Enterprise Community Partners, Inc.

Ready to Respond: Strategies for Multifamily Building Resilience

December 1st, 2015
• Overview of efforts to support resilience in affordable housing
• Energy systems and community resilience & sustainability
• Questions - resilience & sustainability in low-income communities

Create opportunity for low- and moderate-income people through healthy, sustainable, affordable housing in diverse, thriving communities.
Enterprise Green Communities

A holistic approach to sustainability in affordable housing

- Integrative Design
- Location + Neighborhood Fabric
- Site Improvements
- Water Conservation
- Energy Efficiency
- Materials Beneficial to the Environment
- Healthy Living Environment
- Operations + Maintenance
Compendium to Enterprise Green Communities Criteria

Design for Resilience
Superstorms and Hurricanes

Multifamily Partnerships
Multifamily Housing

- Social Services
- Residential Units
- Critical Systems
- Commercial Facility
- Community Room
Lessons from the Field

NJ  NY  55 Sites
Making an Investment in Resilience

- Operations and Staffing
- Utility Savings
- Insurance and Risk Reduction
Decision Making Process

Identify your hazard exposure:
Understand your previous experience with climate and emergency hazards, the location and climate zone of your site and your community, and your future anticipated risk. See the Hazard and Risk matrix on page X to identify your hazard exposure.

Assess your risks:
Assess potential threats, and anticipate their impact on infrastructure and residents to determine where to focus your attention. See the Hazard and Risk matrix on page X to identify your hazard exposure.

Determine your resilience strategies:
Once you understand the hazards and risks, you can assess which resilience strategies make sense for your building. The chart on page X will guide you.
## Climate Hazards Matrix

<table>
<thead>
<tr>
<th>Potential Hazard</th>
<th>Determine your Hazard Exposure</th>
</tr>
</thead>
</table>
| **Floods** (River and Coastal) | - Locate your Flood Zone and Base Flood Elevation on the FEMA flood map center: [https://msc.fema.gov/portal/search](https://msc.fema.gov/portal/search)  
- Hire a surveyor to provide you with an Elevation Certificate and your flood zone determination.  
- In urban areas connected to a combined sewer-stormwater system, many communities are at risk for flooding, even if not located within the Flood Zone. |
| **Extreme Temperatures and Winter Storms/Blizzards** | - Power grids and HVAC systems become overtaxed and at risk of failure.  
- Buildings with little natural ventilation and poor envelope performance are at risk during heat waves from overheating.  
- The Urban Heat Island Effect (UHIE) can make heat waves worse.  
- FEMA and The National Oceanic and Atmosphere Administration (NOAA) provide tools to assess risks of long-range changes in weather and climate.  
- Third-party subscription services provide severe weather alerts by Email or SMS. |
| **Severe High Wind Events** | Determine your wind speed zone in accordance with FEMA guidelines.  
- ASCE 7 is the standard for building performance in high winds. Check if your local building codes require ASCE 7 compliance. |
| **Fire** | The following buildings are at a higher risk for fire:  
- Buildings that allow smoking in units.  
- Residents with special needs who may be at risk of accidentally starting a fire or being unable to put one out.  
- Buildings that consume highly flammable fuels |
| **Explosion** | - Work with your utility company to ensure that your fuel lines are secure and maintained.  
- Check for illegal fuel diversion |

**Identify Hazard and Exposure**
Assess your Risks

<table>
<thead>
<tr>
<th>Risks to Community</th>
<th>Risks to Residents</th>
<th>Risks to Buildings</th>
<th>Risks to Business Continuity</th>
</tr>
</thead>
<tbody>
<tr>
<td>» Destruction of public infrastructure</td>
<td>» Injury or loss of life</td>
<td>Damage to:</td>
<td>» Cost of repairs</td>
</tr>
<tr>
<td>» Damage to property</td>
<td>» Psychological trauma</td>
<td>» Envelope</td>
<td>» Displacement of residents</td>
</tr>
<tr>
<td>» Economic stress</td>
<td>» Loss of property</td>
<td>» Building systems</td>
<td>» Rising insurance rates</td>
</tr>
<tr>
<td>» Evacuation/Migration</td>
<td>» Economic hardship</td>
<td>» Frame</td>
<td>» Reduction of property value</td>
</tr>
<tr>
<td>» Disruption of transportation</td>
<td>» Exposure to pathogens and toxins</td>
<td>» Communications infrastructure</td>
<td>» zLost rent during repairs</td>
</tr>
<tr>
<td>» Loss of faith in public institutions</td>
<td></td>
<td>» Roof</td>
<td>» Risk of regulatory fines</td>
</tr>
<tr>
<td>» Blackouts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Water supply contamination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Security risk</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>» Regulatory sanctions or fines</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>» Migration out of community</td>
<td></td>
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</table>
# Resilience Strategies

## Decision Matrix

<table>
<thead>
<tr>
<th>Protection</th>
<th>Low to Mid-Rise walk-up's</th>
<th>Small-Rise contemporary</th>
<th>Mid-rise contemporary</th>
<th>High-Rise contemporary</th>
<th>Estimated Cost</th>
<th>Related Strategies</th>
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<tbody>
<tr>
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<td>Dry Floodproofing</td>
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<td>Site Perimeter Floodproofing</td>
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<td>Resilient Elevators</td>
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<td>Backwater Valves</td>
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<td>Sump Pumps</td>
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## Adaptation

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Low to Mid-Rise walk-up's</th>
<th>Small-Rise contemporary</th>
<th>Mid-rise contemporary</th>
<th>High-Rise contemporary</th>
<th>Adaptation Cost</th>
<th>Related Strategies</th>
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<td>Envelope Efficiency</td>
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<td>🟦</td>
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<tr>
<td>Elevated Equipment</td>
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<tr>
<td>Elevated Living Space</td>
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<td>🟦</td>
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<td>Surface Stormwater Management</td>
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<td>Distributed Heating and Cooling</td>
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## Backup

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<tr>
<th>Backup</th>
<th>Low to Mid-Rise walk-up's</th>
<th>Small-Rise contemporary</th>
<th>Mid-rise contemporary</th>
<th>High-Rise contemporary</th>
<th>Backup Cost</th>
<th>Related Strategies</th>
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<tbody>
<tr>
<td>Maintaining Backup Power to Critical Systems</td>
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<tr>
<td>Access to Potable Water</td>
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## Community

<table>
<thead>
<tr>
<th>Community</th>
<th>Low to Mid-Rise walk-up's</th>
<th>Small-Rise contemporary</th>
<th>Mid-rise contemporary</th>
<th>High-Rise contemporary</th>
<th>Community Cost</th>
<th>Related Strategies</th>
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<td>Building Community Tie</td>
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<td>Creating Community Resilience Spaces</td>
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<td>Developing an Emergency Management Manual</td>
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<td>$555</td>
<td>16, 17, 18</td>
</tr>
</tbody>
</table>

## Building Types

- **Low to Mid-Rise walk-up's**
  - Units: 8-30
  - Floors: 1-6
  - Year Built: pre-1929
  - Typical Building Construction: Masonry, structural walls, brick cornice, masonry foundations, wood frame, and wood/steel roof
  - Elevator: Y/N

- **Small-Rise contemporary**
  - Units: 9-12
  - Floors: 2-3
  - Year Built: 1929-1949
  - Typical Building Construction: Masonry, concrete block construction, concrete foundations, wood frame, and steel/wood frame roof
  - Elevator: N

- **Mid-rise contemporary**
  - Units: 50-100
  - Floors: 4-11
  - Year Built: 1950-Current
  - Typical Building Construction: Concrete, masonry, concrete, steel, or slab-on-grade foundations, brick or wood, and steel/wood frame roof and steel/wood frame roof
  - Elevator: Y/N

## Applicability

- 🟦: Applicable
- 🟦: Internally applicable
- 🟦: Internally applicable
Individual Strategy Components

1. Description and Function
2. Strategy into Action
3. Operations and Maintenance
4. Estimated Cost
5. Additional Resources
Adaptation
Strategies that improve a facility's ability to adapt with changing climate conditions

7 Envelope Efficiency
Backup

Strategies that reduce a facility's vulnerability to extreme weather

Access to Potable Water

Water Efficiency Measures

1. Minimize the water flow to fixtures in the building by setting a reasonable flow rate.

2. Install aerators on faucets to reduce water usage.

3. Consider installing dual flush toilets to save water.

Emergency Storage

Install tanks and cisterns to provide an emergency water supply in case of a disruption. These tanks should be located near the source of water and ideal for the building’s use in emergencies. Water should be stored in a cool, dry location to maintain its quality.

Critical Areas Circuits

If the building has a emergency generator, consider installing a solar power system to ensure the proper operation of the generator and critical systems in the event of an emergency.
Community
Strategies that encourage changes in behavior to enhance resilience

Creating Community Resilience Spaces

Creating a Community Resilience Space
- A community resilience space can support collaboration and improve community resilience.
- The space should be accessible and safe for all community members.
- Engage local stakeholders and residents in the planning and design process.

Example: Community Resilience Space Layout
- Open areas for gatherings and activities
- Emergency services area
- Lighting and signage for visibility and safety

Community Resilience Space Key Features
- Promote community engagement and resilience
- Serve as a hub for community events and gatherings
- Enhance neighborhood safety and security

Community Resilience Space Implementation
- Partner with local organizations and residents
- Secure funding and resources
- Ensure sustainability and maintenance

Community Resilience Space Benefits
- Strengthen community bonds and resilience
- Increase neighborhood safety and security
- Enhance quality of life for residents

Enterprise

[Image with people moving supplies]
Tools for Resilience Landing Page

Ready to Respond Tools for Resilience

- **Take Our Short Survey**: Are you ready to respond?
  - Complete this short, anonymous survey to evaluate your organization's preparedness efforts.

- **Disaster Staffing Toolkit**: Develop comprehensive disaster plans to protect buildings, residents and business operations.

- **Strategies for Multifamily Building Resilience**: Coming soon: 19 retrofit strategies to make buildings more resilient against extreme weather events.

- **Speaker Series Video Library**: Over 100 training videos on disaster preparedness, building infrastructure, resident engagement and more.

Our Ready to Respond Tools for Resilience were developed to help affordable housing organizations make their buildings resilient, prepare their staff to handle emergencies and ensure their residents remain safe.

**These tools will help you:**
- Communicate and coordinate with residents and external stakeholders during a variety of emergencies.
- Ensure housing infrastructure can sustain shocks from a variety of emergency events.
- Maintain business continuity during an emergency event.

www.enterprisecommunity.com/readytorespond
An Overview of the Disaster Staffing Toolkit
Funders
Energy systems - resilience & sustainability

- Current best practices - policies and programs
- Future imperatives - adaptive, renewable, low/no carbon
- Systems perspective
  - Infrastructure
  - Buildings
  - Distributed resources & technologies
- Assets, revenues and value creation
  - Business model disruptions
  - Delineation of benefits
  - New capital structures
Neighborhood scale models grew out of the central premise that **cities need innovation partners to foster systemic change**.

Delivering **social equity** while driving system change in our built environment needs the right partners.

**Neighborhoods are where policy, scale and capital combine in support of community development and built environment transformation.**
- Community development leadership
- Design excellence & placemaking
- Financial innovation
- Policy advocacy
- Green performance across neighborhood
- Collaboration with partners & communities
Resilience discussion - a resilient system/community will

- Why are disruptive events disruptive? decades of incremental dismantling of institutions and systems/subsystem
- What is a community or system? an abundant and diverse set of organizations/institutions, many of which have direct relationships/causality with the community's/system's resilience

Sustainability & Resilience

- What? [metrics] - built environment, social cohesion, economic equity/opportunity (multi-layered)
  - Sympathetic systems
- How to address resilience in communities that fundamentally are NOT sustainable?