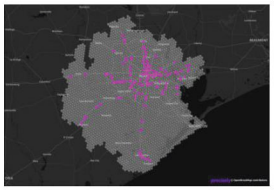

Angle Transmission Structures


Wood Transmission Structures


Distribution Pole Replacements

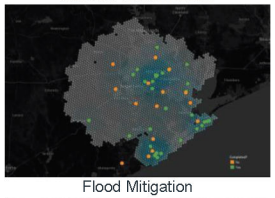

Tree Fall-in Risk


Coastal Transmission

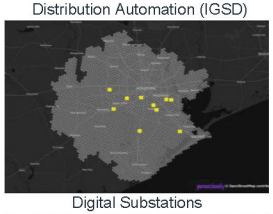

Strategic Undergrounding

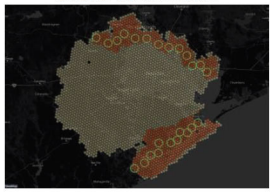

Distribution Automation (IGSD)


Coastal Contamination


Flood Mitigation


Transformer Fire Barriers

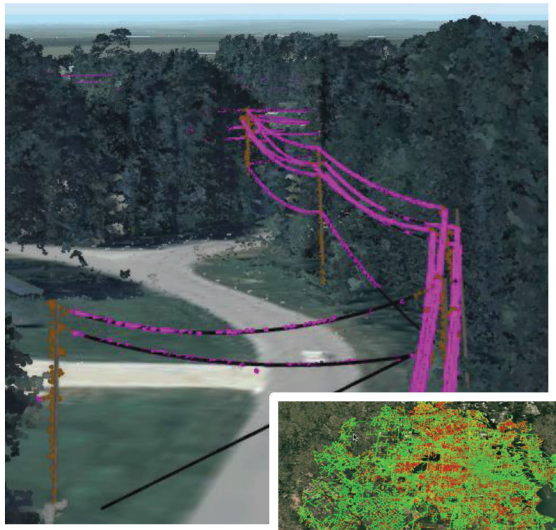

Digital Substations

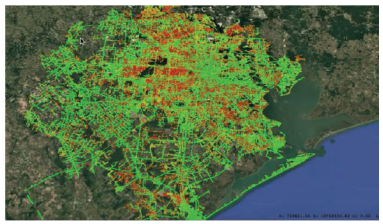

Wildfire Camera Monitoring


Wildfire Automation (IGSD)


Wildfire Strategic Undergrounding


Load Shed Automation (IGSD)





Montgomery County Take-Aways

- Communities of Concern
  - Woodbridge, Magnolia, Woodforest, Rayford Sawdust corridor
  - Prioritize essential services – Kingwood hospital
- Additional discussion points
  - Improve communications with mutual assistance crews
  - Year-round modeling, drills, and preparedness so we're not "caught off guard"
  - Accelerate wood pole replacements
  - Focus on activities core to our business

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CenterPoint® Energy

SRP 2026-28 November Update

Industry Leading System Resiliency

Our mission is to build and operate the most resilient coastal grid within the country by leading the way through strategic resiliency mitigations and the best-in-class customer communications. This will be accomplished through:

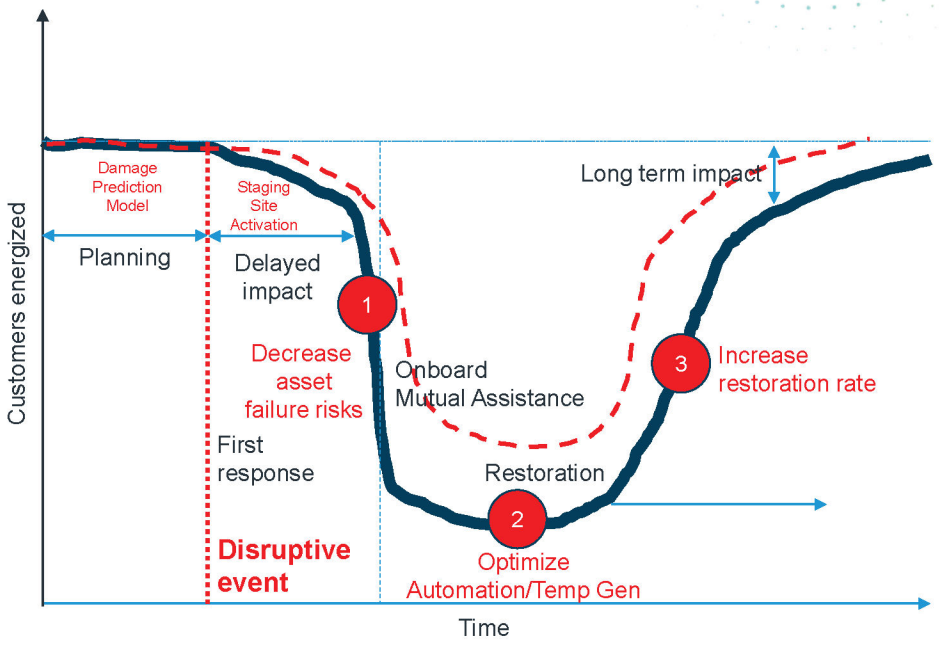
- Optimization of the deployment of the most effective mitigations and processes
- Maximization of capital efficiency through leading AI tools that balance system performance and cost with customer expectations.

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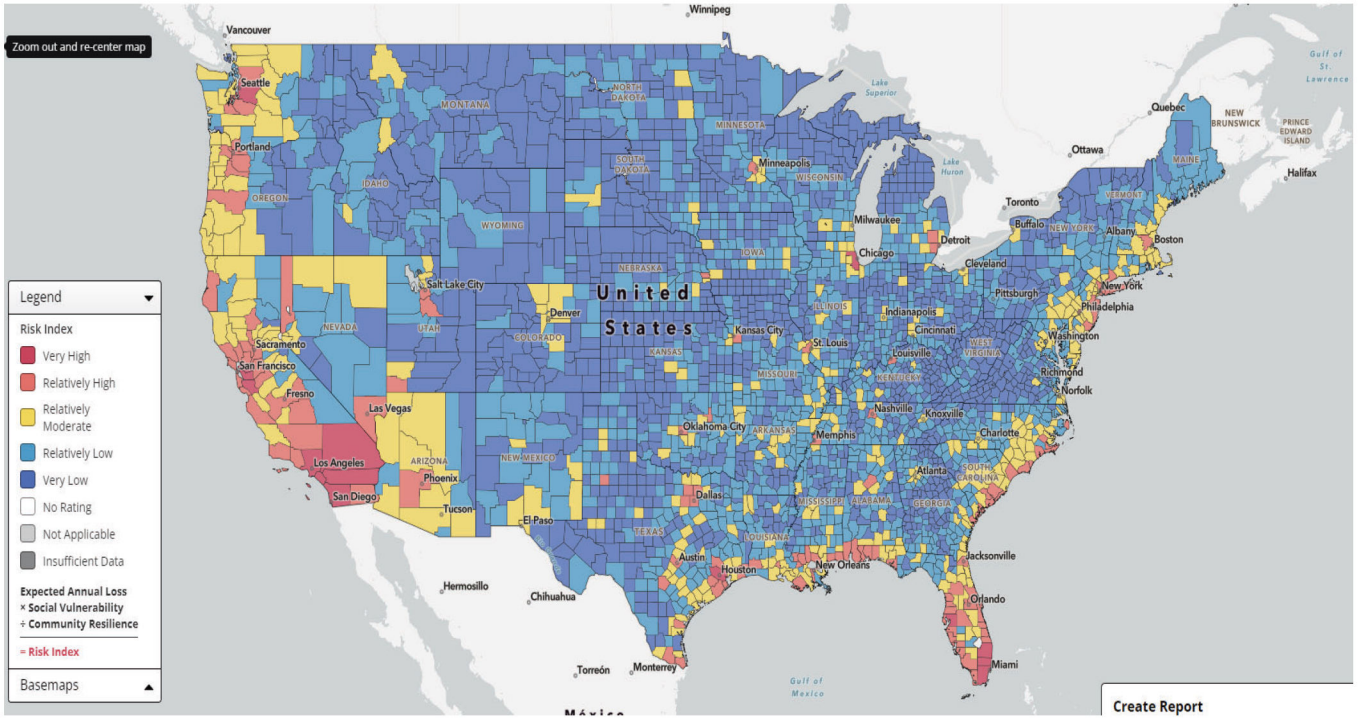
CEHE Strategy: Deploy the most effective mitigations in the least resilient locations

1. Decrease asset failure risks prioritizing less accessible locations based on criticality and total customer counts
2. Increase utilization of automated devices for a self-healing grid and optimization of temp generation
3. Reduce customer restoration times by decreasing the number of asset failures, customers affected, and time needed per asset repair.



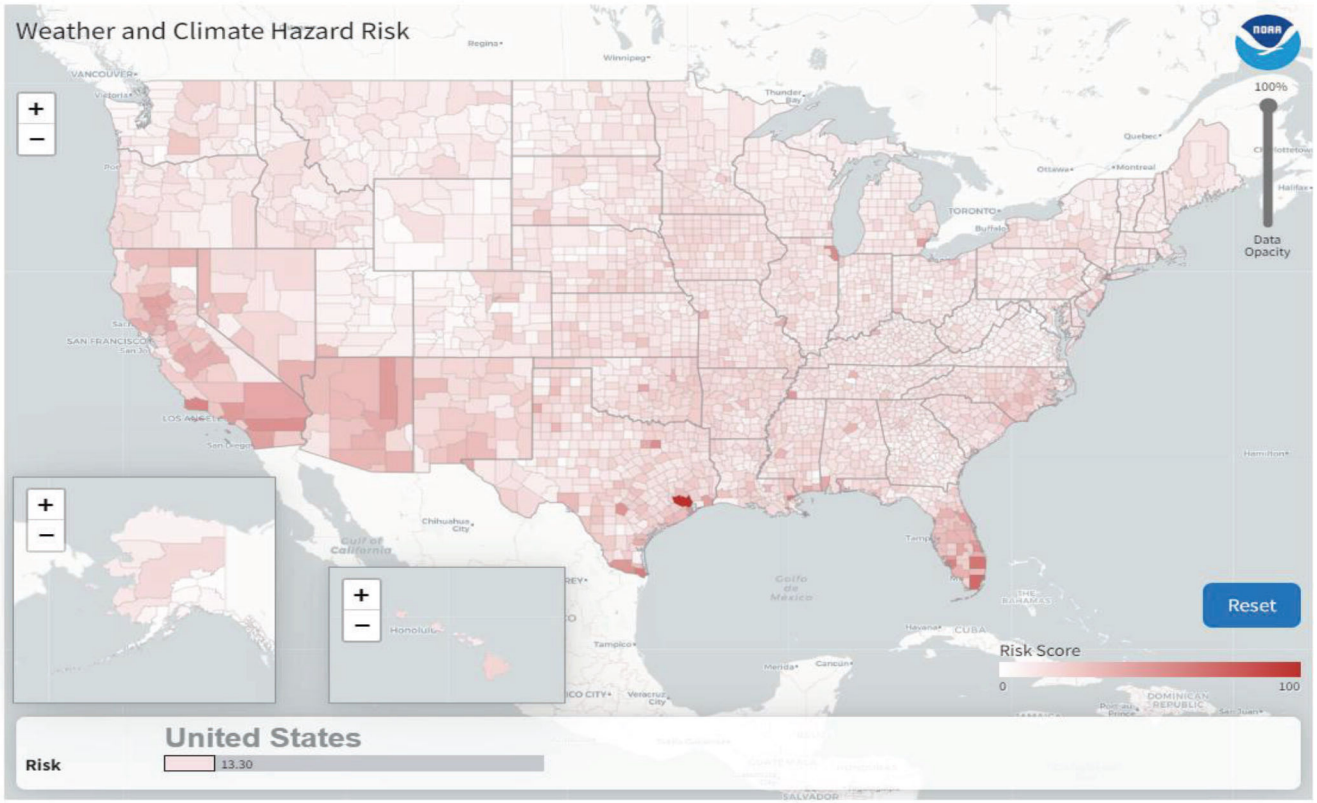
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FEMA National Risk Index Map



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NOAA Weather and Climate Hazard Risk Map



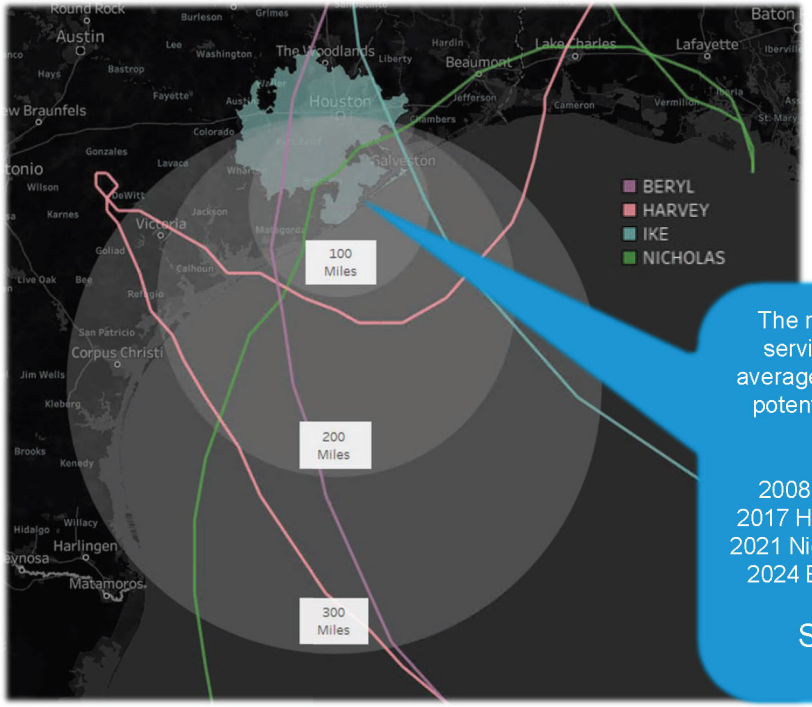
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NOAA Risk and Vulnerability Summary

Data Type	Harris County	Texas	U.S.
Weather and Climate Risk			
Drought Risk	20.36	14.32	11.61
Flooding Risk	100.00	12.97	9.13
Freeze Risk	12.05	13.09	15.72
Severe Storm Risk	94.56	20.58	16.99
Tropical Cyclone Risk	100.00	6.41	4.36
Wildfire Risk	11.81	11.28	6.30
Winter Storm Risk	65.33	15.99	13.71
Flooding, Freeze, Severe Storm, Tropical Cyclone, Wildfire, and Winter Storm Risk	100.00	15.88	12.14

Houston Area Challenges to Coastal Resiliency

- **Highest coastal Population Density and a compact area**; customers in entire service territory subject to impacts
- Of coastal areas with higher **Population Density,** the Greater Houston Area has the **highest Vegetation Density**
- Higher levels of **Population and Vegetation Density** increase non-utility asset occurrence causing failures and limit **Asset Accessibility;** a major factor in rate of customer restoration
  - Typical hurricanes: about **300 miles wide**
  - Hurricane-force winds: extend outward about **25 miles (small hurricane) to more than 150 miles (large hurricane)**. Tropical storm-force winds can extend upwards of 300 miles
  - Frequently, the **right side of a hurricane ('the dirty side") is the most dangerous** in terms of storm surge, rainfall, winds, and/or tornadoes.



The relatively small CEHE service territory results in average hurricanes having the potential to impact **100%** of assets.

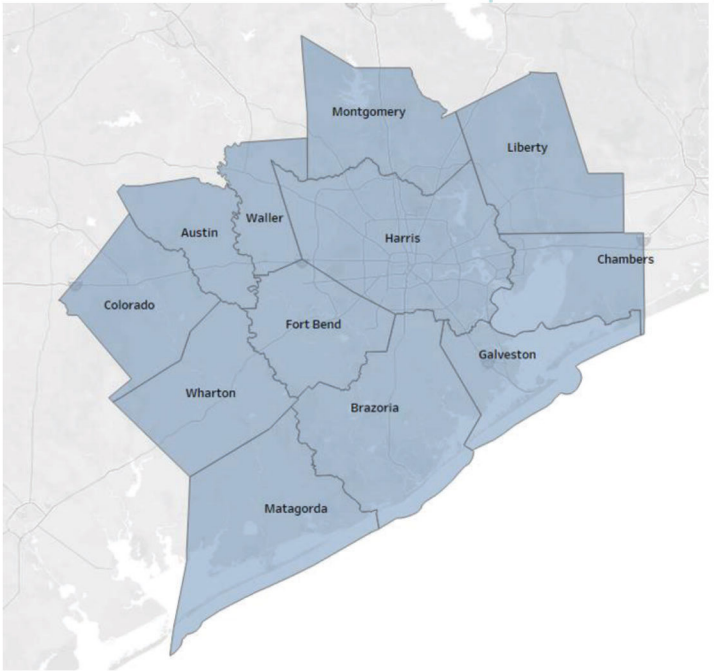
2008 Ike – 600 miles wide
2017 Harvey – 280 miles wide
2021 Nicholas – 115 miles wide
2024 Beryl – 376 miles wide

Storm track is important!

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Adjusting to Exceed Resiliency Expectations

- Incorporated 3rd party feedback for communications, smarter grid, stronger grid, and customer restoration
- Accelerate deployment of industry leading AI technologies to optimize mitigation of risks, investment decisions, and improve customer restoration decision making processes and execution
- Transitioning from a program to project based approach based using recently completed accessibility analytics
- Must increase the pace of asset deployment based on: Post-Beryl lessons learned, Greater Houston Resiliency Initiative, and PUCT report

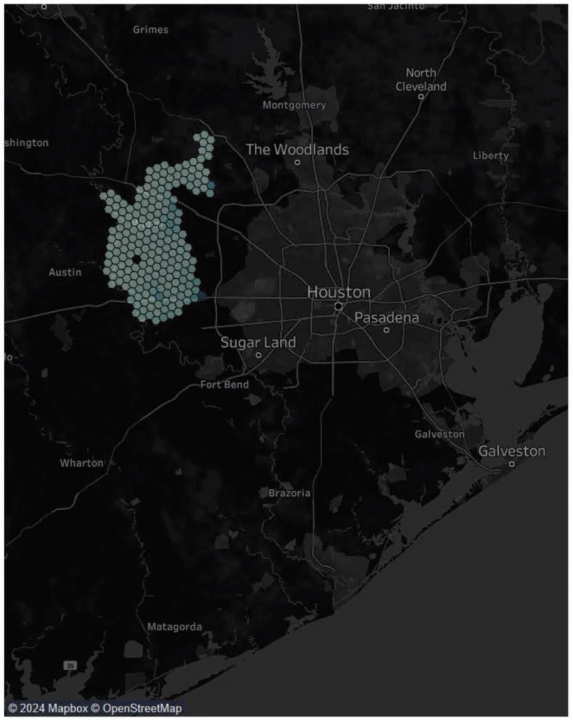


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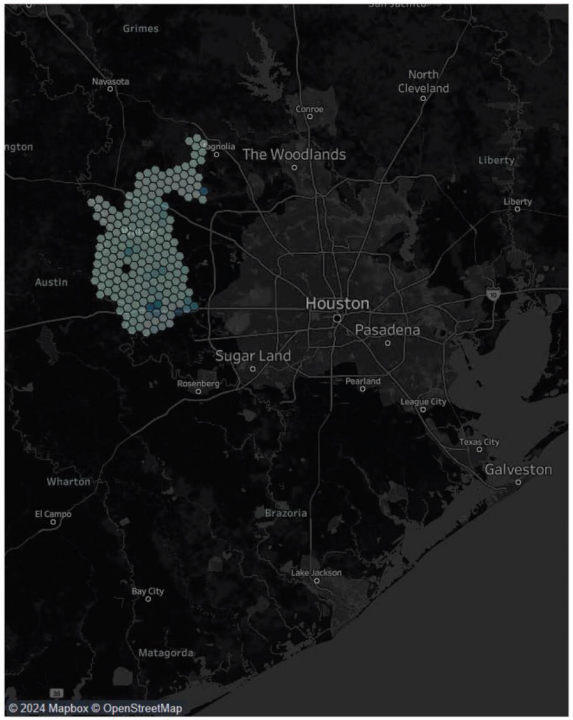
County Based Customer Impact Analysis

Waller County

Damage Prediction



Outage Duration



- Identify areas and circuits with:
  - higher probability of longer duration outages
  - Critical Infrastructure
  - Priority County OEM locations
- Aids in prioritizing strategic mitigation projects and aligning restoration processes

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3-Tiered Approach to Project Identification

Post-Event Analysis



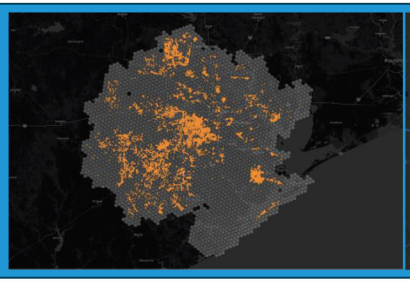
Industry Best Practices

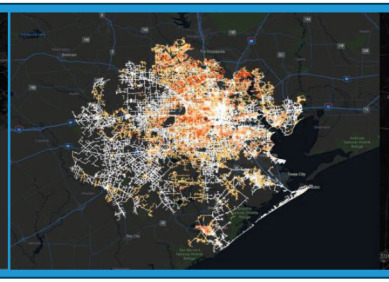


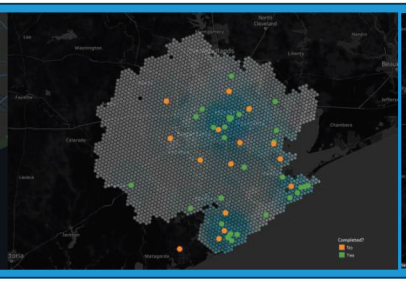




Scenario Based Modeling





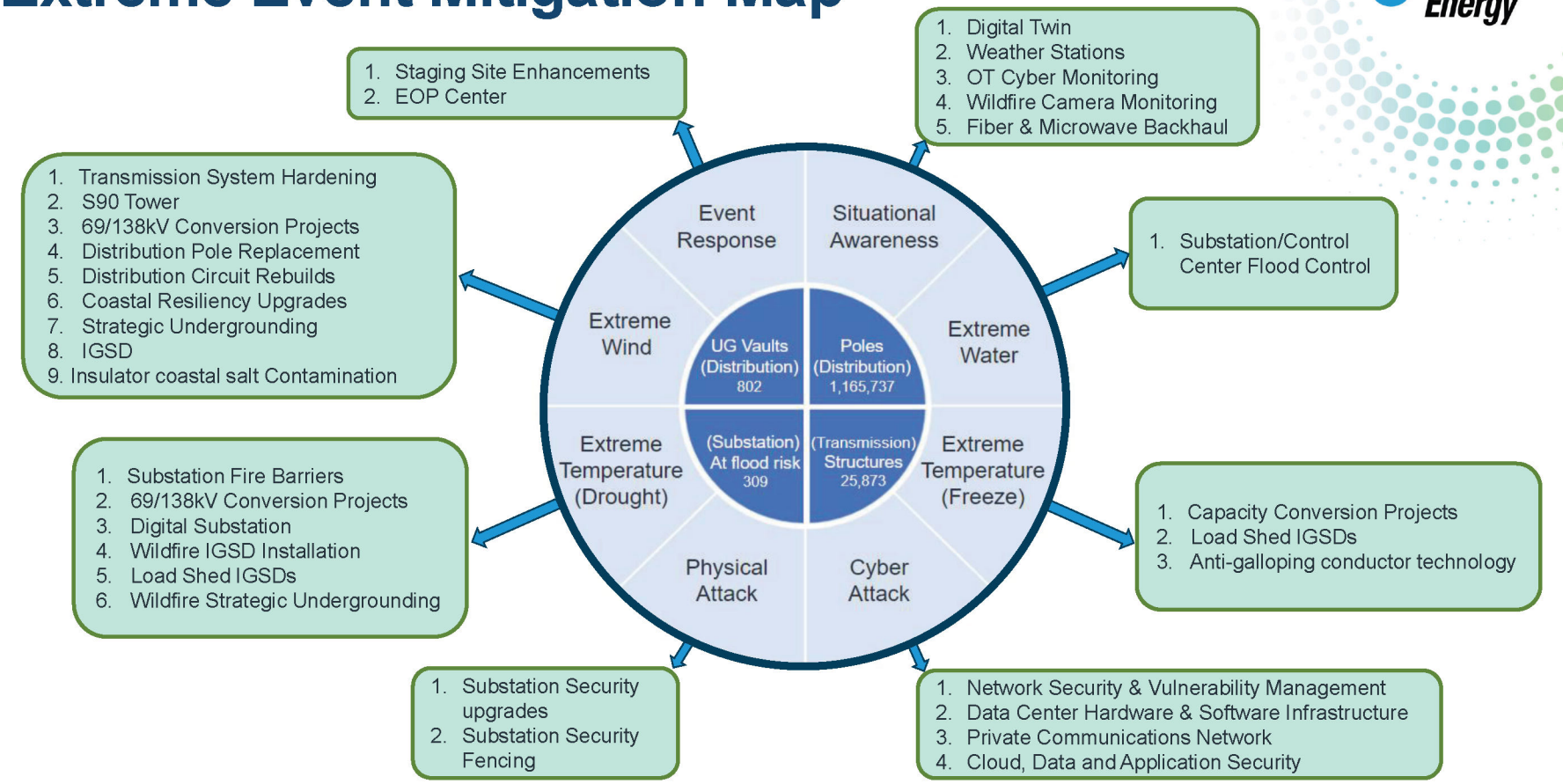




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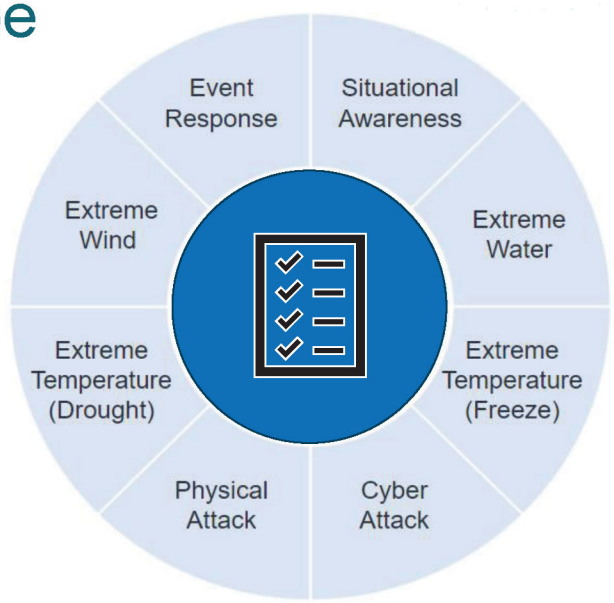
Extreme Event Mitigation Map



Scenario Based Framework

Review by Event Type

a. Risk Characterization of Event Type
b. Planning and Response
c. Benchmark Events
d. Best Practice Mitigations
e. Mitigation Prioritization
f. Project Selection Criteria
g. Project Location Map
h. Explanation of Benefits



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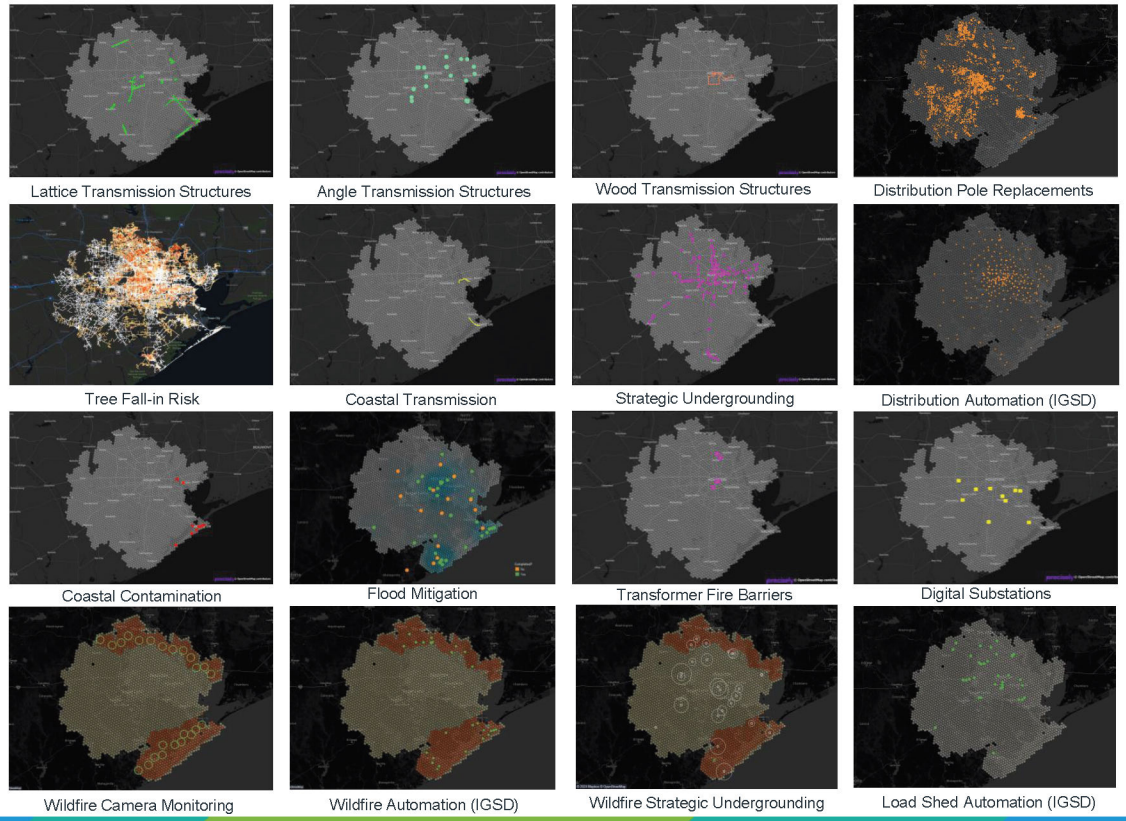
Event Types and Mitigations

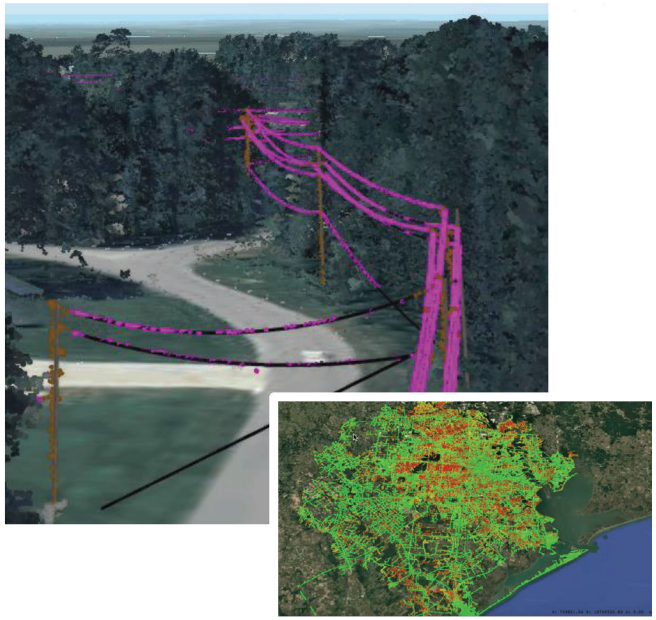
Based on the different event types the following mitigations will be deployed based on the 3-tiered analysis approach

Event Class	Event Type (% assets likely affected)	Mitigation Objective
Extreme Wind	Hurricane (100%) Microburst (50%) Derecho (50%) Tornado (25%) High wind (50%)	Replace transmission structures with stronger towers or concrete/steel monopoles
		Replace select 90-degree structures with new steel monopoles
		Replace wooden structures with stronger towers or concrete/steel monopoles
		Replace or brace poles based on condition
		Replace equipment poles and reconfigure cross-arms
		Build additional transmission lines for contingency case
		Underground freeway crossings and low access spans
		Automation to reduce outage durations for customers
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LiDAR Based Model Library Development





Waller County Take-Aways

- Communities of Concern
  - Prairie View
  - Brookshire
- Additional discussion points
  - Inclusion of critical customers in modeling

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