



ASTM E3429 UNDER E06.25 PERFORMANCE OF BUILDINGS

Property Resilience Assessment

Assessing Resilience for C-PACE

Attributes of ASTM Standards



OPEN AND TRANSPARENT PROCESS

- Direct and equal participation to ASTM for all people and organizations
- Information on ASTM International standards are transparent and readily available online

IMPARTIAL, CONSENSUS-BASED MODEL OF ENGAGEMENT

- Balanced system where producer votes are equal to those of users
- Impartial, inclusive, and fair to all, with appeals and protections to avoid abuses

**12,000+ ASTM
standards
globally**

EFFECTIVE AND RELEVANT STANDARDS

- Constantly responding to market needs, keeping pace with industry and innovation
- Relevant to the global marketplace and performance-based in application

DRIVEN BY RESEARCH, DATA, AND SCIENCE-BASED DECISIONS

- Focus on science and technical quality, and specifically addressing risks and needs

COLLABORATION WITH OTHER STANDARDS BODIES TO AVOID DUPLICATIONS

- Collaborate with other standards organizations to avoid duplication and to pursue international standards work in a smart way

Partial List of ASTM Standards for CRE



- ASTM E 1527 – Standard Practice for Environmental Site Assessments - Phase I
- ASTM E 2018 – Standard Guide for Property Conditions Assessments
- ASTM E 2557 - Standard Practice for Probable Maximum Loss Evaluations for Earthquake Due Diligence Assessments
- ASTM E 1903 – Standard Guide for Environmental Site Assessments - Phase II Investigation
- ASTM E 2600 – Standard Practice for the Assessment of Vapor Intrusion into Structures on Property Involved in Real Estate Transactions

Why develop a Property Resilience Assessment Standard



Investor Pressure to disclose and address climate risk. To enhance resilience, a review of all natural hazards along with climate-related risks is needed.



Understand physical climate risk for competitive advantage. For acquisition, disposition, risk management, underwriting, reporting, property management and capital planning.



Providers are generating climate risk assessments with wide variation in scope (climate risk data providers, engineers, consultants).



Transparency and Consistency is needed. Risk information is enhanced when provided alongside site observations and resilience recommendations.

Insurance Crisis

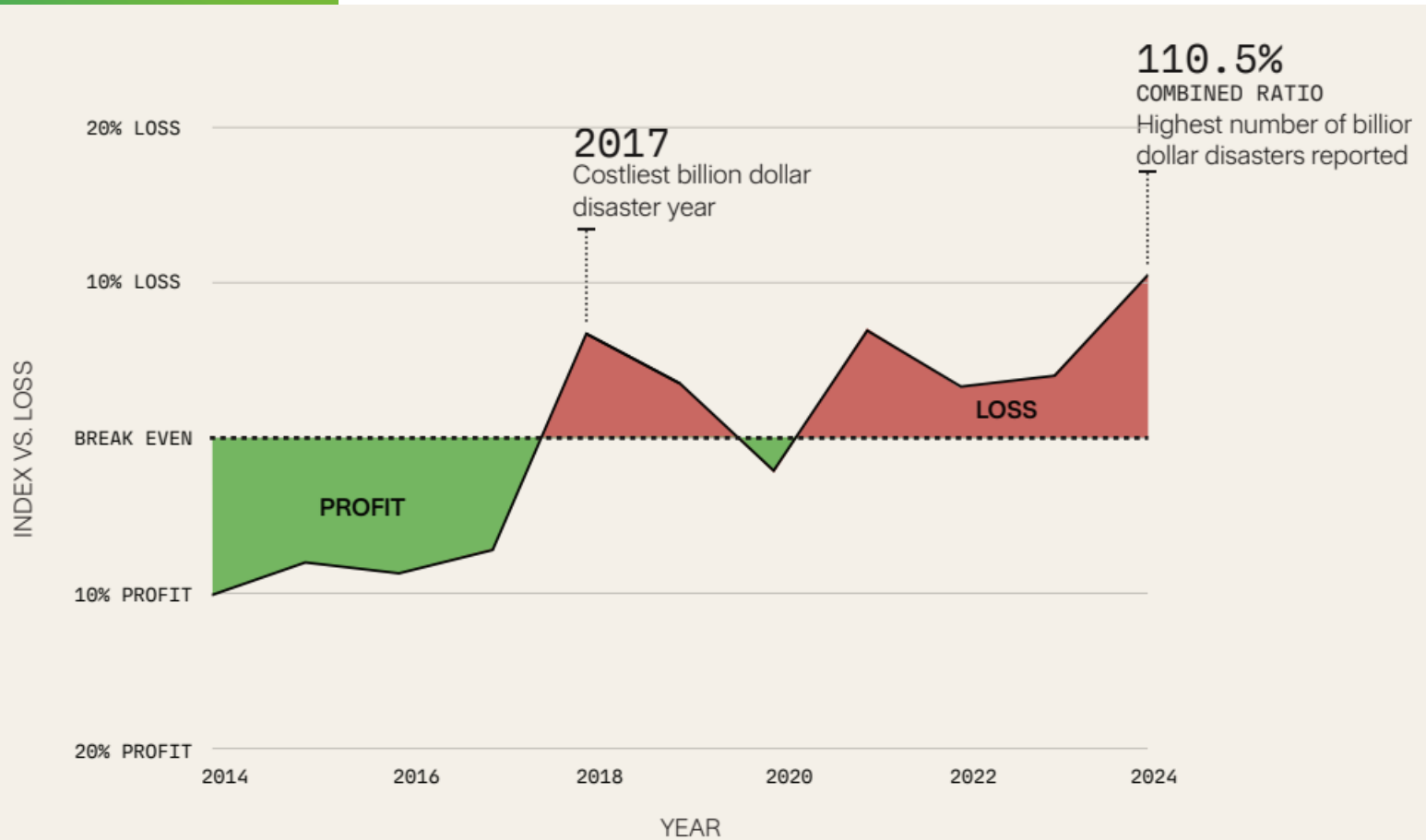


Figure 10. Homeowners insurance industry annual combined ratio, 2013 - 2023

Note: Break even is equivalent to a 100% combined ratio, where claims & expenses = premiums collected. A 10% loss corresponds to a 110% combined ratio and a 10% profit corresponds to a 90% combined ratio.

Access to Climate Risk Information Expanding

The image displays the Zillow Climate Risk tool interface. At the top, navigation options include 'Back to search', 'Zillow' logo, and actions like 'Save', 'Share', 'Hide', and 'More'. Below this are tabs for 'Overview', 'Facts & features', 'Market value', 'Payment calculator', and 'Neighborhood'. The main section is titled 'Climate risks' with the source 'First Street®'. It features five risk factor cards: Flood Factor (Extreme, 9/10), Fire Factor (Moderate, 4/10), Wind Factor (Extreme, 9/10), Air Factor (Moderate, 3/10), and Heat Factor (Extreme, 10/10). A 'Request a tour' button is also present. A detailed 'Flood Factor' report is shown in a pop-up, indicating an 'Extreme' rating (9/10) and identifying the property as a 'FEMA Special Flood Hazard Area'. It notes that a separate policy is required for a federally backed mortgage and that there is no record of flooding since 2001. The report also states a 99% chance of flooding over the next 30 years, with a table showing probabilities for 'This year' (17%), 'Next 15 years' (95%), and 'Next 30 years' (99%). A 'View Flood Factor report' link is provided at the bottom. The background shows a map with various risk overlays and a 'Depth of flooding' legend.

Street Satellite Lot lines

Flood Fire Wind Air Heat

Climate risks

Source: First Street®

Flood Factor
Extreme 9/10
FEMA hazard area
Insurance: critical

Fire Factor
Moderate 4/10

Wind Factor
Extreme 9/10
Insurance: critical

Air Factor
Moderate 3/10

Heat Factor
Extreme 10/10

Request a tour
as early as tomorrow at 9:00 am

Contact agent

Show more >

Flood Factor
Extreme 9/10

FEMA Special Flood Hazard Area
A separate policy is required to get a federally backed mortgage.

No record of flooding at this property since 2001

This property has a 99% chance of flooding over the next 30 years.

Time Period	Chance of Flooding
This year	17%
Next 15 years	95%
Next 30 years	99%

View Flood Factor report

Depth of flooding First Street®

Our Mission for Task Group WK62996:



Develop an umbrella Guide outlining the process for multi-hazard evaluations of resilience



Create a foundation from which hazard-specific Practices can be created












Align with existing standards and frameworks

Types of Climate Risk

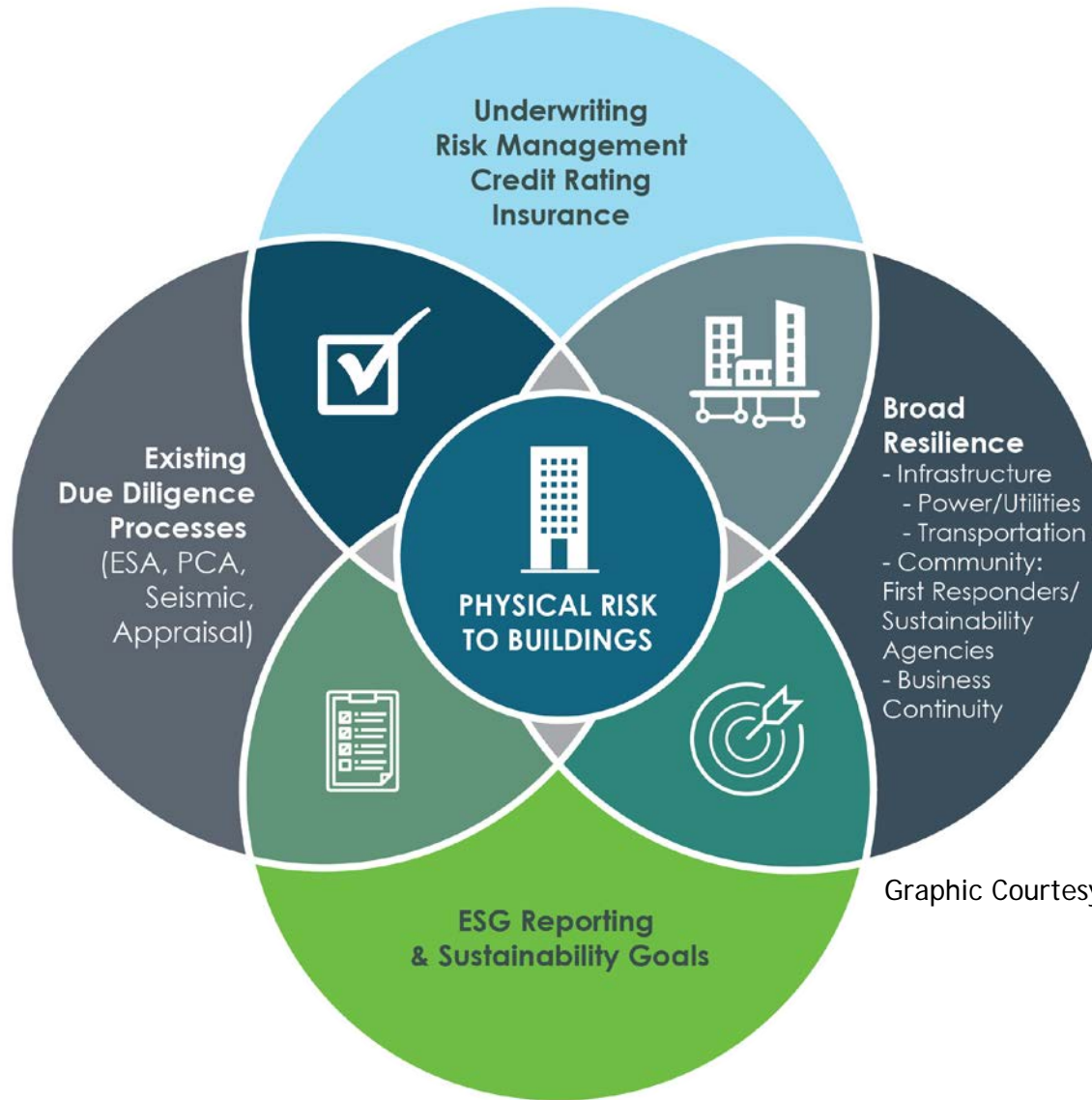


PHYSICAL VS. TRANSITIONAL CLIMATE RISK

	Wildfire		Building Efficiency Regulation
	Sea Level Rise		Carbon Emissions Regulation
	Severe Storm		
	Flood		
	Tropical Storm		
	Heat Stress		
	Water Stress		

← Focus of the PRA

Focus of this ASTM Guide - Physical Risk & Resilience



Graphic Courtesy of AEI Consultants

Task Group Participation - Owners



- JP Morgan Asset Management
 - Prologis
 - Heitman
 - Panattoni
 - PGIM Real Estate
 - CBRE
 - Revantage/Blackstone
 - LBA Realty
 - Principal Financial
 - LaSalle
 - TA Realty
 - Amazon Web Services
 - PCCP
 - Marriott
- Stakeholders
 - Risk Assessment
 - Portfolio Management
 - Time Horizon
 - Tenants
 - Lenders
 - Insurance

Task Group Participation - Lenders



- Fannie Mae
 - Freddie Mac
 - Virginia PACE
 - 40/86 Mortgage Capital
 - Chase
 - Citizens Bank
 - PGIM Real Estate
 - CIT
 - US Bank
 - Regions Bank
 - Umpqua Bank
- Stakeholders
 - Collateral Value
 - Risk Assessment
 - Debt Service
 - Tenants
 - Insurance

Task Group Participation – Non-Profits / Associations / Certifications / Standards

- Adaptation International
 - BREEAM US
 - Insurance Institute for Business & Home Safety (advisory)
 - US Resiliency Council
 - Building Technology Inc
 - Climate Advisory
 - Institute for Sustainable Communities
 - American Society of Civil Engineers (ASCE)
 - Enterprise Communities
 - ULI Resilience Program
 - Waterfront Alliance
 - Resilience Youth Network
- Advocacy
 - Asset Resilience
 - Community Resilience

Task Group Participation – Research and Academia

- NSF National Center for Atmospheric Research
- Massachusetts Institute of Technology
- University of North Carolina
- University of Maryland
- University of Virginia
- Colorado School of Mines
- Mississippi State University
- Central Michigan University
- Florida International University

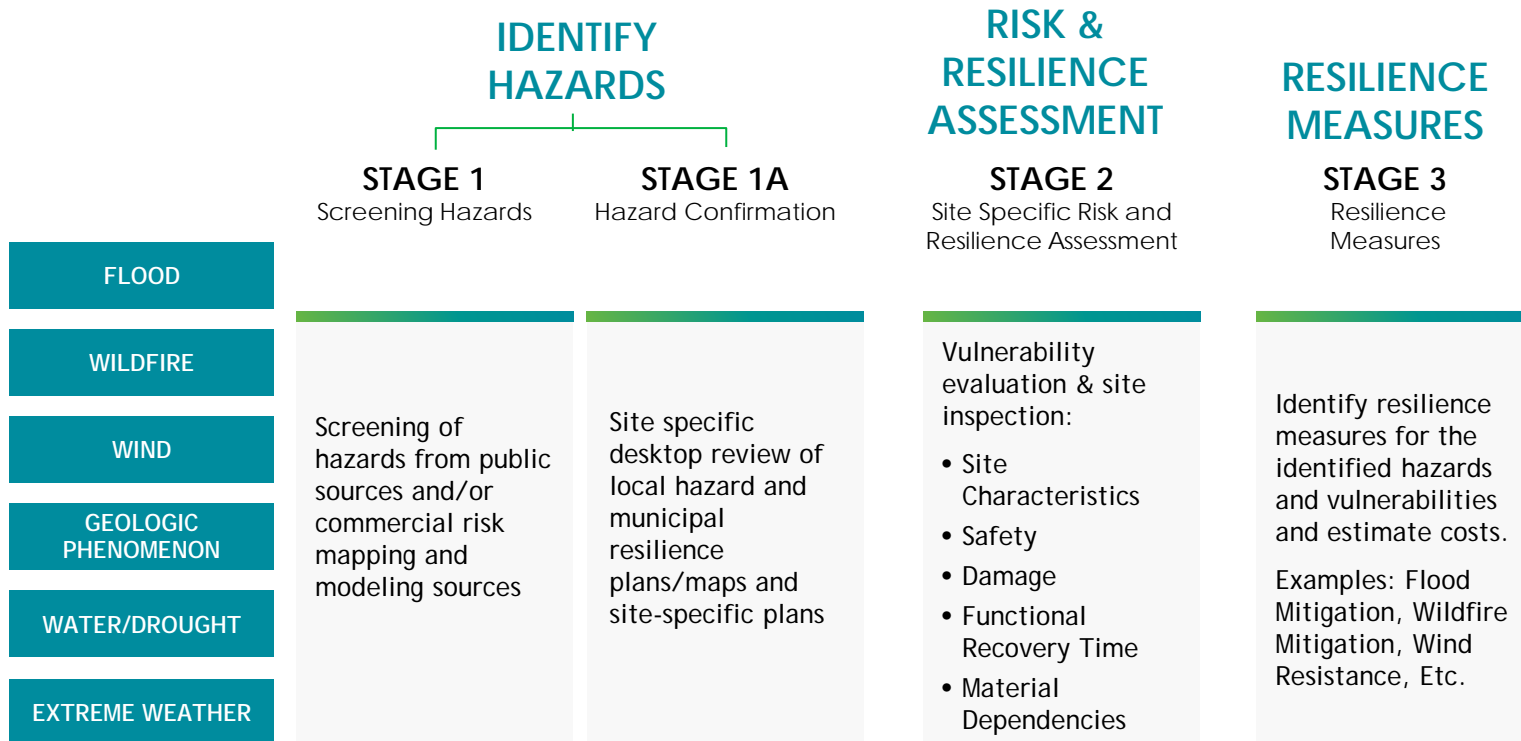


Task Group Participation – Consultants and Providers

- AEI
- Apex Companies
- Arup
- BBG
- Cannon Design
- Simpson Gumpertz
- Marx/Okubo
- Climate Advisory
- TRI
- Dewberry
- Bureau Veritas
- EM Partners
- EBI
- EFI Global
- Partner Energy
- EPM
- Nova
- Intertek
- TRC
- Haselton Baker Risk Group
- RETech Advisors
- Ramboll
- Kinetica Risk
- Verisk
- Moody's ESG
- Lightbox
- RMS
- Measurbl
- Risk Footprint
- Climate Check
- ResCentric
- SPA Risk
- MSCI
- MunichRe
- Envirosite
- True Flood Risk
- SPA Risk
- ImageCat
- LivCor
- Verdani
- EY
- Terracon
- Pond Robinson
- Haley Aldrich



Property Resilience Assessment Process



- Not a certification or rating system. Rather, an assessment approach.

Property Resilience Assessment Process



What it is:

- Begins with understanding the goals, risk appetite, and resilience goals of the project - CPACE applications require heads up at the beginning of the project.
- Requires Transparency (Data Used and Methods)
- Establishes Provider Qualifications - PRA Professional and Specialists



Property Resilience Assessment Process

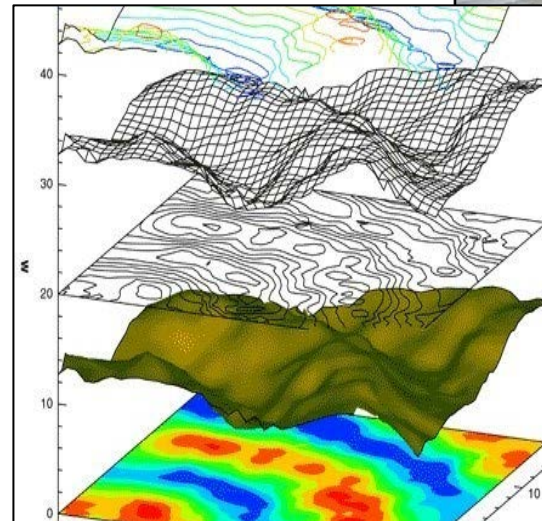
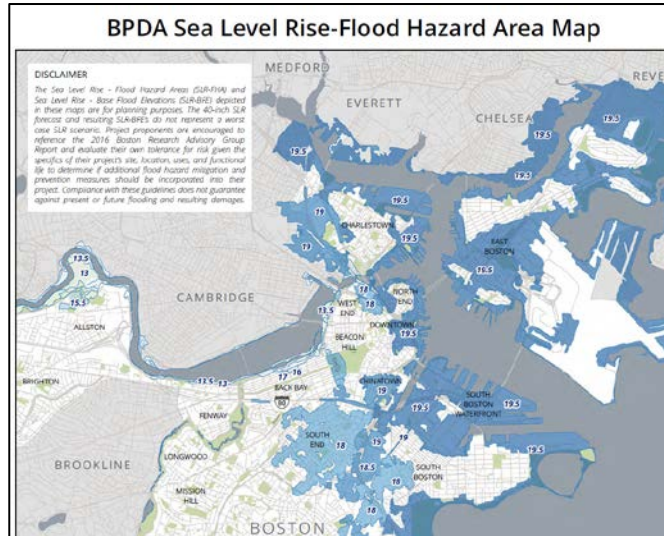


What it's Not:

- Resilience Certification
- Audit of Code Compliance
- GHG or Carbon Footprint Assessment
- Design Document - The PRA informs design but is not itself a design-level assessment.



Stage 1 Hazard Screening/ Identification



Stage 1A Hazard Confirmation



Local Hazard Resources

- Flood Maps/Models
- Sea Level Rise Maps/Models
- Storm Surge Maps/Models
- Topographic Maps
- Government Tools and Databases
 - NOAA and NWS
 - USGS
 - FEMA
 - EPA
 - NIST
 - UNESCO
 - State Level Resources
- ASCE 7-22 Hazard Tool
- Wildfire Maps (NFDRS and NIFC)
- Wind Hazard Maps
- Slope Stability/Landslide Maps
- Community Resilience Information

Stage 2 Property-Level Risk and Resilience Evaluation



Inspect (If Existing Building)

Site Inspection and review of documents/plans to determine vulnerability and exposure to hazards identified in Stage 1.



Evaluate

Nature of construction, type of occupancy, age of the building, site characteristics, existing resilience measures, hazard preparedness, etc.



Assess

- Safety Considerations
- Damage Potential
- Functional Recovery Timelines
- Material Dependencies





Stage 3 Resilience Measures

(Sustainability to be considered when determining resilience measures)

PROTECTION – REDUCE VULNERABILITY TO EXTREME WEATHER

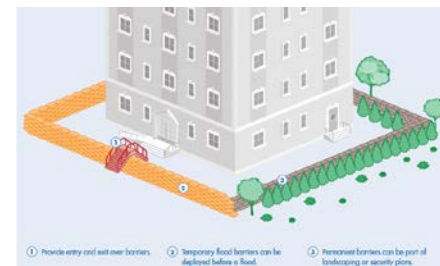
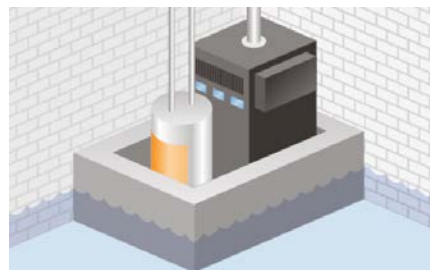
- Wet, dry and site perimeter floodproofing
- Resilient Elevators
- Backwater valves and sump pumps

ADAPTATION – IMPROVE ADAPTATION TO CHANGING CLIMATE

- Envelope Efficiency
- Elevated equipment and living space
- Surface stormwater management
- Window shading and distributed heating/cooling

BACK-UP – PROVIDE CRITICAL NEEDS DURING POWER LOSS

- Backup power to critical systems
- Emergency Lighting
- Access to potable water



Source: Enterprise Communities

Resilience works....

One Florida community built to weather hurricanes endured Ian with barely a scratch

As parts of Florida went dark from Helene and Milton, the lights stayed on in this net-zero, storm-proof community



A drone image shows Hunters Point homes in Cortez, Florida, in April 2024. Billed as the first "net-zero" single-family home development in the US, Hunters Point boasts some of the most sustainable, energy-efficient and hurricane-proof homes in the country. Julian Quinones/CNN/File



Abcock Ranch, in Florida, runs on solar power and was built to weather the worst storms. After Hurricane Ian, the community didn't lose power or water, and it experienced minimal damage. arlos Osorio for NPR



Resilience & Efficiency Intersect

- **Building Envelope Measures**
 - Wildfire
 - Wind
 - Hail
 - Flood
 - Extreme Temperatures
- **Control Systems and Conservation Measures**
 - Extreme Temperatures
 - Drought
 - Flood
- **Resilience Measures**
 - Wind Resistant Roofing and other Wind Resistant Measures (High Impact Doors and Windows, Opening Protections, Storm Shutters, Secondary Water Barriers)
 - Snow Load Management
 - Foundation Strengthening
 - Emergency Shut Off Systems
 - Flood Resistance

Questions & Discussion

- Ideas to ensure the PRA meets the needs of the CPACE Community

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