# LP 25

# POLICY ACTIONS

## LOMA PRIETA 25 SYMPOSIUM

ASSOCIATION OF BAY AREA GOVERNMENTS
RESILIENCE PROGRAM

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LP25

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# Policy Actions Summary

## Recommendations for improving building performance

- Encourage communities to evaluate their existing building stock and determine the acceptable level of performance needed from specific building types and uses to achieve broad community performance objectives.
- Encourage communities to enact programs to require the upgrade of highly vulnerable buildings.
- Advocate that California Building Code explicitly declare the seismic performance expected from new buildings by using clear, transparent performance objectives, such as those proposed by SPUR, so local officials can determine whether certain buildings or occupancies should achieve improved performance.
- Partner with Northridge 20 policy group to recommend local building code amendments that provide cost-effective improvements to seismic performance. Partner with code developers to incorporate these recommendations into future versions of the building code.

## Recommendations for statewide guidelines on soft-story buildings

- Brief state partners such as the California Seismic Safety Commission (CSSC), the Housing and Community Development Agency (HCD), the State Building Standards Commission, and Bay Area legislators to make the case for the need to address vulnerable soft-story buildings statewide.
- Encourage development of statewide soft story retrofit standards that are incorporated in the California Building Code to provide a consistent mitigation approach for California jurisdictions.
- Coordinate education and advocacy planning with the League of California Cities and the California State Association of Counties to secure organizational support for the proposed improvements.

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## Recommendations for financial incentives

- Understand the efficacy of statewide PACE programs and explore regional financial incentive or financing options that fill any additional needs.
- Explore ways for existing financial mechanisms currently used to finance water and energy upgrades, such as BayREN's loan fund, to support seismic safety objectives.
- Encourage cities to consider use of Community Development Block Grant (CDBG) program funds with approval from City Councils for seismic safety improvements in private buildings.
- Recommend that local municipalities apply a rebate of the property transfer tax at the point-of-sale for upgrading residential and commercial buildings, as is successfully done in Berkeley.
- Explore other potential incentives to spur mitigation action, such as obtaining mortgage interest rate deductions for seismic safety retrofits and potential waiver of business license tax for a limited period to those program participants.

## Recommendations for establishing a lifelines council

- Convene lifeline providers: Establish a State Lifelines Council and convene a Regional Lifeline Council in the San Francisco Bay Area, and support and coordinate with Southern California regional lifelines councils

# LP25

## LOMA PRIETA 25 SYMPOSIUM

# POLICY ACTIONS

California communities face significant earthquake risk despite progress in improving building standards, retrofitting vulnerable buildings, and upgrading essential infrastructure. The August 2014 Napa earthquake demonstrated again that California communities can suffer substantially with damages from even moderate earthquakes. Though technology exists to significantly improve performance in earthquakes, challenges exist that prevent meaningful action.

The challenge for Bay Area communities is to enact standards for existing and new buildings that ensure communities can quickly recover from earthquakes; to develop financing tools to pay for improving seismic safety; and to ensure coordinated improvements of essential infrastructure. Speedy recovery requires that vulnerable buildings and lifeline systems are upgraded so that homes remain livable and businesses are operational.

The key reasons for continued seismic vulnerability are:

- Building codes without adequate seismic performance goals
- Lack of general knowledge about vulnerable existing buildings
- Few financial resources for investment in seismic upgrades
- Lack of coordinating and knowledge sharing among essential lifeline providers.

Reducing earthquake risk is a priority issue. Community leaders are often slow to implement solutions to risks that appear remote, expensive, or cumbersome. This reasoning is understandable given community concerns about quality public education, jobs, and affordable housing; however, all suffer in a disaster when prudent mitigation action is not taken. These barriers are serious impediments to risk reduction even though local jurisdictions and utility agencies control decisions about the quality of new construction and mitigation of existing buildings and utilities.

In 2014, the 25th anniversary of the 1989 Loma Prieta and the 20th anniversary of the 1994 Northridge earthquakes focused attention on the profound physical and social impacts of those earthquakes. Elected and appointed officials, community leaders, and seismic safety and public policy experts convened two conferences to map out solutions to earthquake risk. A Northridge 20th Anniversary Symposium was held in Los Angeles on January 16-17, 2014 and a Loma Prieta 25th Anniversary Symposium was held in Oakland on October 16, 2014. Discussions at the two symposia highlighted consequences of the earthquakes, cited the safety and policy accomplishments that resulted from the events, and explored actions needed to improve earthquake resilience.

The Loma Prieta 25th Anniversary Symposium (LP25) marked the launch of a three-year public policy program to improve state and local laws that address community safety and resilience. The LP25 Steering Committee developed the following policy recommendations, informed by the Northridge 20th Anniversary Symposium Summary Report. The LP25 Symposium promoted a legislative program with these goals:

- **Update building codes.** Adopt building code standards to improve the seismic performance of new and existing buildings and ensure that building codes meet community performance expectations.
- **Upgrade vulnerable apartments and condominiums.** Enact statewide guidelines for the identification, evaluation, and retrofit of seismically unsafe apartment and condominium buildings.
- **Develop financial incentives.** Establish regional financial incentive programs for improving the seismic safety of apartments and condominium buildings.
- **Convene lifeline providers and cities.** Establish a State Lifelines Council and convene regional Lifeline Councils in the San Francisco Bay Area and in Southern California.

Seismic and policy experts defined these four actions as critical next steps to achieve in the near future that could launch widespread implementation throughout the Bay Area; however resilience-building is an ongoing activity that will require more effort beyond these near term actions.

The Association of Bay Area Governments (ABAG) serves as the public policy hub with its member cities, towns, and counties to implement these policy actions, and will work to incorporate these policies into other regional planning efforts. ABAG is the regional council of governments which serves its members through research and planning related to land use, environmental and water resource protection, disaster resilience, energy efficiency and hazardous waste mitigation; and through risk management and financial services. The ABAG Regional Planning Committee endorsed the LP25 policy measures in October 2014, and recommended their adoption by the ABAG Executive Board, which unanimously approved the policies in January 2015. The issues addressed by policies and recommended next steps in implementation are discussed in detail in the proceeding sections.

POLICY

Adopt building code improvements to increase the seismic performance of new and existing buildings and ensure that building codes meet community performance expectations.

Scientists expect that damage to buildings in a strong Bay Area earthquake could displace 150,000 people or more from their homes and shutter businesses for weeks or months. The economic disruption from such an event is forecasted to exceed $100 billion. Business owners and residents will sustain substantial losses and the most vulnerable people in the region will suffer disproportionately. Many people may be forced to leave the Bay Area.

Most people expect cities with modern buildings to perform well in earthquakes, but the predicted losses do not align with this expectation. However, much can be done to ensure that a community's performance expectations are met. Building new schools, homes, and job centers to higher standards that increase post-earthquake resilience will minimize disruption on daily lives and protect one of the world's largest economies. Older, existing buildings can also be seismically upgraded to meet reasonable performance standards and minimize disruption.

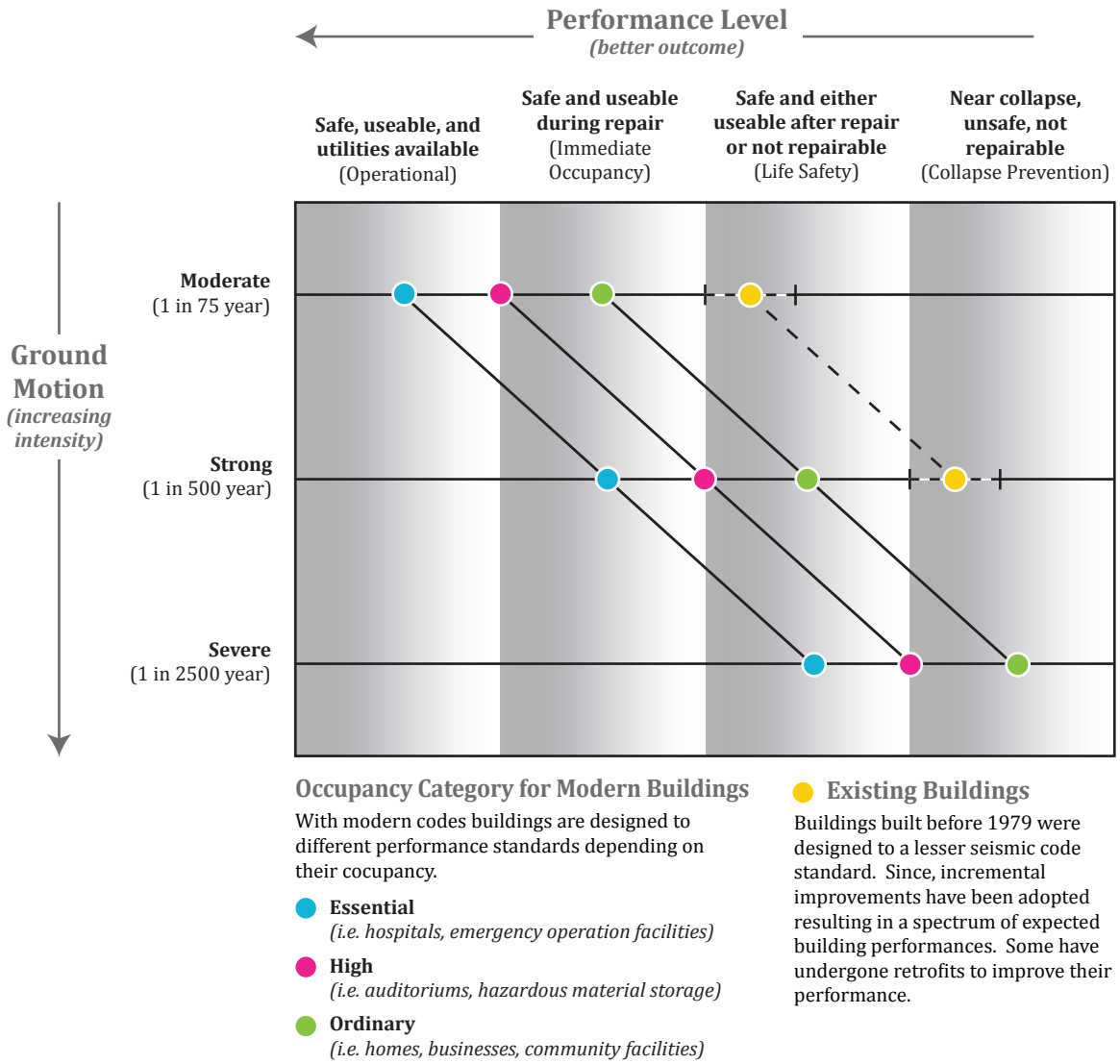
## Building performance in earthquakes

### Modern buildings

Understanding current building code performance is the first step to improving building and community performance. The performance objective of seismic provisions in the modern building code (adopted after 1973) is life safety for most buildings in a strong earthquake. Life safety means that there may be structural and nonstructural building damage but no collapse or other life-threatening hazards. The goal of the building code for severe earthquakes is to prevent building collapse and loss of life. While this objective does a good job of reducing death and injuries, it does not limit building damage or ensure that buildings will be usable or easily repairable in strong earthquakes. In moderate or minor earthquakes, building damage should be minimal and easily repairable. In rare, severe earthquakes, building damage is expected to be significant and may be unrepairable or not cost effective to repair. Figure 1 demonstrates the expected performance of different buildings with different occupancies in moderate, strong and severe earthquakes.

Experts who develop building codes have long recognized that essential service buildings such as hospitals, fire and police stations, emergency operations and dispatch centers, and facilities housing large numbers of people must remain operational after an earthquake and should be built for better performance (see figure 1). However, ordinary buildings, such as homes, schools, community facilities, and businesses important for everyday functioning are not built with performance standards higher than life safety because they don't support emergency response operations.

## Figure 1: Performance of New and Existing Buildings in Moderate, Strong, and Severe Earthquakes




Adapted from: NEHRP *Recommended Seismic Provisions for New Buildings and Other Structures* (2009) & SPUR *When is a Building Safe Enough?* (2009)

Even if they were constructed under the most current building codes, these buildings may suffer significant damage in a strong earthquake. Widespread damage of these community-serving buildings can have significant economic and social impacts on a community.

SPUR, a San Francisco-based policy organization, has recommended building performance objectives that clearly indicate the expected safety and usability of buildings after an earthquake. Performance is measured in terms of a strong earthquake that is reasonably expected to occur within the lifetime of a building. Buildings would be more affected by large earthquakes; less by more moderate ones.

## Table 1: Building Performance Targets

| Performance category | Description | Newer buildings (using current building code) | Older buildings |
|---|---|---|---|
| Safe and operational | Buildings will experience only very minor damage and have energy, water, wastewater, and telecommunications systems to back up any disruption to the normal utility services. | Performance expected of new essential facilities such as hospitals, emergency operation centers, facilities housing hazardous materials, and large gathering places. | Most older buildings are not expected to meet this performance target. |
| Safe and usable during repair | Buildings will experience damage and disruption to their utility services, but no significant damage to the structural system. They may be occupied without restriction. | A few new, non-essential buildings will meet this performance target.<br>*Recommended performance for new non-essential buildings.* | |
| Safe and usable after repair | Buildings may experience significant structural damage that will require repairs prior to resuming unrestricted occupancy. These buildings will likely receive a yellow tag after the "expected" earthquake. Time required for repair will vary from months to years. | This is the current expectation for new, non-essential buildings. | *This is the high end of performance recommended for existing buildings undergoing rehabilitation.* |
| Safe but not repairable | Buildings may experience extensive structural damage and may be near collapse. Even if repair is technical feasible, it might not be financially justifiable. Many buildings performing at this level are expected to receive a red tag after the "expected" earthquake. | This is the low end of acceptability for new, non-essential buildings. | This is often the performance goal used for existing buildings undergoing rehabilitation.<br>*This is the low end of performance recommended for existing buildings undergoing rehabilitation.* |
| Unsafe | Partial or complete collapse. Damage will likely lead to significant casualties in the event of an "expected" earthquake. | No new building is expected to meet this performance target. | Some existing building types are known to be unsafe and need to be addressed most urgently in new mitigation policies. These include unreinforced masonry, non-ductile concrete and soft-story buildings. |

Adapted from *When is a Building Safe Enough?* SPUR (2009), ABAG comments in italics

These performance measures are clear and easily understandable for the public and building code officials adopting building codes. They are an example of the kind of building performance statements that would help make the building code more transparent and allow communities to compare performance of newer and older buildings together. Communities could make better informed decisions about building code standards once they define the level of expected performance after damaging earthquakes.

### Existing buildings

Most Bay Area communities are already significantly developed, so desired community performance cannot be attained only by improving  new buildings. Many older buildings built before current codes will sustain significant damage; some fragile older buildings types, such as unreinforced masonry, tall concrete, and "soft-story" apartment buildings, are known to kill and injure people in large earthquakes. Performance of older buildings varies widely depending on construction type. Most current standards for the retrofit of older buildings are designed to meet a lower standard than newly constructed buildings (generally 75 percent of the current building code specifications). This standard is interpreted by some engineers to mean "safe but not repairable." While this standard reduces the threat to human life in these buildings, it does not ensure that buildings will effectively continue functioning. Communities can evaluate existing building stock to determine an acceptable level of performance needed from specific building types and uses to achieve improved performance objectives.

Currently, no state law requires retrofit of seismically vulnerable buildings that do not meet current safety standards, though the building codes do require retrofit for existing buildings undergoing significant rehabilitation. However, some cities have required that hazardous buildings (like unreinforced masonry [URM] and multi-unit apartment buildings with soft-story construction) be upgraded to prevent loss of life and minimize displacement of residents. Older residential and community-serving buildings should achieve the performance objective of "safe and usable during repair" or "safe and usable after repair."

## Improving building performance

The building code sets minimum performance requirements to achieve life safety and, in the case of essential buildings, basic functionality. The California Building Code (CBC) is comprised of the International Building Code (IBC) with additional performance-enhancing provisions for certain new and existing buildings.  Each municipality adopts the CBC, sometimes with additional local performance-enhancing amendments if justified by local climatic, topographic, or geological conditions.  Most large cities, like San Francisco, have adopted local building code amendments, but many smaller jurisdictions have not developed of local amendments.

Whether through model local amendments or statewide adoption, we recommend developing a more comprehensive system to define building performance expectations, such as described in the SPUR example on page 10, so local officials can designate certain vulnerable buildings to

achieve improved performance objectives. We believe that designing most new buildings to the "safe and usable during repair" performance target will minimize community disruption in a major earthquake. While designing and constructing buildings to more stringent performance objectives may increase construction costs by up to 5%, this modest investment will serve to recoup the direct losses and disruption costs of a disaster. Furthermore, from a city perspective, upgrading the performance of new buildings is significantly less expensive than retrofitting existing buildings.

Incorporating transparent performance expectations for all buildings would provide the opportunity for the public to consider whether the current set of performance expectations is acceptable for their community's existing buildings. The performance categories developed by SPUR could be used to inform a region-wide discussion about what level of seismic safety performance communities expect from the building code. Discussions could then focus on defining acceptable levels of risk in a city. Local officials, community leaders, and residents need to understand the problem in order to determine how much financial investment and legislative effort should be put into improving existing buildings and new construction to improve the overall performance of the community's building stock. Codes and standards can then translate community performance expectations to evaluation and design provisions for individual buildings.

## Recommendations for improving building performance

The LP25 policy group and the ABAG Executive Board recommend taking the following actions:

- Encourage communities to evaluate their existing building stock and determine the acceptable level of performance needed from specific building types and uses to achieve broad community performance objectives.
- Encourage communities to enact programs to require the upgrade of highly vulnerable buildings.
- Advocate that California Building Code explicitly declare the seismic performance expected from new buildings by using clear, transparent performance objectives, such as those proposed by SPUR, so local officials can determine whether certain buildings or occupancies should achieve improved performance.

- Partner with Northridge 20 policy group to recommend local building code amendments that provide cost-effective improvements to seismic performance. Partner with code developers to incorporate these recommendations into future versions of the building code.

POLICY

## Enact statewide guidelines for the identification, evaluation and retrofit of seismically unsafe apartment and condominium buildings.

Certain multi-unit residential buildings, called "soft-story" buildings, are at substantial seismic risk in a large earthquake and are likely to suffer significant damage, causing residents to be displaced from their homes. Soft-story buildings represent a major proportion of the multifamily housing stock in the Bay Area.

The term "soft story" refers specifically to a multi-story building that has large openings on the ground floor, typically due to garage doors, open parking stalls, or large storefront windows, resulting in relatively "soft" or a weak structural system on the ground floor. Ground shaking causes such structures to sway, deforming and possibly collapsing the first story, leaving the floors above unusable. Most soft-story buildings were built prior to 1978. ABAG models show there are approximately 140,000 housing units in 17,000 soft story buildings in the region. Most soft-story buildings are located in San Francisco, Oakland, Berkeley and Santa Clara County, but they are also scattered throughout many of the older suburbs in the Bay Area, especially the East Bay. In a large earthquake on the Hayward or San Andreas faults, two-thirds of uninhabitable housing units will likely be in soft-story residential buildings.

A soft-story building collapse can kill people and those occupying the first story are at particular risk. Even short of collapse, significant damage will prompt owners of soft-story buildings to demolish and rebuild them after a disaster, slowing community recovery. In many cities, soft-story housing older and typically more affordable, and more likely to be renter-occupied than owner-occupied. In past disasters, low-income or older rental housing has often been demolished and rebuilt as market rate housing or condominiums, creating significant loss of affordable housing in the community. The social equity impacts of post-disaster housing losses are a crucial determinate of community recovery.

The risk posed by soft-story buildings is a multi-faceted community safety and social equity issue. Without mitigation measures, many people could be injured or killed, and communities could suffer from a serious loss of housing and neighborhood businesses, leading to prolonged long-term recovery. Damage to soft-story multifamily buildings could result in a significant loss of affordable housing, permanently changing community and regional demographics.

While some Bay Area jurisdictions have completed a preliminary assessment of soft-story risk, few have implemented retrofit programs. Though some jurisdictions may have not taken action due to lack of financial or technical resources to develop a soft-story evaluation and retrofit program, many communities have not yet recognized the broad significance and urgency of the issues involved.

## Recommendations for statewide guidelines on soft-story buildings

The LP25 policy group and the ABAG Executive Board recommend taking following actions:

- Brief state partners such as the California Seismic Safety Commission (CSSC), the Housing and Community Development Agency (HCD), the State Building Standards Commission, and Bay Area legislators to make the case for the need to address vulnerable soft-story buildings statewide.
- Encourage development of statewide soft story retrofit standards that are incorporated in the California Building Code to provide a consistent mitigation approach for California jurisdictions.
- Coordinate education and advocacy planning with the League of California Cities and the California State Association of Counties to secure organizational support for the proposed improvements.

POLICY

## Establish regional financial incentive programs for improving the seismic safety of apartments and condominium buildings.

Retrofitting soft-story apartment and condominium buildings will save lives, minimize injuries, preserve the vitality of small neighborhood businesses, and help keep people in their homes after a major earthquake. At costs ranging between $25,000 and $130,000 per building, strengthening earthquake-vulnerable soft-story buildings can be expensive, but is considerably less burdensome than replacement costs of collapsed buildings. While retrofit costs are coming down as the industry gains efficiency and expertise, many building owners and tenants cannot bear such an unplanned expense, even if they understand the long-term benefits.

Sharing costs between tenants and owners, and how financial incentives can assist building owners and renters, is an area of active public debate. Each city approaches the issue differently: San Francisco allows 100 percent of the costs of retrofits to be passed to tenants, while Berkeley requires the owner to pay the full cost. Oakland will likely adopt a compromise policy with costs shared between owners and tenants. Local officials must be careful to consider the burden of costs on tenants and have sufficient hardship protections in place to ensure that rent increases don't cause displacement of the low-income tenants the retrofits are designed to protect. Oakland is also considering incentives for financing that reduce the cost of this work on both landlords and tenants. As more cities require seismic retrofits of soft-story buildings, the financial options for retrofitting could increase.

Currently, each city establishes its own mix of financing and incentives for building owners. For example, Oakland has set aside $1 million in Community Development Block Grant (CDBG) funds to reduce the cost of soft-story retrofits for low income tenants and owners. In Berkeley, new property owners in buildings with four or fewer units can receive a rebate of their property transfer tax if they perform a seismic retrofit. Additional

### Property Assessed Clean Energy (PACE)

One of the most promising financing mechanisms for seismic retrofits is Property Assessed Clean Energy (PACE). PACE is a mechanism for financing renewable energy, energy efficiency, and water efficiency to residential and commercial properties. PACE provider, AllianceNRG, has expanded its offerings to include seismic strengthening improvements. Additional PACE administrators may add seismic improvements to their program offerings. Through PACE, qualified property owners can obtain affordable long-term financing and repay it through their secured property tax bills. To access PACE, a public agency must "sponsor" the program by establishing its legal authority through a routine legislative process to issue bonds to finance eligible projects. Because the loan is attached to the property rather than to an individual, the contractual assessment stays with the property upon sale.

financial mechanisms offered regionally might help cities more easily tap financial resources to ease costs for property owners and tenants. Regional funding pools and multi-jurisdictional programs may be able to secure better terms than individual cities, which could benefit smaller cities that have identified and evaluated risk in soft-story buildings, but have yet to require they be retrofitted. For example, the Bay Area Regional Energy Network (BayREN) has a loan fund of $1.5 million currently available to owners of multi-unit residential buildings in Alameda County for use to upgrade building energy systems. This type of project funding can supplement seismic upgrade projects where owners seek to leverage structural improvements.

## Recommendations for financial incentives

The LP25 Policy group and the ABAG Executive Board recommend establishing regionally available financing programs for residential seismic retrofits that can be accessed by all Bay Area cities and counties. Initial steps include the need to:

- Understand the efficacy of statewide PACE programs and explore regional financial incentive or financing options that fill any additional needs.
- Explore ways for existing financial mechanisms currently used to finance water and energy upgrades, such as BayREN's loan fund, to support seismic safety objectives.
- Encourage cities to consider use of Community Development Block Grant (CDBG) program funds with approval from City Councils for seismic safety improvements in private buildings.
- Recommend that local municipalities apply a rebate of the property transfer tax at the point-of-sale for upgrading residential and commercial buildings, as is successfully done in Berkeley.
- Explore other potential incentives to spur mitigation action, such as obtaining mortgage interest rate deductions for seismic safety retrofits and potential waiver of business license tax for a limited period to those program participants.

POLICY

## Establish a State Lifelines Council and convene Regional Lifelines Councils in the San Francisco Bay Area.

Failure of lifeline infrastructure system following earthquakes, floods, fires, and other hazards limits the long term habitability of homes and slows economic activity. A resilient Bay Area is dependent on functioning infrastructure systems. Since the 1989 Loma Prieta earthquake, the region has invested $25 billion to improve the resilience of regional infrastructure systems, but the investment has been inconsistent across sectors. Significant threat from natural hazards continue to threaten the prosperity of the region.

The LP25 policy partners and the ABAG Executive Board recommend the establishment of a Regional Lifelines Council to address vulnerabilities in the region's infrastructure systems. Modeled on the San Francisco Lifelines Council, the council membership would consist of executive officers and senior-level staff of local and regional water, transportation, transit, and energy operators and providers. The goal of a lifelines council is to:

- Develop and improve collaboration across the region, and share risk assessment information, recovery plans, projects, and priorities.
- Understand inter-system dependencies and establish coordination processes for lifeline restoration and recovery following a major disaster event.
- Communicate to the public what performance they can expect from regional infrastructure systems following natural disasters or other disruptions.
- Develop long-term plans to correct the most serious risks that will impede rapid recovery.

A lifelines council would directly improve regional resilience, decrease future disaster losses, and improve system performance by connecting parallel efforts of disparate utilities, improving knowledge of system operations and system interdependencies, and engaging the public for the first time to help set performance standards from the user perspective. The stated goals attempt to improve resilience by reducing initial damage, accelerating system restoration, and increasing the capacity of institutions, businesses, and individuals to withstand the interruption.

Regional efforts will be more meaningful if they are coordinated with Los Angeles area and statewide efforts. The Bay Area Regional Lifelines Council can support and encourage establishment of a statewide council and other regional councils, such as in Los Angeles.

The Bay Area effort will be bolstered by a number of key supporters:

- State Seismic Safety Commission – The Seismic Safety Commission is key due to their ability to engage other state agencies (CPUC, CalOES, CEC, DWR, Caltrans, etc.), facilitate

coordination between regions, and provide a conduit to state political power, as both an inflow and outflow of information.

- Pacific Earthquake Engineering Research (PEER) Center – PEER, a network of ten universities, is a leading earthquake engineering research center. PEER's lifelines program can provide analysis capabilities and has completed technical studies of individual system fragilities, as well as interdisciplinary studies on infrastructure failures on the region.
- Climate Research Institute—U.C. Berkeley's interdisciplinary center is developing an innovative research and application program to address climate impacts in local jurisdictions. Because many of the Bay Area's natural hazards will be exacerbated by climate change, climate adaptation and mitigation measures in development can be effectively integrated with disaster resilience plans for lifelines' reliability.
- Department of Homeland Security, Office of Infrastructure Protection – DHS would be able to provide assistance to build partnerships across government and the private sector to address infrastructure resilience.
- San Francisco Lifelines Council - Support from the City/County Council would provide a division of tasks that allows San Francisco to focus on local issues and promote region-wide efforts to a regional body. ABAG staff is currently involved in a City and County of San Francisco Lifelines Council working group on Regional Coordination of Lifelines Restoration. The relationships and lessons learned in this working group could evolve into a regional lifelines council that brings in a greater area of the Bay Area, as well as other lifeline systems.

## Recommendations for establishing a lifelines council

The LP25 policy group and the ABAG Executive Board recommend taking following action:

- Convene lifeline providers: Establish a State Lifelines Council and convene a Regional Lifeline Council in the San Francisco Bay Area, and support and coordinate with Southern California regional lifelines councils.

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