Guide to Expanding Mitigation

MAKING THE CONNECTION TO CODES AND STANDARDS

FEMA

Photo: Aerial of the dam and canal locks for shipping on the Oswego River by Phoenix, NY

Cover Photo: Aerial photo of suburban homes in a neighborhood with trees

Photo: Flooded houses after Hurricane Sandy

The well-being of our families, safety of our homes and prosperity of our communities are what we value most. One cost-effective way to safeguard the people and places we love from disasters is to adopt codes and standards that reduce risk, promote smart land use and save energy. Such codes can provide insurance benefits for residents and improve a community's applications for federal mitigation grant funding. Modern codes and standards can keep future development out of high-hazard areas. Using them reduces injuries and the cost of damage during a disaster, in addition to the indirect costs of energy use, business interruptions, lost income and trauma. With lower costs, communities, individuals and businesses can get back on their feet more quickly after a disaster.

Communities can adopt various codes and standards to reduce hazards and be more resilient. Updates to codes are often informed by past disasters. The International Code Council publishes International Codes (I-Codes) and the minimum requirements to protect lives and reduce damage for a risk like the 1%-annual-chance flood. To apply at the state or local level, governments must enact ordinances adopting the I-Codes. The International Building Code is arguably the most well known. Lesser known but effective codes are the International Energy Conservation Code, International Plumbing Code, International Wildland Urban Interface Code and International Zoning Code.

This *Guide to Expanding Mitigation* explains how to benefit from diverse codes and standards, communicate the hidden costs of failing to act, and work with departments to adopt and enforce codes that increase community resilience. It also includes case studies where higher standards save money. This guide will help officials, especially those in emergency management, start conversations about codes to make communities more resilient.

This *Guide to Expanding Mitigation* is part of a series highlighting innovative and emerging partnerships for mitigation.

A community's building and development code is a comprehensive set of interconnected regulations that work together to govern land use, development and construction. You know your community best and can help guide the adoption and enforcement of codes and standards that address its specific hazards and challenges. In addition to the commonly known International Building Code and International Residential Code, these specific codes deserve a closer look when assessing your community's resilience:

International Energy Conservation Code: Can enhance social resilience through reducing monthly energy costs for vulnerable residents. Increases passive survivability, which is a building's ability to maintain critical life-support conditions during extended loss of power or heat, potentially reducing pressure on shelters and the energy grid. Energy savings can be invested in the community and allow for a more rapid response and recovery. These codes also reduce greenhouse gas emissions to combat climate change and improve public health.

International Plumbing Code: Reduces the impacts of rain, snow and flooding by providing ways to convey stormwater away from the building and standards for subsoil drainage. It lowers water use by setting limits on flow rates. It can be used to reduce the volume of potable water supplied to the building, which increases passive survivability. Additionally, the code details storage, treatment and distribution standards for non-potable water. There are also provisions for pipe insulation, which helps save energy throughout the year and protects against freezing in cold climates.

International Wildland Urban Interface Code: Reduces risks from wildfire to life and property by regulating structure density and location, building materials and construction, vegetation management, adequate water supply, and emergency vehicle access.

International Zoning Code: Encourages smart growth strategies that help communities adapt to climate change, including flooding and sea level rise.

Photo: Aerial view of road intersection

WHY ADOPT CURRENT CODES AND STANDARDS?

Adopting updated building and zoning codes creates environments that improve public health, safety, welfare and economic interests. Zoning specifies the location, type, amount, density and characteristics of development permitted in different areas of a community. It can be used to restrict development in high-hazard areas or encourage development in safer locations. For example, zoning can reduce exposure to hazards by only allowing open space uses in floodplains, requiring setbacks between buildings and at-risk areas, or creating special-use permits or overlay districts so that construction is more resilient to local hazards.

Building codes are another tool that can protect buildings and the people and property inside them from hazard events. They ensure structural integrity, systems safety, accessibility and achievable levels of energy efficiency. The International Building Code is focused on life safety and includes hazard maps and minimum standards to reduce risks. Resilience is addressed across I-Code chapters and topics, including those on critical facilities, hazardous materials, construction materials, accessibility, emergency exits, areas for shelter, and overall building integrity and performance.

Adopting up-to-date I-Codes is one of its most cost-effective mitigation measures a community can take. The 2020 *Building Codes Save: A Nationwide Study*, published by FEMA, reports that the cumulative losses avoided by applying codes are projected to grow to over $132 billion by 2040. The 2019 National Institute of Building Sciences report found that at the national level, current I-Codes save $11 per $1 spent. Communities with both high hazards and growth could save the most.

THE HUMAN VALUE OF CODE ADOPTION. IT'S MORE THAN DOLLARS AND CENTS.

- More lives saved and fewer people injured.
- Fewer people displaced and for shorter periods.
- More people can shelter in place while waiting for repairs.
- Wellness increases; mental trauma is reduced.
- Social and business disruption is reduced.
- Faster recovery from a disaster.
- Reduced loss of income.
- Continued public services, including to underserved communities.

Photo: Row of old homes

THE HIGH COST OF DOING NOTHING

Many communities avoid adopting current codes or choose to adopt older versions because people think more strict requirements may limit development and increase building costs. In practice, codes create an environment of predictability and transparency for developers that can reduce the need for discretionary approvals. Code adoption efforts are successful when the design and construction community receives training regarding changes. Adoption and enforcement also keep more dollars within local economies. Failing to adopt and enforce current codes places a burden on the local community. Take energy codes as an example. States that adopt the latest energy code see buildings with better energy use and lower operational costs, reduced greenhouse gas emissions, and increased passive survivability. See the *Guide to Expanding Mitigation: Making the Connection to Electric Power* for more insight on resilient energy.

Outdated or weakened codes pass on unnecessary long-term costs to residents, who are forced to pay for wasted energy and water. They may be unable to return to a safe home after a disaster. Not adopting the latest codes can also negatively affect people outside your community. The inconsistent review and update of codes often means larger changes from one update to another. These can be confusing and burdensome to apply.

WHAT IS A "WEAKENED" CODE?

A weakened code occurs when a state or community adopts the latest code, but then passes amendments that remove certain requirements.

Failing to adopt current codes results in lost tax receipts and missed opportunities for revenue from safe, healthy and energy-efficient buildings. It may also result in buildings in high-risk areas that cause higher insurance, public health and safety costs.

Photo: New beach house construction

Photo: Farm fields in Jack's Reef, New York

TAKE ACTION TO PROTECT COMMUNITIES AND SAVE MONEY

The time to prepare for the future is today. Having modern codes in place before a disaster can keep development out of high-risk areas and help a community achieve resilient recovery. Emergency managers and code officials should work with other local, county and state officials to ensure codes advance the mitigation goals of the whole community. When possible, higher standards should be included in zoning updates, comprehensive plans and capital improvement plans so the community can rebuild resiliently after disasters. These efforts should also be included in local hazard mitigation plans. The Alliance for National and Community Resilience created Community Resilience Benchmarks that encourage communities to review their existing buildings and suggest strategies for high-performance designs.

Starting a review and adoption cycle at regular intervals, and not just after a disaster, allows jurisdictions to respond to changes in climate, population and growth. It also shows they are committed to improving the lives of their citizens now and in the future.

THE ROADMAP FROM CODE CREATION TO IMPLEMENTATION

1. Identify the codes in effect in your community.
2. Build a team.
3. Create a shared strategy for reducing disaster risk.
4. Map out the process for building code adoption.
5. Build the case for modern building code adoption.
6. Advocate.
7. Draft the code.
8. Adopt the code without weakening amendments.
9. Enforce the code.

When starting to review, adopt or update codes and standards, consider including the following people and/or groups:

- Community associations and individual residents and citizens.
- Local and state government leaders.
- Community planners and/or planning associations.
- Construction and real estate development industry professionals, including builders, architects, engineers, contractors, landlords and real estate agents.
- The broader business community.
- Civic and advocacy organizations.
- Emergency management agencies.

Once codes are adopted, development proposals are either reviewed and permitted by-right or are subject to review and approval by a local government to confirm they adhere to standards. As a proposal goes through technical review, various departments may review it. In Myrtle Beach, South Carolina, the planning, emergency management, fire, police, and water and sewer departments meet to review proposals. That way, the committee can raise concerns to the expert, such as an expected increase in fire service demand due to a subdivision proposal.

Photo: Close up of two people reviewing building blueprints

Photo: Construction engineers discussing blueprints

Photo: Drainage culvert with pipe under a path

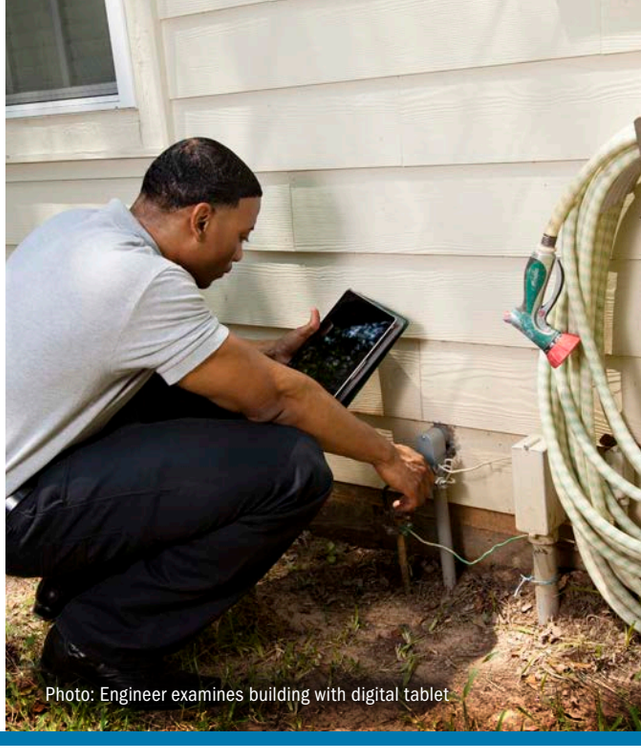

Photo: Engineer examines building with digital tablet

WHAT'S ENFORCEMENT GOT TO DO WITH IT?

Adopting modern codes isn't enough to protect communities and save money. To be effective, codes must be enforced. Planners, emergency managers and code enforcement officials work directly with residents and are often their primary contact with government. Their roles are critical for educating the public about stronger codes and standards.

Understanding the technical parts of land use regulation and construction is only one part of the job. Those responsible for enforcing codes should also have strong customer service skills. In the city of Rochester, New York, enforcement officers include former schoolteachers, veterans and community organizers. The department's multilingual and diverse staff reflect the residents they serve.

Working with residents in code enforcement means:

- Making a complex system easier to understand: When people are closer to the problems and solutions, we can expect to see better results in community development.
- Increased support for codes and standards: Shared ownership and buy-in is achieved when residents affected by the policies are involved in decision making.

EQUITABLE ENFORCEMENT

At its best, code enforcement is used as a community building tool to support investments in neighborhoods that were previously ignored and experienced housing discrimination. At its worst, code enforcement gives privilege to those who make complaints, sends more resources to those with the loudest voices, and neglects those with the most need.

Equitable code enforcement can avoid a "complaint-based" system. This solution is based on data and can involve those most in need without burdening them. For example, repeat fines may show a need for help to comply, and municipalities can offer these owners grants or low-interest loans to fund repairs.

Photo: Hurricane Sandy aftermath on Staten Island

Photo: Brush fire near houses

BEYOND CODE REQUIREMENTS: CASE STUDIES OF HIGHER STANDARDS

While designing to codes can save lives and money, adopting higher standards has other benefits. The 2019 National Institute of Building Sciences report found that designing all new construction to exceed the latest available codes could result in a national benefit of $4 for every $1 invested. Communities across the country have found creative solutions to go above and beyond to build in long-term resilience.

Staten Island Special Coastal Risk District

After home buyouts on the East Shore of Staten Island, New York, which was heavily damaged by Hurricane Sandy, the city created a zoning overlay. The Special Coastal Risk District adds requirements beyond the residential base zoning. This overlay limits all new development in the buyout areas to single-family detached homes. To ensure any new growth aligns with the vision to return the area to wetlands, the overlay also creates a permit that requires approval by the planning commission.

Maryland Coast Smart Siting and Design Criteria

Coastal Maryland communities are at risk to rising sea levels. More than two dozen of these areas could see chronic sunny day flooding and sinking land by 2025. As a result, the county and city have adopted higher building standards in at-risk areas. 2020 standards now require eligible structures to be built (or rebuilt) with their lowest floor 3 feet above the base flood elevation. Benefits of these new rules include connecting siting and design with the flood zones shown on FEMA's flood maps. They use existing mapping data from FEMA and Maryland. They are also consistent with FEMA best practices for siting critical facilities.

Wildfire Site Assessment in Santa Fe

In Santa Fe, New Mexico, major fires in 2003 and 2011 burned 17,000 acres and heavily affected air quality, local water, recreation and tourism. Since then, the community has worked to set up an overlay district within an area of 500 acres where the foothills meet the plateau. Any proposed development within the district is subject to strict building rules to reduce wildfire risk. Reducing wildfire risk in this area includes reviewing sites, vegetation and parcel data.

New York City Climate Resilient Design Guidelines

The guidelines create higher building standards for city-owned properties and explain how to pair historic climate data with forward-looking climate projections in the design of city facilities. They also note that a successful resilience strategy "provides co-beneficial outcomes, reduces costs over the life of the asset wherever possible, and avoids negative indirect impacts to other systems." Designers must look at the useful life of a capital project and build it to withstand impacts to the climate change projections for heat, precipitation and sea level rise.

When our codes and standards are informed by climate change data and incorporate future risk, our communities take a proactive approach to mitigation and will be more prepared through the lifespan of a development.

RESOURCES

Guides to Expanding Mitigation
https://www.fema.gov/about/organization/region-2/guides-expanding-mitigation

Thinking Beyond Flood Maps
https://storymaps.arcgis.com/stories/da2b7cb4ad53424980be99e9ffeeb374
Using FEMA Coastal Data to Reduce Risk and Build Resilience

Building Codes Save: A Nationwide Study
https://www.fema.gov/sites/default/files/2020-11/fema_building-codes-save_study.pdf
Losses Avoided as a Result of Adopting Hazard-Resistant Building Codes

Protecting Communities And Saving Money
https://www.fema.gov/sites/default/files/2020-11/fema_building-codes-save_brochure.pdf
The Case For Adopting Building Codes

Alliance for National and Community Resilience
http://www.resilientalliance.org/
A coalition advancing benchmarks for community resilience

Building Energy Codes Program
https://www.energycodes.gov/
Resources to support the adoption of model energy codes

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ENGAGE WITH US

Are you a state, local, tribal or territorial official interested in making the connection between codes and standards and hazard mitigation? Are you a code enforcement professional interested in connecting with local officials to reduce risk from hazards? Please contact us at fema-expandingmitigation@fema.dhs.gov.