



EERI Policy White Paper

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Creating Earthquake-Resilient Communities

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EERI Policy Position

EERI advocates for all earthquake-prone communities to develop community-driven resilience plans and strategies to ensure rapid and robust recovery. Resilience plans should link the community's social and economic functions and services to the buildings and infrastructure systems that support them.

Background

When an earthquake strikes, some communities are prepared to respond to the immediate emergency, but few are prepared to recover normal community services in a timely manner. Over the long term, failure to recover these services can be harmful, and this is the focus of community resilience. Community earthquake resilience is the "ability of a community to prepare and plan for, absorb, recover from, and more successfully adapt to adverse seismic events" (42 USC 7703). Enhancing community earthquake resilience reduces post-disaster losses and decreases community recovery time.

Earthquake-related public policy, including building codes, has traditionally focused on safety, without consistent regard for recovery. Damage to the built environment, even if it does not cause death or injury, can prevent the recovery of essential social and economic functions - housing, healthcare, education, commerce, and culture. Certain social and economic functions are more recovery-critical than others. For example, public-safety facilities (e.g., emergency operations centers, 911 centers, hospitals, police, fire, and emergency medical services stations), public shelters, and certain critical infrastructure (e.g., power, water, communications) need to be functional within hours of a damaging earthquake; building codes therefore set special design requirements for structures that support these critical functions. Housing, schools, non-urgent healthcare, and local businesses need to be functional within days or weeks of the event to avoid cascading and sometimes unrecoverable losses; those that serve vulnerable populations need to recover even faster. Current building codes for these non-emergency functions, however, do not set criteria based on acceptable recovery times. In a joint report to Congress, experts convened by the National Institute of Standards and Technology (NIST) and the Federal Emergency Management Agency (FEMA) have recommended a number of ways to fill this gap (NIST-FEMA, FEMA P-2090, 2021).

Concepts introduced by the NIST *Community Resilience Planning Guide* (CRPG) can help communities identify, understand, and address their resilience challenges by linking the built environment to the social and economic functions needed after an earthquake or other damaging natural hazard event. For example, the CRPG groups buildings into four broad categories, or "clusters," based on the services they support: critical facilities, emergency housing, non-emergency housing and neighborhood services (including schools), and other community services (including most commercial uses). Infrastructure systems are grouped into similar functional categories based on the buildings they support and the services they provide directly to users. This framework helps establish performance goals for the built environment based on both the expected and needed recovery time of a community's various, and often intertwined, social and economic functions.

Achieving community resilience is an ongoing and evolving process that might take some communities decades to accomplish. Success begins with the development of a resilience plan that sets functional recovery¹ goals for the community's social and economic functions. A resilience plan's priorities will be identifiable as gaps between those

¹ Functional recovery is defined as "a post-earthquake performance state in which a building or lifeline infrastructure system is maintained, or restored...to support the basic intended functions associated with the pre-earthquake use or occupancy...or service level" (NIST-FEMA, FEMA P-2090, 2020)



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goals and what the community's existing built environment can deliver. Strategies suited to fill these resilience gaps can then be developed. Because resilience is multi-faceted, successful resilience planning relies on the expertise of a multidisciplinary team of government agencies, technical experts, business leaders, and others able to represent the community's many stakeholders.

Public and private entities have developed tools to assist the community resilience planning process. For example, the CRPG recommends a planning process with six steps: 1) form a collaborative planning team, 2) understand the situation, 3) determine goals and objectives, 4) develop the plan, 5) prepare, review, and approve the plan, and 6) implement and maintain the plan. These steps align with guidance from the FEMA Comprehensive Preparedness Guide (CPG) 101, which provides emergency planning recommendations for use by all levels of government.

Needed Action

EERI advocates for all earthquake-prone communities to develop and implement community-driven resilience plans with strategies to ensure rapid and robust recovery. Different communities will use different processes to suit their priorities and resources. The following actions, which generally align with the CRPG's six-step process, are expected to benefit the resulting resilience plans:

- Utilize a multi-disciplinary team of local experts (CRPG Step 1);
- Engage community organizations that represent groups of stakeholders (CRPG Step 1);
- Understand the community's earthquake risk, including its relation to the existing built environment and other threats and hazards (CRPG Step 2);
- Understand and respond to socio-economic factors that make communities more vulnerable to indirect or cascading earthquake losses, including housing affordability, access to transportation, income and savings, and employment stability (CRPG Step 2);
- Set appropriate functional recovery goals at the community level (CRPG Step 3);
- Set specific goals for new and existing buildings and infrastructure systems and determine their anticipated performance (CRPG Step 3);
- Align resilience objectives with other established community goals for sustainability, public health, community development and growth, etc. (CRPG Step 3);
- Identify gaps between expected and desired performance and develop a plan to address them (CRPG Step 4);
- Make planning and risk data available to all stakeholders, ensuring that it is fairly presented and thoroughly contextualized so that interest groups and media can use it responsibly (CRPG Steps 1 and 5);
- Incorporate earthquake resilience planning into existing or new local hazard mitigation plans (CRPG Step 6).

EERI also advocates for, contributes to, and supports the following activities related to improving community resilience, which utilize the multidisciplinary talents of its membership:

- Long-term funding support for the Learning from Earthquakes Program that will gather and archive resilience-related data from actual earthquake events nationwide.
- Collaboration with other organizations to balance the goals of earthquake resilience with those related to chronic or more frequent community stresses, including climate change impacts.
- Development of processes and tools that assist communities with understanding their earthquake risks and conducting resilience planning.
- Changes in the Stafford Act to support resilience planning and resilience-based research and design criteria.
- Engagement of EERI regional chapters with their local community to incorporate earthquake resilience into existing resilience planning efforts.



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References and Sources for More Information

- 42 USC 7703 <https://uscode.house.gov/view.xhtml?req=granuleid:USC-prelim-title42-section7703&num=0&edition=prelim>
- National Institute of Standards and Technology (NIST 2015) *Community Resilience Planning Guide for Buildings and Infrastructure Systems*. NIST SP-1190 Gaithersburg, MD.
- More information on this policy and EERI's Public Policy and Advocacy at: <https://www.eeri.org/advocacy-and-public-policy/>
- National Institute of Standards and Technology and Federal Emergency Management Agency (NIST-FEMA 2021) *Recommended Options for Improving the Built Environment for Post Earthquake Reoccupancy and Functional Recovery Time*. FEMA P-2090 Washington, D.C., NIST SP-1254 Gaithersburg, MD.
- Federal Emergency Management Agency (FEMA 2010) *Comprehensive Preparedness Guide (CPG) 101 Version 2: Developing and Maintaining Emergency Operations Plans*.