Foreword

Over the decades, a variety of experts have done a lot of work to identify actions that communities can take to become more resilient to the impacts of disasters. While there are a number of communities that have realized successes following those recommendations, many others lack the willingness or resources to take action. As a result, the economic and social costs of disasters have continued to rise. What the nation needs are options that are not only effective in their impact, but desirable to those who must implement them. That is, stakeholders need to be incentivized, not just encouraged, to take action.

The National Institute of Building Sciences (Institute) was formed in 1974 for the purpose of bringing together experts who could leverage their experience and knowledge to offer insights and guidance to decision makers and other stakeholders that are responsible for ensuring the construction of safe, affordable structures for housing, commerce and industry throughout the United States. The Institute’s Multihazard Mitigation Council (MMC) engages experts interested in providing a safe and resilient built environment. The Council on Finance, Insurance and Real Estate (CFIRE) examines the intersection of finance, insurance and investment with design, construction and ownership to encourage the development of affordable high-performance buildings. This document represents the embodiment of the missions of the Institute, MMC and CFIRE. It reflects the input of dozens of experts in the fields of mitigation, building sciences, finance and other areas. No one approach will lead to resiliency. The engagement of these sectors is necessary to fully realize the creation of practical, achievable and effective incentive options that will lead to resilience.

The ideas presented in this document are not meant to solve all of the problems faced by the nation. Rather, they are offered to facilitate the discussion among stakeholders who must work together to chart a path forward. The authors believe that building on what the document offers will lead to the implementation of effective and sustainable solutions.

While the solutions proposed in this document often incorporate financial incentives, it is important to note that effective solutions will require more than the engagement of the finance sector; effective solutions will require government action, as well as actions in other market sectors to change consumers’ perspectives, which will in turn drive these incentives.

Kevin Mickey
Multihazard Mitigation Council Chair
Overview
While resilience has come to occupy a place in public policy and programs across the United States, the economic impact from extreme weather events continues to increase, as it has over the past 35 years (Figure 1, below). Yet, even in the face of growing losses and the deleterious effects of natural disasters, and with the efforts from the federal and state pre- and post-disaster mitigation programs, the nation’s efforts to create resilience is still far behind what it needs to be. A new approach is necessary—one focused on capturing the most promising potential incentives provided by both the public and private sectors for pre- and post-hazard investment.

Beginning in 2014, the National Institute of Building Sciences (Institute), through its Multihazard Mitigation Council (MMC) and Council on Finance, Insurance, and Real Estate (CFIRE), assembled a multi-sector team of experts to discuss and consider the concept of incentivization strategies for implementing resilience. Through these discussions, the experts came to believe that the most cost-effective manner to achieve resilience is through a holistic and integrated set of public, private and hybrid programs based on capturing opportunities available through mortgages and loans; insurance; finance; tax incentives and credits; grants; regulations; and enhanced building codes and their application. This focus on private/public-sector opportunities to induce corrective action is called “INCENTIVIZATION.”

To share their findings, the MMC-CFIRE team developed a white paper, *Developing Pre-Disaster Resilience Based on Public and Private Incentivization*, which the Institute published in late 2015. This document summarizes the key points from that publication. That paper contains highly technical and detailed discussions about potential programs and approaches that would create a consumer-based approach to resilience.

The purpose of this summary document is to encapsulate the key points of that *Developing Pre-Disaster Resilience Based on Public and Private Incentivization* white paper for reference by the public; federal, state, and local leaders; and potential incentive providers. Those interested in the more technical discussions can easily find the original white paper at the Institute’s website (www.nibs.org/resources/resmgr/MMC/MMC_ResilienceIncentivesWP.pdf).

Incentivization Target Group
Today, when stakeholders are deciding to make improvements to mitigate against hazards, they tend to rely on three primary mechanisms: federal grant programs (with some support from private foundations); insurance premium discounts for implementing measures to reduce vulnerability; and the political will of communities, typically in the wake of a disaster but sometimes before an event occurs, through the foresight of community champions.

![Figure 1: Billion Dollar+ Extreme Weather Events in Frequency and Losses from 1980-2014](image-url)
While these approaches have led to improvements in some areas and communities, they have not had deep penetration in most communities.

Regardless of how a community prioritizes resilience, clearly, unless consumers (including property owners, operators and residents), believes that they will benefit and incur an advantage for their investment, little will happen. This paper demonstrates the need for a new approach to mitigation and the need to bring many new stakeholders into the discussion, similar to efforts being made to reduce energy consumption at the consumer level. The incentivization approach presented here establishes a pathway to alter consumers’ decision making based on how they weigh economic factors, which in turn should improve resilience within our communities and nation.

This approach calls for input, consensus, leadership, and action from a broad spectrum of stakeholders that represent the entire regulatory and economic processes needed to develop and coordinate incentivization within the national economy. These stakeholders should include those that offer incentives, as well as the decision makers who act on those incentives to implement the mitigation effort. It also requires the engagement of forward-thinking communities and government agencies that develop, analyze and implement policies (including both “carrots and sticks,” i.e., rewards and punishments) that can encourage resilience measures. Such activities need to occur at high enough levels in the public and private sectors to ensure the goals and objectives are met. These stakeholders and their interests in resiliency include:

**Offerers**
- Insurance companies that want to set premiums commensurate with insurable risk and the potential for achieved resilience.
- Banks and other lenders that want to ensure that a threshold level of resilience is created to support mortgage and business loans, and loan servicing security.
- Bond rating companies that assign ratings to reflect the asset resiliency, and the ability of bond issuers to continue to make payments on principal and interest following a disaster.
- Investment companies; mutual, hedge, and pension funds; and others that have a long-term financial duty to their members, contributors, or beneficiaries to safeguard capital and investments in companies, states, and municipalities.
- Private foundations that support local or regional community mitigation efforts.
- Communities (cities, counties, etc.) that provide services and incentives, based on political will, to improve the local resilience to alleviate regional social and economic losses.
- Federal and state agencies that need to stretch grant and emergency fund resources for mitigation before and after disasters.

**Decision Makers**
- Homeowners who understand the need to protect their families, their homes (as this is typically their most significant asset), and their possessions from disasters.
- Businesses and utilities interested in reducing or eliminating interruptions (sometimes in response to disasters elsewhere) that cut into operating resources, profits, and the trust and loyalty of their customers and/or the public.
- Communities (cities, counties, etc.), which may also be recipients of incentives, that want to maximize their preparation for disasters, minimize the duration and cost of disaster recovery, and preserve their local economies. Communities play a significant dual role as offerers and decision makers.

**Incentivization Benefits**
The purpose of providing incentives is to engage and encourage consumers to help drive resilience—moving beyond strictly enhancing response and recovery to include the economic benefits of improving loan security; reducing or eliminating insurance losses; expanding and preserving jobs; increasing construction; and attracting business. Additionally, co-benefits—benefits that will occur whether or not a disaster strikes—add value. Co-benefits include improving the reputations of the
businesses themselves, and addressing the needs of disadvantaged members of society.

All stakeholders should experience the benefits of resilience—reduced losses, business retention, continued employment, and continued services (and revenue) after disasters; accelerated recovery and reduced recovery costs for owners, occupants, and communities; reduced pressure on the resources required for relief and recovery; and, lessened demand on, and risk to, emergency response personnel and expenditures for emergency response.

**Private Sector:** The private sector will not undertake investments to support achieving resilience simply because it is the right thing to do, but because it makes financial sense to do so. Therefore, incentive providers need assurance that the results of the incentives they offer to achieve resilience will outweigh the costs associated with investments, underwriting, and loan and grant programs. In this win-win scenario, all stakeholders should experience the expanded benefits and co-benefits of resilience, including reduced losses and operational continuity. Once incentives start becoming the standard practice of leading private-sector stakeholders, the rest of the private sector should begin to follow.

**Insurance Sector:** The interests of the insurance sector align substantially with pre-disaster concerns. Resilient buildings reduce the potential losses associated with property insurance, and grow even more important in an era of increasing natural disasters. Similarly, improvements in building resilience would reduce the payouts for business interruption insurance, which frequently exceed the losses insurers pay for property damage. Some insurance companies already have instituted discount programs because they recognize that increased resiliency results in decreased claims. The whole industry needs to understand this relationship.

**Mortgage Lenders:** Resilient properties also enhance the security of mortgage lenders. Therefore, banks and other loan agencies have an ability to incorporate performance-based retrofits based on their ability to reflect increases in collateral values and limited risk.

All things being equal, more-resilient properties represent better loan collateral than less-resilient properties. This suggests that permanent mortgage loans on resilient properties, when pooled and sold as bonds, would enhance the credit quality of mortgage-backed securities.

**Businesses:** Businesses, large and small, increasingly recognize the value of close involvement in community resilience for their long-term viability, and the ability of their employees to continue to live and work within their communities. Developers and builders need to engage and appreciate the largely untapped market for more-durable construction. From the owner’s perspective, a more-resilient property should increase the likelihood of securing debt financing. In addition, a more-resilient property—especially in areas prone to natural disaster—likely possesses more value than a less-resilient property in the same market, thus resulting in enhanced sale prospects and (for commercial properties) better leasing performance.

**Communities:** Resilience adds value to the whole community. The IKEA store in the Red Hook section of Brooklyn, New York, which was built to be resilient, with a generator and showroom floors above flood level is an example. It became a Federal Emergency Management Agency (FEMA) field office following Hurricane Sandy. Similarly, strengthened homes that experienced less damage than the surrounding homes supplemented sheltering requirements. For example, using the Airbnb model, a process was created that linked people displaced by Hurricane Sandy to available rooms in undamaged residences.

**Others:** Beyond having more-resilient buildings and communities, stakeholders also may gain additional economic benefits from establishing a system of private-sector incentives, including:

- Increased loan security for lending institutions and enhanced financing opportunities for borrowers and investors.
- More stability in the insurance and reinsurance industries.
- Increased construction activity and jobs associated with achieving resilience.
• Promotion of resilience by communities to attract and retain quality developers and businesses.
• Reductions in the amount of damaged and contaminated materials and contents following a disaster event, which initially may pose health hazards and then will require disposal of at existing landfills or by incineration.

Even beyond these benefits, businesses and society at-large can benefit from the added value of co-benefits. Businesses investing in resilience can produce co-benefits that go beyond helping disadvantaged segments of the population or contributing to sustainable development. For example, businesses can capture the co-benefit of image improvement, which can lead to an increase in long-run profits. Building owners may also limit and reduce liability through actions such as strengthening the foundation of a tall building so that it does not fall on its neighbors and instituting water drainage practices that reduce flooding for the community and neighboring properties.

Co-benefits often take place whether a disaster occurs or not. These co-benefits essentially establish a “no-regrets” strategy that reaps benefits, regardless of future events or outcomes. Businesses typically ignore such co-benefits, and hence underinvest in resilience. To better promote and capture co-benefits will require making information available to businesses explaining how they can reap the rewards of broader co-benefits, as well as developing more versatile financial instruments; and providing subsidies that correspond to a portion of, or all of, the co-benefits, which contribute to societal goals. Obviously, these co-benefits will need to be expressed in monetary terms, so they can be presented in a way that businesses leaders understand.

Incentivization Strategies
To be effective, offerers must tailor incentivization strategies to address new and existing construction and to account for hazard, risk, location, business size and the value of resilience. One size cannot fit all.

Incentives integrate a set of solutions, and they need to evolve as the field of resilience changes. Incentive programs should possess defined entry points and streamlined processes easily understood by the consumer audience and applied to ensure widespread usage and effectiveness. The Incentivization white paper provides a catalogue of existing programs for different hazards, which private- and public-sector stakeholders can evaluate and then modify or expand to develop incentives.

Incentives-based resilience needs to promote and support the protection, maintenance, recovery and sustainability of the built environment while also creating consumer demand to drive these efforts. Four major points for consideration include:

• Making resilience in the built environment (e.g. buildings and infrastructure) part of each stakeholder’s approach to asset management and the conduct of their business and community operations.
• Providing a level of confidence to stakeholders that the results (financial and physical) of implementing the actions will justify their participation in resilience programs, whether through investments, underwriting and loan and/or grant programs.
• Clearly defining and demonstrating the expanded benefits and co-benefits when promoting resilience, such as supporting emergency response; reducing breakdowns in the supply-chain; reducing economic and political uncertainty; the promotion of economic growth and stability; expanding community or business branding; and protecting the most-vulnerable elements of the population.
• Gogoing beyond current measures and indices to provide tools for stakeholders and guidance to assist them with using incentives to support resilience.

Incentivizing property owners, lenders, and those who provide market securities, to increase the use of mitigation standards should involve:
The development and adoption of appraisal and bond underwriting standards that recognize the value and benefits of building resilience, all other factors being equal. Enhanced appraised values allow a borrower access to improved mortgage financing for a given loan-to-value ratio. Conversely, for a specific loan amount, a more-resilient building increases collateral value (that is, it has a lower loan-to-value ratio) than a less-resilient comparable property. Similarly, bonds backed by resilient properties would carry higher ratings, thus reducing interest expense to the issuer.

- Federal, state or local tax incentives for building owners participating in mitigation programs.
- Federal, state or local grant programs (or revolving funds) to support participation in approved mitigation initiatives.
- Realtor disclosure of resilience features, which could drive consumers to seek these resilience strategies.

Additional incentives strategies would be especially useful for residential properties:

- The expansion of federal home renovation programs that allow payment of mitigation improvements.
- Interest rate reductions for residential mortgages, provided through Fannie Mae and Freddie Mac, for properties built with higher standards (Fannie Mae adopted a similar approach for mortgages on green-certified residential properties).

Buildings owned by small businesses face special challenges to implementing mitigation strategies for resilience. Renovation financing opportunities for these properties are significantly limited. To overcome these challenges, strategies should include:

- Locally administered resiliency programs that provide turnkey renovation services for participating property owners. For example, local Property-Assessed Clean Energy (PACE) programs already provide similar services for green building renovations.
- Federal Small Business Administration (SBA) loans, guaranteed by the federal government, made by private lenders or community development financial institutions, to finance building resiliency upgrades. SBA loans already serve as a key source for building acquisition and renovation financing for small businesses, but these loans currently lack specific resiliency requirements.
- Contractor-based financing, whereby a general contractor develops turnkey resilience programs within small buildings.
- Public-private solutions such as combining PACE and SBA approaches with private capital and delivery of resilience-based renovation programs at the local level.

While financial institution involvement in resilience discussions grows, the capital markets should address incentives for mitigation as follows:

- Corporate debt ratings (the ability of a company to fulfill its financial obligations), in appropriate cases, could recognize mitigation efforts. By implementing mitigation measures, companies would experience improved bond ratings, all other factors remaining equal. Similarly, municipal bonds linked to the construction of resilient facilities in disaster-prone areas should have increased bond ratings (other factors being equal).
- Resilience-based Real Estate Investment Trusts (REITs), private equity funds and bond issuances represent market drivers. In such cases, resiliency efforts can combine with other environmentally friendly approaches. Such investments would address growing investor appetite for green investments, while the resiliency strategies would reduce the overall investment risk and improve portfolio performance.

A community’s approach to investing in mitigation often parallels that of the private sector. Resilience to disasters improves the community’s reputation as a...
place to run a business. Incentives for communities as decision makers could consist of:

- Enhanced bond ratings for hazard-resistant facility projects.
- Federal and/or state grants to help communities create a local mitigation grant program or a revolving fund loan program.
- Building code programs that encourage local governments to adopt and enforce increasing standards for resilience incentivized by federal and state investment with post-disaster recovery funding.

**Communities** have the unique position of both offering incentives and being the target of incentives. In addition to exercising political will, communities are in a position to drive resilience through implementation and enforcement of increased building codes and zoning requirements, as well as incentives for utilizing above-code provisions through accelerated local permitting and inspection procedures. Working with developer agreements, a community can encourage increased resilience through tax incentives or removal of disincentives.

To support mitigation by **utilities**, incentives could include:

- Reduced insurance premiums to support the avoidance of interruption losses.
- Public Utility Commission policies allowing for small, temporary, immediate increases in rates to pay for system resilience enhancements for communities participating in a rating system.
- Enhanced bond ratings for projects that incorporate resilience strategies.

The **states** represent key stakeholders in enhancing private-sector incentivization by both removing barriers to mortgage and insurance programs, and providing tax incentives and grants (or loans). For the U.S. Congress, a public-private sector approach to resilience could begin alleviating the federal government’s role in supporting response and recovery efforts following a natural disaster.

**Incentivization Implementation**

In order to implement resilience through regulatory and business-based decision making, stakeholders—both offerers and decision makers—must determine the commercial value of such strategies. They need better data and tools to identify areas with the highest risk, and where levels of increased building code requirements and incentives would be most effective. Software programs can help expedite underwriting the financial impacts of mitigation and streamline business processes that support incentivization. Stakeholder offerers and decision makers also need more accurate and timely information to promote incentivization. At the same time, a comprehensive incentives-based resilience framework must avoid creating disincentives, such as state insurance rate regulation that ignores risk-based pricing, which might limit the penetration of mitigation programs into the private-sector arena. Meanwhile, some strategies, such as offering insurance rate discounts for an entire community or resilience-based construction loans, may not work as well in an incentives framework.

The next step is implementing the public-private incentives to support resilience. Efforts should include expanding existing programs or creating new programs (including those modeled on related green building programs); and developing supporting business and investment processes; programs and policies for utilities; and community initiated incentives. Promoting resilience needs to become part of common business practices, and seen as integral to maintaining and enhancing the nation’s economy.

The **Developing Pre-Disaster Resilience Based on Public and Private Incentivization** paper provides a catalogue of existing programs for new and existing construction, and for different hazards. These programs can be evaluated, and then modified or expanded to support the development of incentives. Successful incentives should incorporate the following characteristics:

- **Use Of Optimal Resilience Measures.**
  Currently required laws or customs do not
require optimal resilience measures or incentives for measures that improve resilience. They usually have costs and benefits. The MMC is aware of no thorough study of incentives for optimal resilience measures. To perform a study like this would require a framework to quantify the benefits to the offerer and to the decision maker. Such a study could benefit from an inventory (or taxonomy) of optimal resilience measures, even if the inventory is not exhaustive.

- **Flexibility.** The specifics of incentivization needs to be tailored to factors like the local hazard, risk, locality, business size, and value of resilience. One size cannot fit all. Incentives will need to evolve as the field and definition of resilience changes.

- **Coordination.** Individual strategies will not work by themselves. Following one of Judith Rodin’s five main characteristics of resilience described in *The Resilience Dividend*, incentives and mandates should provide an integrated set of solutions. This will require creative private- and public-sector partnerships that use a set of economic incentives.

- **Facilitation.** Any incentives program developed should be well-coordinated, with defined entry points and streamlined processes easily understood and applied to ensure widespread usage and effectiveness.

Incentivization is a means to inform and influence the consumers that make decisions around investing in resilience-related measures. When consumers invest in resilience, in turn, their efforts can have a positive impact on the resilience of their community and the nation as a whole.

Incentivizing resilience investments before a disaster occurs requires showing financial institutions and others the monetary benefit they can receive when they incorporate the mitigation of risk into their ordinary course of business. Once incentives-based resilience becomes standard practice for the leading private-sector stakeholders, other private-sector entities should follow suit. Private-sector managers are influenced by their peers, and are especially motivated if they believe that there is a risk to not getting involved. Developers, building owners, construction companies and others whose primary interest is the least first cost of building will see it in their best interest to take advantage of incentives. When resilience becomes part of the consumer mentality incorporating resilience becomes not just sensible, but economically prudent as well.

**Conclusion**

The United States has been actively working on hazard mitigation and the reduction of disaster losses for more than three decades. Though there has been progress in areas, it is with limitations, and the federal and state government continue to be burdened with the lion's share of absorbing local losses and restoring communities post-disaster. The unique nature of communities throughout America makes it highly unlikely that a singular, one-size-fits-all strategy will be sufficient to kick-start progress in improving the nation’s overall resilience. Unless stakeholders understand that there is a benefit to resilience, and an advantage to their investing in it, little progress will happen. A holistic set of incentives, cutting across the entire spectrum of socio-economic factors, can advance resilience nationwide, yet be implemented by individual communities and stakeholders. All of the incentives identified in this document and the related *Incentivization* white paper can be applied at the local community level. The MMC and CFIRE team believes that identifying ways that all stakeholders, including property owners, renters, and government can work collaboratively toward the implementation of mitigation strategies, it is possible to use human nature to encourage universal, local investment in resilience.