



INTERNATIONAL
CODE
COUNCIL®



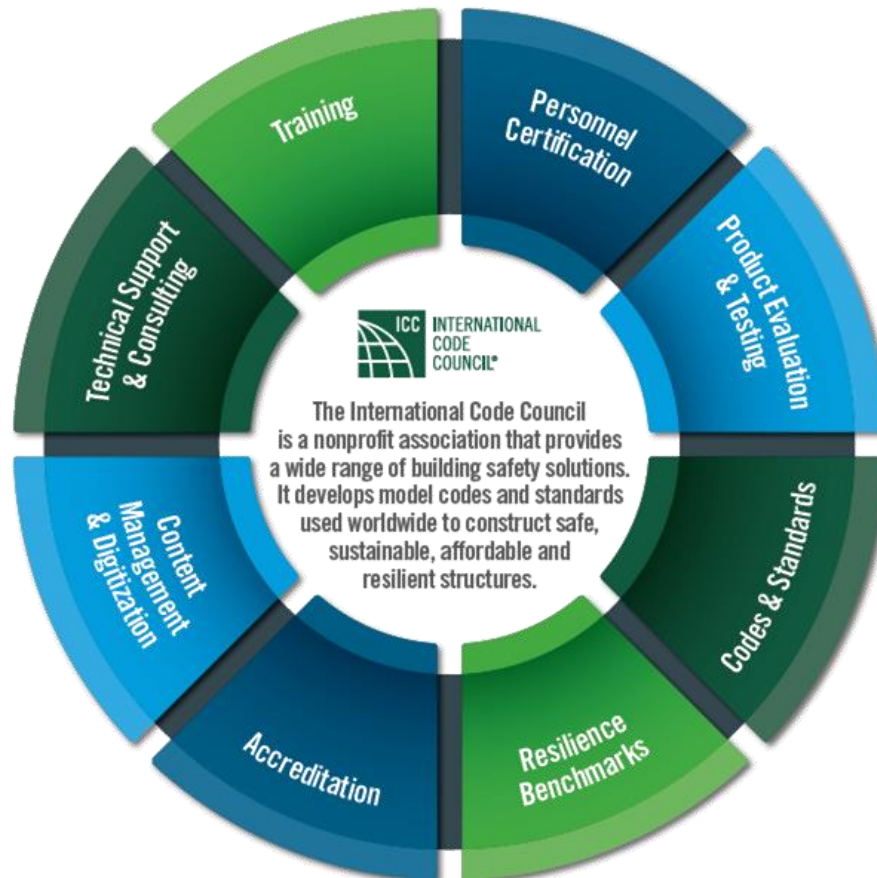
ANCR

Resilience in the Face of Shocks & Stresses

MEEA Codes Conference
November 13, 2019

Ryan M. Colker, J.D., CAE
Vice President, Innovation
Executive Director, Alliance for
National & Community Resilience

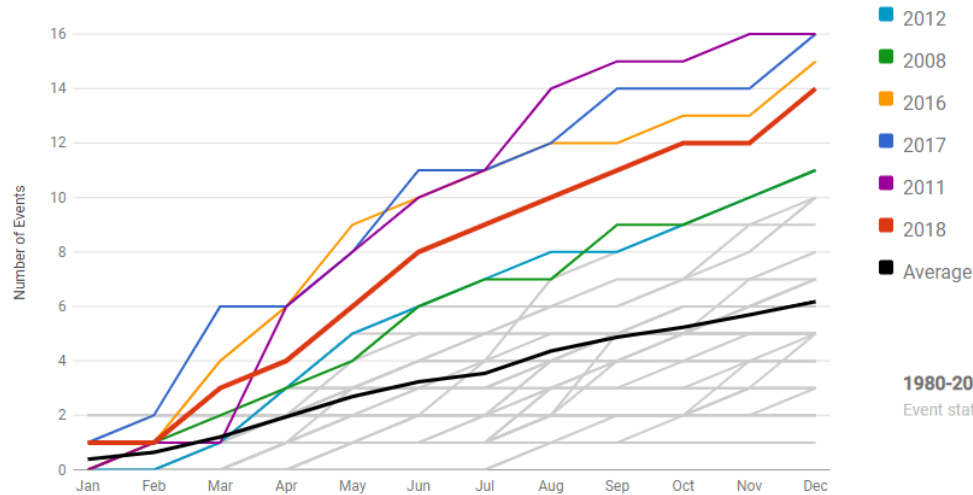
The Family of Building & Community Solutions



Why Resilience?

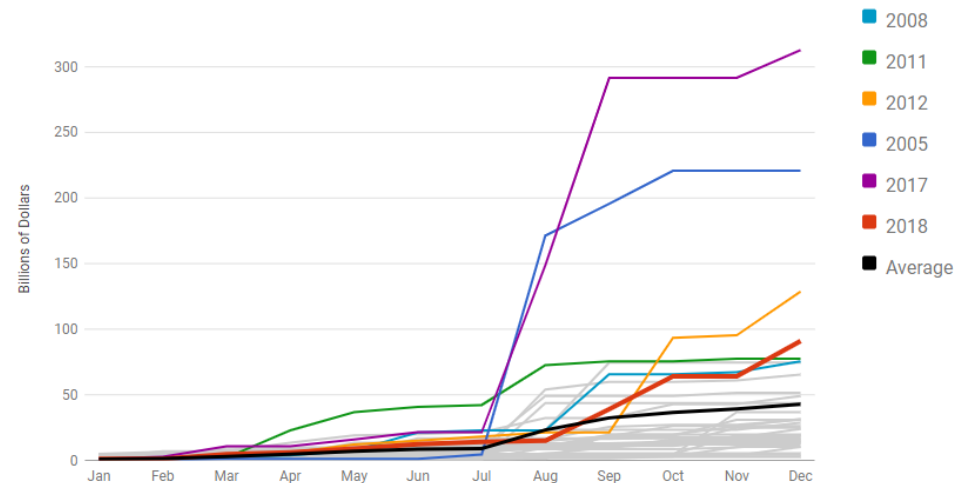
1980-2018 Year-to-Date United States Billion-Dollar Disaster Event Frequency (CPI-Adjusted)

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



1980-2018 Year-to-Date United States Billion-Dollar Disaster Event Cost (CPI-Adjusted)

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



Benefit Cost Ratios by Hazard and Mitigation Measure

National Benefit-Cost Ratio Per Peril

**BCR numbers in this study have been rounded*

Overall Hazard Benefit-Cost Ratio

Exceed common
code requirements

4:1

Meet common
code requirements

11:1

Utilities and
transportation

4:1

Federally
funded

6:1



Riverine Flood

5:1

6:1

8:1

7:1



Hurricane Surge

7:1

Not
applicable

Not
applicable

Too few
grants



Wind

5:1

10:1

7:1

5:1



Earthquake

4:1

12:1

3:1

3:1



Wildland-Urban Interface Fire

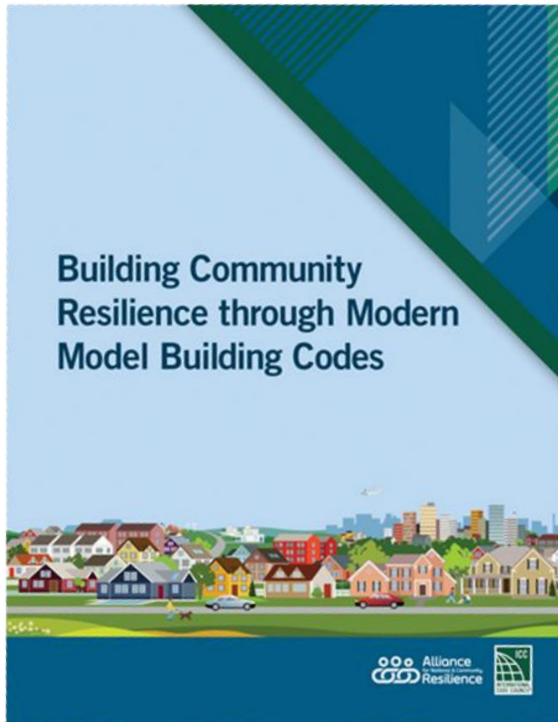
4:1

Not
applicable

Not
applicable

3:1

Building Codes & Resilience



Resilience in the built environment starts with strong, regularly adopted, and properly administered building codes. However, to attain whole community resilience, communities must look at the resiliency of all interconnected systems and function of the community as well.

More on Codes & Resilience



Resilience Contributions of the International Building Code



INTERNATIONAL CODE COUNCIL



The scope of the IBC is clearly focused on assuring that a community's building stock supports the resilience of the community. Reducing the impacts on people and property in the face of multiple shocks and stresses allows communities to survive and ultimately thrive.

First in a series

The Importance of Community-Level Resilience



Galveston Texas, Post-Ike



Manhattan, Post-Sandy

*Among the Ruins of Mexico Beach
Stands One House, Built 'for the Big One'*



The elevated house that the owners call the Sand Palace, on 38th Street in Mexico Beach, Fla., came through Hurricane Michael almost unscathed. Johnny Milano for The New York Times

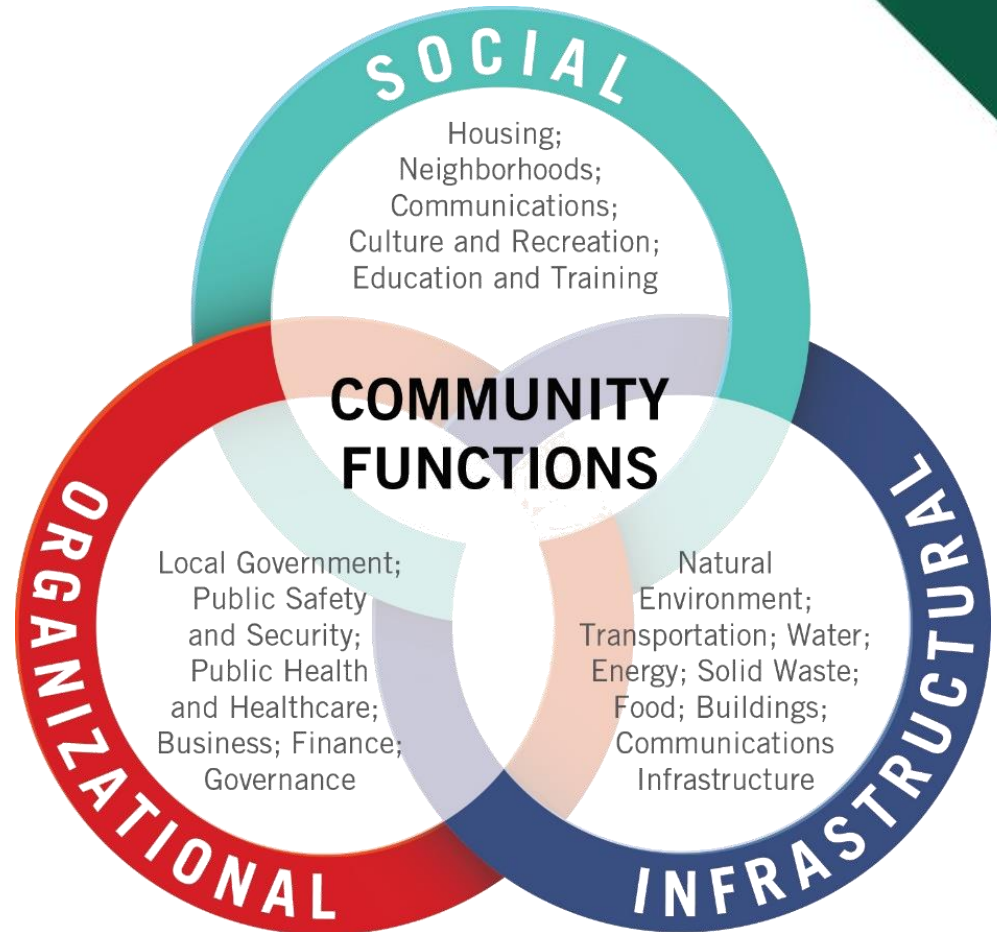
Mexico Beach, Post-Michael

A Holistic Approach to Resilience



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www.resilientalliance.org



A Buildings Benchmark for Community Resilience



1. Adoption of Building Codes
2. Administration and Enforcement of Building Codes
3. Licensure & Continuing Education or Testing of Contractors
4. Mitigation of Highly Vulnerable Buildings
5. Mitigation and Design of Critical Facilities
6. Resilient Design
7. Disaster Response/Continuity of Operations Plans (COOPs)
8. Standards for Emergency Shelters
9. Financial Resources for Post-Disaster Recovery



Housing Benchmark



1. Housing Affordability & Availability
2. Housing Affordability: Policies
3. Disaster Preparedness: Communication & Outreach
4. Disaster Preparedness: Emergency & Temporary Shelter
5. Transitional & Post-Disaster Housing
6. Total Cost of Home Ownership/Rental
7. Insurance Coverage
8. Disaster Response/Continuity of Operations Plans (COOPs)
9. Equitable Long-Term Recovery from Disasters



The Energy/Resilience Nexus

- Energy Burdens
- Community Health

- Money in the Community
- Reduced Shelters



- Urban Heat Island
- Cascading Effects
- Passive Survivability
- Rot, Mold and Mildew

Energy Code Contributions to Resilience

Works in Tandem with
Other Model Codes

Durability

Durability ensures
home is livable
for decades

Moisture Management

Rot, mold,
mildew

Extreme Weather Protection

Better envelopes
Habitability –
more lives saved

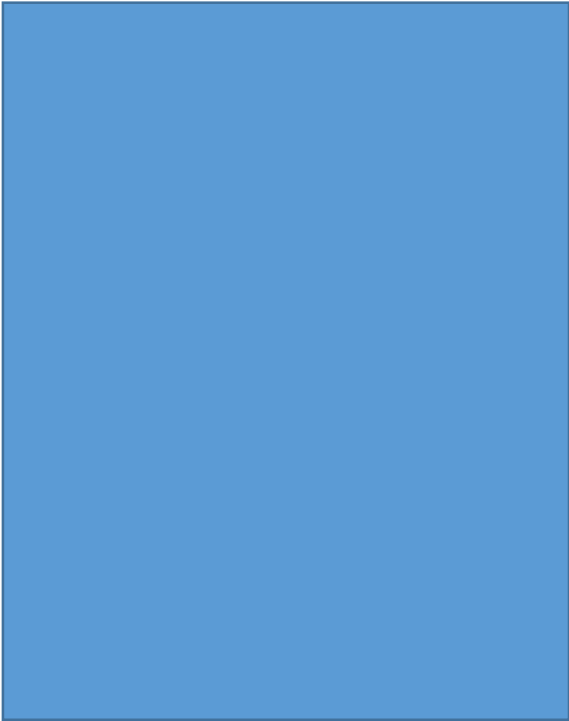
Energy Efficiency

Grid Stability
Microgrids
Energy Storage

Fire Safety



Energy Codes & Resilience

A solid blue square is positioned on the left side of the slide, partially overlapping the text area.

“Using energy codes to provide enhanced passive survivability provides significant co-benefits. Community and individual resilience is enhanced while building owners and tenants reap energy efficiency related rewards everyday in the form of lower energy bills and greater cost certainty.”

Second in a series

A New Age for Resilience Policy



2018 2022



Strategic Plan

Helping People. Together.

FEMA Mission: Helping people before, during, and after disasters.

I. BUILD A CULTURE OF PREPAREDNESS



- 1.1 Incentivize investments that reduce risk, including pre-disaster mitigation, and reduce disaster costs at all levels
- 1.2 Close the insurance gap
- 1.3 Help people prepare for disasters
- 1.4 Better learn from past disasters, improve continuously, and innovate

II. READY THE NATION FOR CATASTROPHIC DISASTERS



- 2.1 Organize the "BEST" (Build, Empower, Sustain, and Train) scalable and capable incident workforce
- 2.2 Enhance intergovernmental coordination through FEMA Integration Teams
- 2.3 Posture FEMA and the whole community to provide life-saving and life-sustaining commodities, equipment, and personnel from all available sources
- 2.4 Improve continuity and resilient communications capabilities

III. REDUCE THE COMPLEXITY OF FEMA



- 3.1 Streamline the disaster survivor and grantee experience
- 3.2 Mature the National Disaster Recovery Framework
- 3.3 Develop innovative systems and business processes that enable FEMA's employees to rapidly and effectively deliver the agency's mission
- 3.4 Strengthen grants management, increase transparency, and improve data analytics

FEMA Vision:
A prepared and resilient Nation.



The entire Nation must work as a team to increase pre-disaster mitigation in communities. FEMA will continue to work directly with SLTT and non-governmental partners to advocate for the adoption and enforcement of modern building and property codes. **Disaster resilience starts with building codes, because they enhance public safety and property protection.**

Furthermore, FEMA will encourage robust code enforcement, providing education and training when needed to help convey the value of standardized, up-to-date building codes.

National Mitigation Investment Strategy

Mitigation Framework Leadership Group

August 2019

Recommendation 3.1 – Encourage Communities to Adopt and Enforce Up-to-Date Building Codes



Homeland Security

A New Age for Resilience Policy



- Bipartisan Budget Act (February 2018)
 - Authorized an increased federal cost share for states implementing resilience measures
 - Mitigation planning
 - Adoption & enforcement of codes
 - Community Rating System participation
 - Incentive Programs
- Disaster Recovery Reform Act (October 2018)
 - Authorized Pre-Disaster Mitigation Grant Program with percent set aside
 - Recovery consistent with latest codes and standards
 - Define resilience and resilient

Opportunities for Action



- DOE/NBI Public Buildings Portfolio Management
 - <https://newbuildings.org/public-buildings-portfolio-management-helps-cities/>
 - <http://www.wbdg.org/additional-resources/tools/life-cycle-energy-performance-framework-cities>
- HUD CDBG-MIT (\$6.9bn), CDBG-DR / FEMA PDM
 - Incorporate codes as part of mitigation planning, funding requests
- Engage Policymakers to Connect Climate Goals & Building Energy Policy
- Programs at the intersections (e.g., Building-to-Grid)
- Comprehensive planning (hazard mitigation, transportation, economic development, etc.)

Advancing the Energy/Resilience Nexus



Workshop on the Nexus of Resilience and Energy Efficiency in Buildings: Proceedings Report



Ronald Ott, ORNL
Scott Morgan, Energetics
Matt Antes, Energetics

September 30, 2019

Approved for public release.
Distribution is unlimited.

OAK RIDGE NATIONAL LABORATORY
MANAGED BY UT-BATTELLE FOR THE U.S. DEPARTMENT OF ENERGY

ORNL/TM-2019/1352

Challenges and Opportunities

Efforts to integrate efficiency and resilience must address critical challenges and leverage the most significant opportunities including the following:

Enclosures		Operations	
Challenges	Opportunities	Challenges	Opportunities
Lack of planning and priorities	Improved, clear rating systems	Knowledge & awareness gaps	Greater knowledge & awareness
Lack of policies	Codes	Insufficient resilience modeling	New financing & incentives
Uncertain cost/benefits	Defined value proposition / business case	High or uncertain costs	Technology R&D
Siloes	Greater collaboration	Lack of collaboration	Greater collaboration
Lack of education & awareness	Greater education & awareness	Uncertain resilience valuation measurement	Defined resilience valuation
Power grid integration	Studies and tools	Building complexity & design	Advanced structures & modular designs
Knowledge/research gaps	Pilot projects	Energy "routing"	Smart systems
	Workforce training		Codes & standards
	Advanced structure & components		"Low tech" guidance

High-Priority Actions

Based on the challenges and opportunities, potential high-priority quick-win and game-changing actions were identified and action plans were prepared. These actions include the following:

Enclosure Actions	Operation Actions
<ul style="list-style-type: none">Review adoption/modification above-code programsAdvancing codes to address resilience holisticallyTools and analyses for the nexus of efficiency, load flexibility & resiliencePublic facing education & awarenessResilience rating systemDevelop resilience value proposition	<ul style="list-style-type: none">Incentivize This! Insurance & underwriter resilience incentivesCreate an energy efficiency & resilience (EER) utilityMethodology to optimize resilience & efficiency valueAdvanced energy efficiency & resilience design guidesCreate resilience benchmarking for zoning/bldg. codesUp the PACE—Integrate resilience in PACE financingCost-effective "DIY" packages and solutionsGrid-friendly, resilient, eff. HVAC, DHW, air distributionActionable resilience information for businesses

Resilience Opportunities For Energy Entities



- Continued advances in energy storage, renewables
- Support for microgrids and islanding
- Facilitate distributed generation
- Preparing buildings & industrial facilities to be good grid-citizens
- Advance zero energy [buildings, communities, campuses, portfolios]
- Examine evolution to DC-power
- Conduct interdependencies analysis
- Talk about the energy/resilience nexus
- Participate in code development and adoptions
- Encourage policymakers to think holistically (infrastructure, DRRRA, etc.)

Questions?



ANCR

Ryan M. Colker, J.D.

Vice President, Innovation

Executive Director, Alliance for National & Community Resilience

International Code Council

500 New Jersey Ave., NW

6th Floor

Washington, DC 20001

202-370-1800x6257

rcolker@iccsafe.org • ANCR@resilientalliance.org

iccsafe.org • resilientalliance.org

[@rmcolker](#) • [@ANCRresilience](#)