



Promote Safe and Resilient Housing in the United States

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EERI Policy Position

Actions are needed to increase the safety and habitability of housing after earthquakes, recognizing that housing is architecturally diverse and serves a variety of household sizes and incomes. Residents should be able to “shelter-in-place,” which is the ability of a resident to shelter in their home after an earthquake. This objective would be achieved if the housing is safe and habitable after the event during the repair phase to restore normal functionality.

Background

In a large earthquake, many homes become uninhabitable. In fact, research shows that over half of the losses in earthquakes occur in housing (Comerio, 1998). In addition, damage to housing in an earthquake has implications beyond housing damage.

Residents are the foundation of any vibrant community, and a key to keeping the social, physical, and economic structure during the disaster recovery process. The loss of a home can lead to job loss, resulting from forced relocation, moving from one place to another or searching for a new or temporary home. Damage to one's home harms the entire neighborhood, while a retrofitted home can benefit the resilience of a neighborhood. The economic consequences of significant damage to the housing sector can be region wide. A sharp and sustained reduction in available housing after a disaster may result in a mass exodus from the area, such as occurred in New Orleans after Hurricane Katrina, or in “Ghost Towns,” such as occurred after the Northridge earthquake (Comerio, 1998). These housing losses in turn caused a sharp decrease in the available workforce, and as a result, a decrease in the needed tax base. Housing loss can also lead to poor medical and mental health (Bourque et. al., 2002). Finally, rebuilt housing is likely to be more expensive, leading to gentrification, changes in neighborhood character, and loss of affordable housing, particularly since multi-family housing can take years to replace. Housing for low-income and vulnerable populations deserves particular attention as these groups have fewer resources to apply to housing and community recovery.

Many older homes and especially multi-family complexes could experience significant or catastrophic damage in future earthquakes. Building codes change and improve over time, incorporating new knowledge about how to resist earthquake shaking. New construction, when constructed to the standards of modern codes, is thus considered less vulnerable. However, unlike fire codes, existing homes are not required to be retrofitted to meet modern codes.

Needed Action

Existing Housing: EERI advocates four approaches to reduce the earthquake risk of existing housing that are increasingly more aggressive and work toward the overall goal of enabling all residents to “shelter-in-place” while normal functionality is being restored. Determining the appropriate level of functionality to advocate for involves balancing the costs of mitigation with the hazard in the state, metropolitan region, and community. While this paper focuses on improving the physical housing stock, emergency planners should also adopt policies that facilitate housing reoccupancy and recovery by temporarily waiving certain habitability standards in the immediate post-earthquake period with a phased habitability standard approach (SPUR, 2012). In this context, habitability is the ability for a resident to stay within their home following a disaster granted it is safe enough to resist aftershocks (Post-Earthquake Safety Evaluation of Buildings green tag) and depend on temporary water, power, and sewer service as needed. Normal functionality of housing includes all of the operational features of housing, such as a safe and watertight structure, water, gas, electricity, sewer that allow a resident to reside in the home long-term.

The four broad actions identified below entail activities that can be taken at the local, state, and federal government levels and are listed in terms of increasing effectiveness toward the overall goal of enabling all residents to “shelter-in-place.”



1. Define under what conditions residents will be able to shelter-in-place and enact policies to inform residential building owners and tenants of their risks. Housing buyers and renters should have a right to reliable information, and developers, lenders, insurers, and sellers should have an obligation to provide it. These policies should be comprehensive and can begin productively by focusing on residential construction types already known to perform poorly in earthquakes.
 - Federal: Expand Local Hazard Mitigation Grant funding for inventories and risk studies of existing housing.
 - State: Mandate and provide funding for local jurisdiction inventories and risk studies of existing buildings.
 - State or Local: Mandate seismic evaluation and disclosure upon sale of building or by a specific date.
 - State or Local: Implement mandatory or incentivized programs to take advantage of new earthquake performance rating systems (such as those developed by SEAONC, ABAG, Temblor, ARUP, REDi, or the USRC).
 - Local: Conduct inventories of vulnerable existing housing types.
2. Promote and implement codes, standards and guidelines to increase the number and quality of seismic retrofits, including standardized retrofit plans and training for contractors for retrofit of single-family homes, as well as improvements in existing building codes for single-family and multi-family housing.
 - Federal: Fund research on how common existing housing types and retrofit solutions perform in earthquakes and the development of standards such as ASCE/SEI-41, *Seismic Evaluation and Retrofit of Existing Buildings*.
 - Federal: Promote the implementation of guidelines such as FEMA P-807, *Seismic Evaluation and Retrofit of Multi-Unit Wood-Frame Buildings With Weak First Stories*, and FEMA P-1100, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings*.
 - State and Local: Develop and distribute retrofit guides and model plans for use by contractors, homeowners, condominium complex boards, and multi-family building owners, and adopt retrofit standards.
3. Provide financial and other incentives for owners to upgrade housing, ensuring that these incentives are tied to consensus retrofit standards.
 - Federal: Offer refundable income tax credits or tax deductions for seismic retrofits.
 - State: Offer refundable income tax credits or tax deductions for seismic retrofits.
 - State: Offer exemptions for property tax increases due to seismic retrofit work.
 - State: Offer loans for qualified retrofit projects, such as those enabled through Property Assessed Clean Energy (PACE) financing.
 - Local: Streamline and prioritize permitting process with technical guidance for seismic retrofits within building departments
 - Local: Provide air rights or other incentives such as permitting accessory dwelling units (ADUs) that increase property value for owners who seismically retrofit and allow transfer of these incentives to other owners and locations.
4. Require structural upgrades of seismically at-risk buildings when substantially altered or damaged, upon sale, or by a specific date.
 - State or Local: For multi-family buildings, adopt model building code provisions that trigger upgrades to accompany substantial alterations and repairs.
 - State or Local: For one- and two-family dwellings, restrict the broad upgrade exemptions in current model codes. Amend the applicable model codes (the *International Residential Code* and *International Existing Building Code*) to thoughtfully target the community's most vulnerable and recovery-critical housing types.
 - State or Local: Mandate retrofit by a specific date.
 - State or Local: Mandate retrofit upon sale.

New Construction: Adoption of modern codes is not universal and should be a priority. In addition, building code requirements for new construction are intended to provide for life safety and enable "shelter-in-place." The "shelter-in-place" standard is met if the housing is safe (receives a green tag through the ATC-20 *Rapid or Detailed Evaluation Safety Assessment*) and marginally habitable while repairs are made (SPUR, 2012).



References and Sources for More Information

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