

# REFRAMING RESILIENCE

Proceedings of the AIA 2015 Resilience Summit  
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## A message from the CEO of the American Institute of Architects

Nowhere are hard lessons more starkly preserved than in the built environment. Rapid population growth, degradation of natural resources, and the many physical and social impacts of a changing environment, including the first global climate refugee crisis in our lifetime, are evidence of the challenges we now face, as a profession, and a society. Resilience involves planning, design, construction, and operations in concert with the natural environment. Getting ahead of these challenges is our greatest opportunity.

On this, the tenth anniversary of the AIA's Disaster Assistance Program, we have clear evidence we can and in fact are making progress. Evidence includes an unprecedented Building Industry Statement on Resilience, jointly signed in May 2014 that today represents the commitment of 31 organizations. Most recently, last October's 2015 AIA Resilience Summit has shown that members of the building and construction professions are now partnering with the scientific community, government, and industry to work together to address these challenges.

Herein lies the key to moving forward. The "answer" to some of the toughest questions facing us is not just to design buildings that are more resistant and resilient to natural hazards, but to recognize that new challenges require new approaches. This is where we all have a part to play.

The built environment is a network of natural resources, infrastructure, buildings, and of course, people. These interdependencies mean that a change in one part affects the whole. If the 75 attendees gathered at the National Building Museum last October achieved nothing else—and, as readers will see, in fact they achieved much, much more—it showed we are beginning to reframe the challenge of shaping more resilient communities. We're doing so not by assigning the task to any single profession or group, however well intended, but by working together. This report shows collaboration has begun.

### **Robert Ivy, FAIA**

EVP/Chief Executive Officer

The American Institute of Architects



The AIA Resilience Summit was hosted at the National Building Museum on October 16, 2015.

PHOTO: JAMES GRIMES, AIA

## In Summary: the AIA 2015 Resilience Summit

**“One can build a robust structure. But if that resilient building is situated in a non-resilient community, then what has been achieved? Site selection, infrastructure, availability of natural resources, and community services are all critical to a building’s performance and functionality before and after a disaster.”**

### Executive summary

What makes a community “resilient”? What are the primary threats our communities need to be resilient against, and how do those differ by geography, income, size, or economy? Perhaps most important, who is responsible for creating—and maintaining—resilience at the community level, and how does one community learn from another?

To tackle these questions and more, the American Institute of Architects (AIA) convened leaders representing architecture, engineering, and construction, as well as government agencies, scientists, policy experts, and the insurance industry at its inaugural 2015 Resilience Summit.

The summit built upon AIA’s current work in defining, designing, and promoting resilient communities. This work runs the gamut, encompassing our Sustainability Strategic Initiative; the position statement on resilience and the Building Industry Statement on Resilience AIA helped to craft; targeted work in Energy, Materials, Resilience, and Health as they relate to the built environment; and

longstanding initiatives such as the Disaster Assistance program and the work of the Center for Communities by Design.

In two provocative sessions, *Policies + Practices for Positive Change* and *Resilience Indicators for Long Term Sustainability*, six architects with diverse backgrounds in design, insurance, education, and civic leadership shared their expertise in addressing hazards and climate threats. Critical to the conversation was analyzing the notion of “resilience” itself, and the inherent interconnections the concept evokes.

For instance, one can build a robust structure. But if that resilient building is situated in a non-resilient community, then what has been achieved? Site selection, infrastructure, availability of natural resources, and community services are all critical to a building’s performance and functionality before and after a disaster. The panel experts also reframed the value of resilient building as future cost avoidance: reinforcing a benefit-cost analysis over the service life of the building.

Other key discussions included strategies to enhance hazard mitigation and climate adaptation, including municipal resilience plans, revisions to model building codes, and the development of professional design guidance.

Perhaps most consequential, a series of common themes began to emerge through the discussions:

- Industry partnerships are needed to tackle complex design problems at scales of efficiency to achieve greater cost-benefits;

- Experienced professionals need to continuously reeducate the profession about disaster prevention and resilience and provide awareness and hope to the public;
- Existing policies, tools, and programs must be coordinated at the state and federal level to resolve contradictions, identify opportunities and synergies, and fill gaps; and

- Greater collaboration across the building industry with the public’s participation is needed to align community performance goals and to determine design thresholds

These themes demonstrate the challenge that is before us, but they also provide a clear road map for moving forward. With a shared vision and deliberate action, the building industry can make strides towards a more resilient tomorrow.

## Summit at a glance

With positive movement in the field of resilience—from statewide resilience plans to new incentives for resilience goals, the AIA hopes to build on this momentum to drive collaboration, encourage thoughtful research and experimentation, capture case studies, and inspire new solutions.

To that end, the AIA convening was structured to maximize engagement, dialogue, and knowledge-sharing. Members and partners gathered at the National Building Museum for a day of interactive presentations, discussions, and strategic planning to overcome hurdles to resilient built environments by identifying key objectives, exploring emerging policies, and recognizing the partnerships and collaborations that have brought success to resilience goals. The summit’s objectives were:

- **Challenge assessment.** “Resilience,” “resiliency,” and “resilient buildings” are terms seen and heard in the building industry and beyond, yet consistency is lacking. In reframing resilience, the AIA endeavors to analyze the technical applications of resilience and develop a common consensus about the anticipated results of something considered “resilient.” The performance goals and outcomes associated with a resilient building, a resilient community, or a resilient material are critical to determine in order to maintain the credibility of the building industry. With further investigation, we hope to uncover not only the direct results of solutions employed, but the indirect impacts as well.

- **Solution development.** Leveraging expert architects, the summit positioned attendees to gain a deeper understanding of the complex factors, trade-offs, and underlying requirements of resilience and uncover the programmatic challenges and related barriers to implementing resilience strategies once goals are established. The following channels are determined critical to success: materials and construction methods, resilience project programming, building codes and standards, public policy, incentives, liability and standard of care, metrics, and data for decision-making.
  - **Coalition building.** Architects won't solve complex problems alone. To build a foundation for future innovation, the AIA and its members shared knowledge and expertise in climate and hazard resilience with their colleagues and collaborators. The summit provided the opportunity for a diverse group of advocates—comprised of building industry leaders, government organizations, scientists, and nonprofits—to share intentions, establish relationships, and identify synergies. The hope is that together, these minds will channel that data into actionable policy.
- To achieve these objectives, the day's meeting was designed in four parts:
- **Welcome session.** To frame the topic of resilient built environments, leaders from the American Institute of Architects and the National Building Museum began the summit by providing a historical context of natural disasters, sharing lessons learned, and invoking a call to action.
  - **Panel presentations.** Expert architects shared their work in two panel discussions designed to highlight the impact of emerging approaches and spur new ideas for the future. In *Policies + Practices for Positive Change*, panelists shared case studies outlining the incompatibilities of existing building stock with current regulations and building codes; performance variations due to such seemingly disconnected factors as materials selection and proper inspections; public-private partnerships fostering new community resiliency strategies and public assistance programs; and the latest resilience-focused policies and regulations for the urban environment. In *Resilience Indicators for Long Term Sustainability*, speakers explored methodologies for the development, analysis, and implementation of resilient strategies and metrics to support their cost effectiveness and performance capacities. The panel also noted that financial underwriting, liability, and standard of care will continue to evolve along with strategy recommendations.
  - **Audience discussion.** Donald Watson, FAIA, facilitated a high-level discussion for summit participants to apply issues covered in the panel discussions to their own unique work in the field—from political challenges and economic incentives to technical capabilities.
  - **AIA member working session.** To drive conversations from the day forward, working groups further analyzed current challenges specific to the architectural profession, ways in which resilience can become a design priority, how to acquire and utilize projected climate data to improve building performance, and how to address changing liability risk and evolving standard of care.



- 1972** AIA formally recognizes the role of architects in emergency response
- 1974** The Disaster Relief Act of 1974 establishes the presidential declaration process for federal disaster aid
- 1978** FEMA created as an independent agency
- 1988** Congress passes the Stafford Act to codify the federal role in disaster assistance and improve planning, preparedness, and coordination

## AIA Disaster Assistance and Resilience

- 2005** Hurricane Katrina strikes the United States, raising awareness of disaster risk in the built environment
- 2006** AIA establishes the Disaster Assistance Program and appoints a Disaster Assistance Committee to lead the charge  
AIA creates the Disaster Assistance Comprehensive Response System  
AIA develops model Good Samaritan legislation for licensed architects
- 2008** AIA Disaster Assistance Committee launches the AIA Safety Assessment Program, uniformly training architects, engineers, and building inspectors in post-disaster building assessments
- 2011** AIA joins the Buildstrong Coalition of designers, first responders, and insurance industry representatives to advocate for safer building codes and improvements to federal disaster programs.
- 2013** AIA Sustainability Scan identifies four critical issues: Energy, Materials, Health, and Resilience  
AIA becomes a Platform Partner of the 100 Resilient Cities Initiative.  
AIA makes a commitment to Clinton Global Initiative and creates the Architect's Foundation to launch the National Resilience Initiative
- 2014** AIA adopts a Resilience Position Statement  
AIA co-authors the Building Industry Statement on Resilience
- 2015** Architect's Foundation establishes three regional design studios  
**AIA Resilience Summit**

# Looking Back: building resilience at AIA

**“This issue is not just about disasters; it’s about the necessity to adapt other environmental changes that impact buildings and communities.”**

### **AIA Disaster Assistance: lessons from the field**

The AIA formally recognized the role of architects in emergency response in 1972, and in 2006 the AIA’s unique Disaster Assistance Program was formed so architects could prepare, respond, and rebuild communities nationwide. Under this program, architects have responded both internationally and domestically, providing municipalities with professional volunteer services to assess the habitability of homes and businesses after natural disasters. A Community Response System was constructed to efficiently integrate and dispatch this service, and a national training program for architects and engineers was developed. Architects have also worked steadily to advocate for safer building codes and Good Samaritan Legislation and have been a valuable resource for their communities and their fellow building industry partners by sharing mitigation techniques, providing preparedness tips, and creating industry resources and training courses such as the HURRIPLAN Resilient Building Design for Coastal Communities

workshop and the Safety Assessment Program.

From the Boulder floods to Hurricane Katrina to the Nisqually earthquake, the work of the AIA Disaster Assistance Committee and other AIA member advocates has ushered in an understanding that the disturbances, disasters, and changes we face are no longer a one-off, once in a lifetime event, but a compounding issue that affects us all as global citizens and US taxpayers. This issue is not just about disasters: it’s about the necessity to adapt to other environmental changes that impact buildings and communities.

### **Resilience at AIA**

Today’s dynamic financial markets and shifting regulatory environment, combined with variations in weather patterns, growing resource limitations, and rapid urbanization, reinforce the fact that we are part of a changing world. The AIA recognized these evolving challenges within the built environment and conducted



Beyond the economic loss lies the irreplaceable cultural and communal value intrinsic to the built environment. PHOTO: RACHEL MINNERY, FAIA

#### Ten years of Disaster Assistance:

- 29** Good Samaritan state laws passed
- 18** International and Domestic Disaster Response missions
- 34** States and territories trained in AIA's Safety Assessment Program
- 4** Countries trained in AIA's Safety Assessment Program

the AIA Sustainability Scan in 2013 to examine emerging roles within the architecture profession and reevaluate AIA priorities within the broad sphere of sustainability. The scan revealed four priority issues which became the Institute's Sustainability Strategic Initiative: Energy, Materials, Health, and Resilience. These are facets of design that architects touch every day in their work. Given the scale of the profession's collective work, addressing these areas provides an opportunity to positively impact the "triple bottom line" outcomes of economy, social equity, and environment.

To fulfill the goals of its Sustainability Strategic Initiative and build upon the work of the AIA Disaster Assistance program, the AIA Board of Directors defined the Institute's position on

resilience in 2014. It recognizes the architect's role in addressing and mitigating the negative impacts of climate change, environmental degradation, and population growth—all significant challenges to achieving a sustainable built environment.

**“Energy, Materials, Health, and Resilience. These are facets of design that architects touch every day in their work.”**

Co-authored by the AIA and the National Institute of Building Sciences, the Building Industry Statement on Resilience was an equally important step towards recognizing and acting on the critical need to absorb, recover from, and more successfully adapt to adverse events. This statement brings together leaders

in the design, construction, and building management sectors, each committing to resilience research, education, advocacy, and planning. The AIA and its members have taken action on this commitment with professional educational courses

and webinars, resources such as *Understanding Resilience* and *Qualities of Resilience*, co-authoring resilient design guidelines such as USGBC's LEED Resilience Pilot Credits and the Federal Alliance for Safe Homes' (FLASH) *Resilient Design Guide for High Wind Wood Frame Construction*. The AIA advocates for change in the industry by informing

recommendations, incentives, and policies for resilient built environments when co-authoring and contributing to studies, reports, and white papers including the National Institute of Standards and Technology’s *Community Resilience Planning Guide for Buildings and Infrastructure Systems*, the National Institute of Building Science’s *Developing Pre-Disaster Resilience Based on Public and Private Incentivization*, and the Applied Technology Council’s *Strategies to Encourage State and Local Adoption of Disaster-Resistant Codes and Standards to Improve Resiliency*. Furthermore, the AIA is a committed member of the Build Strong Coalition and has actively supported legislation that encourages community resilience such as the Safe Building Code Incentive Act which would increase FEMA disaster assistance grant funding for states that adopt and enforce up-to-date model building codes. As a member of the Build Strong Coalition, the AIA has also endorsed the PREPARE Act which creates an interagency council on resilience and codifies agency efforts to undertake resilience and climate planning.

As part of AIA’s continued efforts to advance the mission of the Building Industry Statement, the AIA 2015 Resilience Summit was conceived with the goal of bringing together diverse stakeholders to further refine the problems and propose solutions to some of the greatest challenges of our time.



**“It’s time to be proactive.”** The AIA Disaster Assistance Committee has a long history of helping architects--and communities--understand their role in emergency response. PHOTO: LINDSAY BRUGGER, AIA



After a tornado struck Birmingham, Alabama, AIA volunteers provide safety assessments of homes and businesses for the city of Birmingham. AIA Disaster Assistance Committee member Michael Lingerfelt, FAIA finds this building “unsafe” for occupancy and identifies it as such with a red building placard. In six days, volunteers assessed 5,000 structures providing a value of \$300,000 to the city. PHOTO COURTESY OF: MICHAEL LINGERFELT, FAIA



The National Building Museum's *Designing for Disaster* curator, Chrysanthe Broikos urged the room to engage all individuals, families and businesses' in the global issue of resilience and adaptation in the built environment.

PHOTO: BUTCH GRIMES, AIA

# Moving Forward: summit proceedings

## Resilience: the time is now

Architects, building industry experts, and agency representatives from around the country convened at the 2015 AIA Resilience Summit to tackle some of the greatest resilience challenges of today. To frame the topic of resilience in built environments, leaders from the AIA and the National Building Museum began the summit by providing a historical context of natural disasters, sharing lessons learned, and invoking a call to action.

The day began with a welcome from AIA Chief of Staff Abigail Gorman, MBA, who highlighted how architecture impacts the mind, spirit, and environment. For this reason, architects have an obligation to address the challenges of climate change. Turning to the subject at hand, Gorman reminded the audience that “we have all experienced the effects of climate change – every one of us. It is something that ties each and every one of us together as human beings. As those that work in the built environment, both in the private sector as well as government, we have a particularly urgent stake in it -- because we can do something about it.”

Chrysanthe Broikos, who curated the National Building Museum’s Designing for Disaster exhibit, led a virtual tour through the exhibit; exploring new approaches in design and engineering to protect life and property against a range of natural


hazards. As she developed the exhibit, Broikos, was surprised to learn just how many organizations, businesses, and non-profits had a vested interest in disaster resilience. She urged participants to take this as a lesson in collaboration and engage all individuals, families, and businesses in the global issue of resilience and adaptation in the built environment.

**“We have all experienced the effects of climate change ... As those that work in the built environment, both in the private sector as well as government, we have a particularly urgent stake in it -- because we can do something about it.”** –Abigail Gorman, MBA, AIA Chief of Staff

AIA Disaster Assistance Committee Co-Chairs Thomas Hurd, AIA and Michael Lingerfelt, FAIA recounted the volunteerism of hundreds of architects who provided pro bono building safety evaluations for

thousands of homes and businesses after various natural disasters. These volunteer services saved municipalities hundreds of thousands of dollars in disaster recovery and lessons learned first-hand contributed to the development of building design and construction standards that prevent unnecessary damage from natural disasters like tornados, hurricanes, earthquakes, and floods. Hurd encouraged signatories of the Building Industry Statement on Resilience to continue to turn their good words into actions and to share their knowledge to advance the resilience capacity of the building industry.

With these opening remarks, the summit turned to the audience of experts to take the lead in exploring current challenges and successes in resilience and help set a shared vision for future action and collaboration.



**“ A ‘disaster’ comes from the overlap between the hazard and vulnerable systems that must withstand it; the smaller the overlap, the smaller the risk. ”**

**-Jay Raskin, AIA**

Hurricane Katrina, Gulfport,  
Mississippi 2005.

PHOTO: NOAA

PANEL ONE

**Policies and practices for positive change**

Experts shared case studies outlining the incompatibilities of existing building stock with current regulations and building codes; performance variations due to such seemingly disconnected factors as materials selection and proper inspections; public-private partnerships fostering new community resiliency strategies and public assistance programs; and the latest resilience-focused policies and regulations for the urban environment.

**ROSE GEIER GRANT, AIA, RESEARCH ARCHITECT, STATE FARM INSURANCE,** demonstrated the benefits of risk mitigation and several financial incentives for homeowners. The examples she cited exhibited how seemingly minor construction details and material selection can affect the durability of the entire structure. For instance, the use of impact resistant roofing in hail-prone areas can reduce vulnerability as well as insurance premiums. Similarly, instituting wind-resistant construction methods can make an entire home more robust. This is seen in states like Florida where stringent codes for hurricane-force winds have been implemented. Homes constructed to these codes provide hard evidence of avoidable building failures. Now, Midwestern states in tornado alley

are implementing standards similar to those in Florida and finding parallel benefits: reduced damage in tornado-hit towns. While building owners may spend more upfront with certain design choices, the costs are saved over the life of the building, and hazardous risks are reduced. Grant noted, however, that insurance incentives are only part of the solution. Site selection is the first step to creating a resilient building. To emphasize this point,

**“Insurance incentives are only part of the solution. Site selection is the first step to creating a resilient building.”**

–Rose Geier Grant, AIA

Grant referred to two articles linking location and risk: *Tons Of People Are Moving To The Coast Amid A Lull In Hurricanes* and *Despite Wildfire Danger, Wildland Urban Interface Continues to Grow*. It’s not just how we build, but where.

**JAY RASKIN, AIA, PRINCIPAL, JAY RASKIN ARCHITECT,** was one of the pioneers of the Oregon Resilience Plan (ORP), a unique public-private collaborative plan to address the impacts of a catastrophic earthquake. The ORP has inspired numerous resilience initiatives in Oregon, including revisions to the state land use plan that restrict certain development within the tsunami inundation zone, and the development of a Resilient Transportation Plan that includes a

tiered backbone system for the State’s highways and other transportation means. Most notably, ORP stimulated a large increase in funding of the state’s Seismic Retrofit Grant Program for upgrades to schools and essential facilities. The first-of-its-kind state fund requires that grantees’ school facilities be retrofitted to “life safety standards” and emergency service facilities to “immediate occupancy standards” as defined by the American Society of Civil Engineers. The success

of the Grant Program is in large part due to community education on the risks of a Cascadia earthquake and the vulnerabilities of Oregon schools. This education empowered voters and taxpayers with an understanding of risk and the knowledge of how such a fund (and the resulting retrofits) can reduce vulnerability. Raskin emphasized that still more work remains to be done in Oregon to fulfill the plan, particularly in regards to social resilience. Raskin proposed a conceptual framework for hazards that range from “stealth hazards” that are generated by human activities on one end, to geologic and weather related hazards on the other.

An underlying challenge identified by Raskin is the prevalent misunderstanding of how risk and



vulnerability contribute to a disaster. He aptly describes that a “disaster” comes from the overlap between the hazard and the vulnerable systems that must withstand it—the smaller the overlap, the smaller the risk. People can reduce their vulnerability by forging interdependent relationships in their community, maintaining emergency preparedness plans and kits, and ultimately removing themselves from the highest risk areas to reduce exposure and, therefore, risk. In Oregon’s case, this might mean building away from liquefaction areas or coastlines to reduce the potential of secondary hazards such as foundation failure or tsunami inundation. If vulnerability, and therefore risk, can be reduced, then so too can the effects of

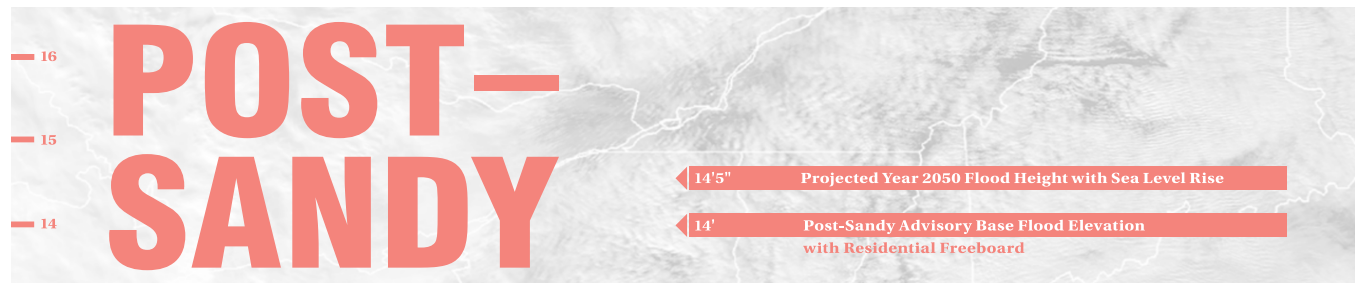
disasters. Ultimately, the goal of resilience must be to dilute disasters into inconveniences.

**ILLYA AZAROFF, AIA, DIRECTOR OF DESIGN, +LAB ARCHITECTS**, gave a field report of Post-Superstorm Sandy recovery plans and policy innovations from New York City, providing some of the first guidance on recovery for dense urban cities. The Resilient Neighborhoods initiative and the One NYC plan account for city growth, equity, sustainability, and resilience, and utilizes these topics to inform and prioritize urban solutions. Many of the local laws passed since Hurricane Sandy either match or are related to FEMA’s Mitigation Assessment Team (MAT) recommendations; yet resilience challenges remain for property

owners in older communities that are densely populated. Illegal basement apartments and rows of townhouses are retrofit challenges when they share walls. Furthermore, site retrofit strategies can pose more problems than solutions if not carefully considered in policy and design practice. For example, berms to deter encroachment of flood waters may add protection for the homeowner, but steer the flood waters around the house, increasing flood damage to adjacent properties. Land use in New York City compounds this issue. As the city ran out of space to accommodate its booming population, it built permanent housing in areas previously identified as uninhabitable—barrier islands and wetlands—and now the notion of retreat from these vulnerable areas may cause displacement of whole neighborhoods and communities. AIA NY’s Design for Risk and Reconstruction Committee mounted a redevelopment strategy with planning and design colleagues, developing numerous resources and design guidelines. Many resources were created in concert with the non-profit sector, the city, and community members; including AIA NY’s Post-Sandy Initiative and the award-winning Sandy Design Help Desk that provided a place for homeowners and small business owners to have their nuanced rebuilding questions answered by volunteer architects and design professionals trained in the most current post-Sandy codes and regulations.

### The Oregon Resilience Plan (ORP)

- **Public/private collaboration.** Directed by the state, Oregon’s Seismic Commission worked with a diverse group of volunteers, including architects, engineers, and government officials to create the plan.
- **Gap analysis and recommendations.** A resilience gap analysis and resulting recommendations were made for: Business and Workforce Continuity, Coastal Communities, Critical and Essential Buildings, Transportation, Energy, Information and Communications, Water and Wastewater Systems
- **Stakeholder engagement.** The ORP was successful because legislators, seismic-experts, built environment professionals, and the public understood the need for such a plan and knew the value resulting actions could provide.



## AIA New York Post-Sandy Initiative:

an award-winning response by the planning + design community

Initiated by the American Institute of Architects New York Chapter (AIANY) and the AIANY's Design for Risk and Reconstruction Committee (DfRR) in the weeks that followed Superstorm Sandy, in collaboration with a wide range of other professional organizations and concerned individuals, the planning and design community responded to support a variety of local, regional, state, and national public agency efforts. The Post-Sandy Initiative convened Working Groups to focus on several areas key to resilience, including:

- Transportation & Infrastructure
- Housing
- Critical & Commercial Building
- Codes & Zoning and Waterfront

Over 150 professionals gave their time to explore important issues about the emergency planning for and response to Sandy, both in terms of short-term recovery efforts and long-term resilience. Their contributions form the basis of the Post-Sandy Initiative Report, released on May 1, 2013 with a corresponding exhibit, informed several recommendations, guidelines, and reports for the city and region including NYC's *Retrofitting Buildings for Flood Risk* and PlaNYC, a Special Initiative for Rebuilding and Resiliency. Recommendations include the following:

### NYC building code

- Permit handicapped lifts in flood zones;
- Wet floodproofed buildings should have an emergency exit at the first floor above flood elevation; and
- As an alternative to floodproofing individual buildings, allow block-wide or neighborhood-wide floodproofing.


### NYC zoning resolution

- Make alignment provisions in contextual districts more flexible. Some currently prevent setting a building far enough from the property line to have a ramp, a flood-dampening landscape, or permeable paving in front of the building.
- Where a building may have to be set back from the street line to accommodate flood zone-related steps and ramps, rear yard requirements should be reduced.

### FEMA

- Dry floodproofing of lobbies, currently permitted for mixed-use residential only, should be allowed for all multi-family buildings.
- Evacuation in place—FEMA's objective is to evacuate flood areas before floods occur, and to minimize the risks, especially to first responders. This may not always be possible in a dense urban environment. It is important in a flood event that those who do not follow government orders, for whatever reason, have a way to get out of their buildings and to safety during a flood.

IMAGE + REPORT CONTENT: AIA NEW YORK CHAPTER



**“Explore how resilience best manifests at the building, neighborhood, or regional scale by evaluating the efficiency and effectiveness of technologies at different scales.”**

**-Z Smith, AIA**

Eskew+Dumez+Ripple's Rosa F. Keller Library and Community Center in New Orleans augments the functions of a traditional library and community center with outdoor meeting spaces and a locally managed cafe to encourage relationship building and the development of social capital.

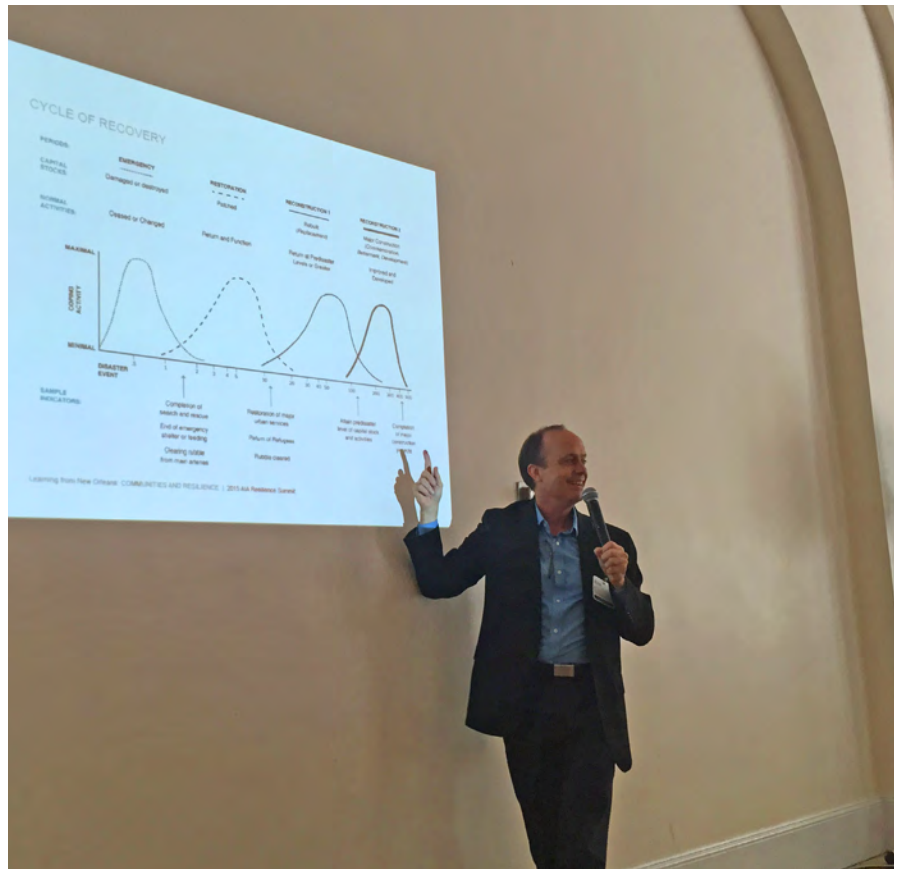
PHOTO: TIMOTHY HURSLEY, ESKEW+DUMEZ+RIPPLE

PANEL TWO

### Resilience indicators for long-term sustainability

Speakers explored methodologies for the development, analysis, and implementation of resilient strategies and metrics to support their cost effectiveness and performance capacities, noting that financial underwriting, liability, and standard of care will continue to evolve along with strategy recommendations.

**Z SMITH, AIA, PRINCIPAL; DIRECTOR OF SUSTAINABILITY + BUILDING PERFORMANCE, ESKEW+DUMEZ+RIPPLE,** asserted that “building back better” demands doing more than maintaining the status quo. Opportunities to address other programmatic desires, building performance goals, code upgrades, and even selection of a safer site are available when making design choices. In the “Cycle of Recovery,” homes, jobs, and schools are critical to community recovery. Sustainability co-benefits contribute to community resilience when site design provides initial defenses—rainwater storage tanks for cooling systems reduce city water dependency and energy efficiency reduces carbon emissions from fossil fuel consumption. The Rosa F. Keller Library and Community Center is an example of post-disaster opportunity that incorporated demolition, retrofits, and redesign for sustainability and resilience. The former library was



Z Smith, AIA, describes the process of recovery at the AIA Resilience Summit at the National Building Museum. PHOTO: LINDSAY BRUGGER, AIA

devastated by levee flood breaks and the site was designated by the city to serve as a park or open space, indicated as such with a “green dot” on the city’s recovery map. The community outcry was strong, and the city conceded to construct a new library and retrofit the original 1917 residence to serve as an adjacent community center with outdoor meeting spaces and a locally-managed café. An example

of social resilience and building performance, the neighbors of Broadmoor were an integral part of design from its conception, even naming the center’s café the Green Dot Café. With each case study, Smith referred to the environmental, social, and economic aspects within any city system that are required to function appropriately to make it sustainable and promote resilience. Smith posed a key challenge to the

## Sustainable? Resilient? or both?

### Reframing stormwater management practices

Some strategies, first introduced as green building techniques, are more compelling when they do double duty for their hazard risk reduction capabilities. For stormwater management, a common set of short- and long-term challenges, and their responses, is described in this scenario:

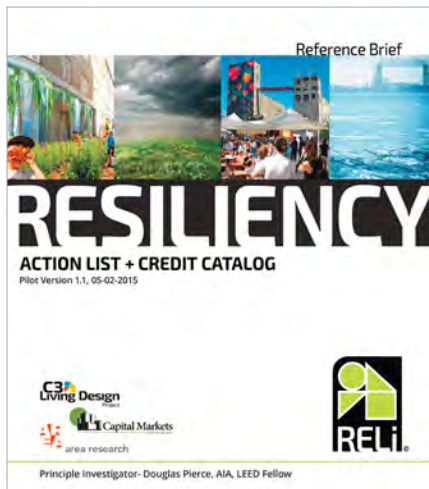
With intensifying heavy rains, particularly those following a period of drought, excessive stormwater runoff carries contaminants like oil, rubber, and even trash from hardened surfaces, blocking catch basins to create unfortunate urban flood conditions. All of this is funneled into an outdated combined city sewer system—already functioning at capacity due to urban growth—which then pollutes and floods local waterways with stormwater overflow. The most effective stormwater management practices slowly replenish groundwater supplies on site with rainfall, reducing the transfer of foreign contaminants off site, therefore behaving most similarly to a natural system where flooding and soil erosion risk is reduced and water quality is maintained. Familiar green building and site design techniques, such as rainwater harvesting

and greywater reuse reduce water demand, and low-impact design practices including smaller building footprints, pervious paving, rain gardens, and bioswales can contribute to sustainable stormwater management goals.

Now for the resilience twist: when considering the impacts of climate change, averages and extremes in precipitation will change, and so will temperatures. Yesterday's rain may be tomorrow's snow, and vice versa, potentially affecting design dead loads for structural design, the sizing of roof drains, downspouts, and rain gardens all the way through the selection of both flood and drought tolerant plants. As climate change increases the risk for evolving forms and amounts of precipitation, just-right-sized green features like bioswales are now undersized and could contribute to temporary flooding if comprehensive stormwater management strategies are not employed for a fluctuating capacity. Thus, green design strategies can provide multiple co-benefits, when properly designed, to achieve both short and long-term adaptive performance goals.

Rain gardens at Eskew+Dumez+Ripple's Rosa F. Keller Library and Community Center in New Orleans.

PHOTO: GLADDEN, ESKEW+DUMEZ+RIPPLE



The *Resiliency Action List Rating System* (RELi) highlights actionable steps that can be influenced or addressed through design, the built environment and project related organizations. IMAGE: C3 LIVING DESIGN / PERKINS+WILL

audience: Consider not only what may constitute successful resilient design strategies, but explore how resilience best manifests at the building, neighborhood, or regional scale by evaluating the efficiency and effectiveness of technologies at different scales.

**DOUGLAS PIERCE, AIA, SENIOR PROJECT ARCHITECT, SENIOR ASSOCIATE, PERKINS+WILL,** introduced the emerging RELi (REsiliency action List) rating system, a programming and design tool developed with an ANSI-approved National Consensus Process. Much like other green building rating systems which include credits or points toward an overall score that translates into a measurable result, RELi seeks to provide a methodology for quantifying resilience. The system integrates a wide-ranging listing

fill gaps between existing guidelines and rating systems that address various qualities of resilience. The rating system covers three areas: Risk Adaptation + Mitigation; Comprehensive Adaption + Mitigation; and Innovation + Creativity. Credits include quarterly education events to advance the public’s understanding of safety and resiliency topics, developing on-site aquaponics and poultry production, and siting the building within a half mile of a storm shelter, a health food cooperative, or an affordable daycare center. Knowing that capturing all-things resilient or salient to a specific project is more than a single list can accomplish, RELi includes space in its Innovation + Creativity category for project-specific applied creativity, innovation, and leadership within the RELi framework.

**“RELi integrates a wide-ranging listing of design criteria for developing resilient communities, neighborhoods, buildings, homes, and infrastructure.”**

of design criteria for communities, infrastructure, neighborhoods, buildings, and homes from numerous standards and rating systems such as the FORTIFIED Standard, LEED, and FEMA’s 141 Guide, *Emergency Management for Business and Industry*. The system supplements these references with their own “unique RELi” criteria to

**ANN KOSMAL, AIA, ARCHITECT, U.S. GENERAL SERVICES ADMINISTRATION,** offered a different perspective with urgency—the time is now to address incremental environmental change and the variability associated with direct and indirect consequences of rising temperatures, increasing precipitation, and longer droughts.



## Resiliency Action List (RELi)

an innovative system to encourage and measure resilience

Much like other green building rating systems which include credits or points toward an overall score that translates into a measurable result. The Resiliency Action List (RELi) seeks to provide a methodology for quantifying resilience. RELi integrates a wide-ranging listing of design criteria for resilient communities, neighborhoods, buildings, homes, and infrastructure.

- **Common reference standards.** The system integrates a wide-ranging list of design criteria from numerous standards and rating systems including the FORTIFIED for Safer Business Standard, LEED, Energy Star, 2030 Palette, Center for Active Design, Sustainable Sites Rating System, Envision Sustainable Infrastructure System, American Red Cross Ready Rating Program, U.S. Small Business Administration's Prepare My Business.org and FEMA's 141 Guide. The RELi system supplements these references with "unique RELi" criteria.
- **Panoramic Approach to Planning, Design + Maintenance.** Addresses hazard preparedness and mitigation, integrative processes, community stakeholder involvement, commissioning, and long-term maintenance. Credit examples include performing a post-occupancy evaluation and analyzing the business case for long-term sustainability.
- **Risk Adaptation + Mitigation:** Addresses risk with hazard preparedness and hazard adaption and mitigation for acute events. Credit examples include providing automated external defibrillators and hosting quarterly education events to advance the public's understanding of safety and resiliency topics.
- **Comprehensive Adaption + Mitigation:** Addresses community cohesion, economic vitality, health, diversity, energy, water and food, and material selection. Credit examples include developing on-site aquaponics and poultry production and siting the building within a half mile of community resources such as a health clinic or an affordable daycare center.
- **Applied Creativity, Innovation + Exploration:** Knowing that capturing all-things resilient or salient to a specific project is more than a single list can accomplish, RELi includes space in its Applied Creativity category for project-specific innovation and leadership within the RELi framework.
- **Characteristics:** The RELi system is driven by resilience, restoration, regeneration, sustainability, and wellness; aiming to create shock resistant, flexible buildings and communities that have the capacity to replenish, endure and contribute to holistic health.

IMAGE: C3 LIVING DESIGN / PERKINS+WILL

**“The Government Accountability Office (GAO) has identified climate change as a high-risk fiscal threat to the federal government.”**

**-Ann Kosmal, AIA**

The Government Accountability Office (GAO) has identified climate change as a high-risk fiscal threat to the federal government and, as the largest U.S. civilian landlord, the General Services Administration (GSA) is working to operationalize climate adaptation. The GSA's intent is to be “future ready,” avoid obsolescence, and develop strategies that can accommodate change. “It is not possible to precisely predict future risks, thus positioning with robust capacity is imperative,” Kosmal explained. Climate data in design standards is based on historic information. If unprecedented conditions are to be anticipated, the baseline design data needs to be informed by scientific climate projections to ensure the facility is appropriate and of a necessary standard for its intended use and duration. This safeguards the investment that the American public is making with their tax dollars. To design building enclosures or site development to serve beyond 2050 means design data must account for extremes of heat or precipitation that are not the same as today, and that both averages and extremes will change and need to be accommodated

to achieve performance goals. It is critical to engage in scenario planning (i.e. exploring alternative futures) as well as “backcasting,” which Kosmal defined as setting a target performance condition and building service life and determining the adaptive management steps required to achieve that performance leading throughout the operation of the building. Backcasting provides for clearer choices today to prevent disruption and added expense later. Kosmal considers that the cost-benefit of climate adaptation actions will include “cost-avoidance” as a bonus return on investment. For example, a company may avoid decreased mission capacity and functional interruption because the design supported long-term business or mission continuity. This is a potential benefit overlooked in typical financial decision making. The U.S Climate Resilience Toolkit and the National Climate Assessment are valuable references and resources for climate and adaptation information, and are just the start of a growing library of guidance and regulations on adapting to climate change.





SURPRISE

DELIGHT

CLARITY

What is the future we want?

BUILDING MUSEUM

Don Watson, FAIA, probes the audience of over 70 built environment professionals and government leaders for actionable next steps on the technical and economic aspects of resilience and partnerships to make it possible.

PHOTO: BUTCH GRIMES, AIA

# Engaging Together: summit discussions

## Discussion + outcomes

**DONALD WATSON, FAIA, EARTHRISE DESIGN**, compelled the attendees to examine the case studies, explorations, and data from the speakers and offer reflections from their own experience, express challenges, and consider prospects for future engagement. With challenges around the technical capabilities of materials, lack of political will, and typical financial hurdles, recommendations gravitated around methodical design research and analysis that would make resilient choices a no-brainer. Isolating design variables is a significant challenge to measure success in any given strategy, yet focused innovation, technical assistance, and compliance support will enable better decision-making. Costs are partially covered by insurance incentives, yet the premiums for this method of “risk transfer” will undoubtedly rise to reflect an increasing level of risk and growing debt from past disasters. Market incentives will be created to target specific cost avoidance measures, and the remaining balance to meet resilience goals

will need to be augmented by policy and regulations. Voluntary practices will be insufficient to meet desired community and building performance. Members of the audience appealed to one another to engage their constituents in these efforts.

Watson shared personal reflections: This is not the first time in history that the United States has faced a monumental challenge with high stakes or, with similar effect, other interventions that turn the status quo on end. Watson has tracked the building industry’s innovation success and failures in responding to the energy crisis of the 1970s, the design profession’s conversion from drafting to building information modeling in the 1990s, and the adoption of city-wide sustainable policies—most recently addressing flood and other hazard risks. “We can do this. We have yet to fully engage the opportunities for innovation to address resilience,” he proclaimed. Watson turned attention to the summit sponsor, reminding the audience of the resilience opportunity present within their professional responsibility—“architects contribute

design imagination, integration, and innovation to advance the quality of our buildings, cities, and cultures.” And that’s just what the AIA and its members sat down to do in a post-summit afternoon session—to roll up their sleeves and cultivate ideas informed by the morning’s insights to address key questions brought forth upon adoption of AIA’s resilience position statement.

**AIA MEMBERS** seized Watson’s charge and evaluated public and industry awareness of built environment resilience and adaptation; strategized resilience-based training and education resources that empower building industry professionals; and identified implementation barriers to resilient practices and policy solutions.

Former Disaster Assistance Committee member and co-creator of HURRIPLAN, Dean Sakamoto, FAIA and his focus group provided recommendations for tools that augment the expertise of built environment professionals in disaster recovery, hazard-resistant material selection and detailing, and



**Members make the difference.**

[Back Row: left to right] Michael Lingerfelt, FAIA, Disaster Assistance Committee Co-Chair; Ann Kosmal, AIA, summit speaker; Z Smith, AIA, summit speaker; Illya Azaroff, AIA, summit speaker; Jay Raskin, AIA, summit speaker, Donald Watson, FAIA, summit facilitator.

[Front Row: left to right] Rose Geier Grant, AIA, summit speaker; Thomas Hurd, AIA; Disaster Assistance Committee Co-Chair; Douglas Pierce, AIA, summit speaker.

PHOTO: BUTCH GRIMES, AIA

the practical application of climate forecast data—implications of life safety, liability, and standard of care are all impacted when implementing resilient strategies. Architecture firms must have business resilience to stay operational and provide client service when they need it the most and architects must be empowered to articulate the benefit of resilience to their clients. Finally, the architects recognized their limitations—interdependencies in the built environment. The performance capacity of a city and region, providing an economic base and natural resources respectively, is the foundation of any viable building and vibrant community. After all, a resilient building in a non-resilient community is not resilient.

AIA Component Executive and liaison to the AIA Disaster Assistance

Committee, Joseph Simonetta, CAE, and his group identified regulations that are barriers to resilient design and practice and strategized policy efforts that lead to change. A series of policy opportunities were identified; including the adoption of improved model zoning codes, performance codes that incorporate evidence-based outcomes that enhance resilience, and the creation and adoption of a federally-required “Resilience Impact Statement” that would require documentation of hazard and climate risk, resilience strategies to be utilized, and anticipated impacts to both the natural and built environment.

AIA Disaster Assistance Committee member, Paula Loomis, FAIA, and her team identified synergies and allies to enhance efforts to move the industry forward. Participants

recognized that when seeking to engage and educate the general public, it is important for partnerships to go beyond industry professionals to include commercial entities that cater to homeowners. To elevate the public’s awareness of critical issues and goals for resilience, the group recommended that the building industry create an ambitious, actionable advocacy campaign on the topic of resilience that would rally the community. Such a movement should create an avenue for measurable progress and would advance resilience goals.

Common themes emerged: alignment of local, regional, and national priorities when combined with systems-level design and an integrated, multi-disciplinary approach to problem solving, will provide optimal impact.

### Workings session take-aways

- Implications of life safety, liability, and standard of care are all impacted when implementing resilient strategies.
- Architecture firms must have business resilience to stay operational and provide client service when communities need it the most.
- There are critical interdependencies in the built environment. The performance capacity of a city and region, providing an economic base and natural resources respectively, is the foundation of any viable building and vibrant community.
- Policies should encourage the application of improved model zoning codes and performance codes that incorporate evidence-based outcomes that enhance resilience.
- A federally-required “Resilience Impact Statement” that would require documentation of hazard and climate risk, resilience strategies to be utilized, and anticipated impacts to both the natural and built environment, would enhance community resilience.
- When seeking to engage and educate the general public, it is important for partnerships to go beyond industry professionals to include commercial entities that cater to homeowners.
- To rally the community, the building industry should create an ambitious, actionable advocacy campaign on the topic of resilience. Such a movement could create an avenue for measurable progress and advance resilience goals.
- Alignment of local, regional, and national priorities, when combined with systems-level design and an integrated, multi-disciplinary approach to problem solving, will provide optimal impact.



### Sharing Insights.

AIA members participate in small working groups to address gaps and barriers in education, policy, and advocacy during the summit working session.

PHOTOS: LINDSAY BRUGGER, AIA

## Building Industry Statement on Resilience

Representing more than 750,000 professionals, America's design and construction industry is one of the largest sectors of this nation's economy, generating over \$1 trillion in GDP. We are responsible for the design, construction, and operation of the buildings, homes, transportation systems, landscapes, and public spaces that enrich our lives and sustain America's global leadership.

We recognize that natural and manmade hazards pose an increasing threat to the safety of the public and the vitality of our nation. Aging infrastructure and disasters result in unacceptable losses of life and property, straining our nation's ability to respond in a timely and efficient manner. We further recognize that contemporary planning, building materials, and design, construction and operational techniques can make our communities more resilient to these threats.

Drawing upon the work of the National Research Council, we define resilience as the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.

As the leaders of this industry, we are committed to significantly improving the resilience of our nation's buildings, infrastructure, public spaces, and communities.

- We research materials, design techniques, construction procedures, and other methods to improve the standard of practice.

- We educate our profession through continuous learning. Through coordinated and continuous learning, design, construction and operations professionals can provide their clients with proven best practices and utilize the latest systems and materials to create more resilient communities.
- We advocate at all levels of government for effective land use policies, modern building codes, and smarter investment in the construction and maintenance of our nation's buildings and infrastructure.
- We respond alongside professional emergency managers when disasters do occur. Industry experts routinely work in partnership with government officials to survey damage, coordinate recovery efforts, and help communities rebuild better and stronger than before.
- We plan for the future, proactively envisioning and pursuing a more sustainable built environment.

The promotion of resilience will improve the economic competitiveness of the United States. Disasters are expensive to respond to, but much of the destruction can be prevented with cost-effective mitigation features and advanced planning. Our practices must continue to change, and we commit ourselves to the creation of new practices in order to break the cycle of destruction and rebuilding. Together, our organizations are committed to build a more resilient future.

### Signatories:

- The Air Barrier Association of America
- American Council of Engineering Companies
- The American Institute of Architects
- American Planning Association
- American Society of Civil Engineers
- American Society of Interior Designers
- American Society of Landscape Architects
- American Society of Plumbing Engineers
- American Society of Heating, Refrigerating, and Air-Conditioning Engineers
- Associated Builders and Contractors
- Associated General Contractors of America
- Building Owners and Managers Association
- Congress for New Urbanism
- EcoDistricts
- Federal Alliance for Safe Homes
- Green Building Initiative
- Illuminating Engineering Society
- Insurance Institute for Business & Home Safety
- International Association of Plumbing and Mechanical Officials
- International Code Council
- International Facility Management Association
- International Interior Design Association
- Lean Construction Institute
- National Association of Home Builders
- National Institute of Building Sciences
- National Ready Mixed Concrete Association
- National Society of Professional Engineers
- Portland Cement Association
- Royal Institution of Chartered Surveyors
- US Green Building Council
- Urban Land Institute

## What's Ahead: next steps

**“Innovation occurs when good ideas are made better by new perspectives.”**

### Taking action

Increasing vulnerabilities to hazards, climate change, and other constantly shifting conditions are a foregone conclusion for the future of our communities. What people need to know is what to do about it. The summit's six speakers, with input from the audience, provided answers. Action is taking place across the nation right now: statewide resilience plans, insurance incentives that guide common construction practices and retrofits, revisions to urban policy that engender hazard resilience, new building practices that marry innovative building science with emerging social science, growth and development in safer places, and standards-based metrics that incentivize financial investment in resilience goals. The hope is that these actions ignite responsive change by the building industry, drive collaboration, and provoke new solutions. Innovation occurs when good ideas are made better by new perspectives.

Committed, the AIA will continue to convene, collaborate, and catalyze new research and strategies to guide design and decision-making for a

better built environment; working to ensure architects have the knowledge and skillsets required to address issues of evolving climate and to be resources for their clients, communities, and fellow industry professionals. With this mission in mind, the AIA will:

- advocate for model building code application and supplemental technical support to identify and achieve performance targets;
- identify gaps in policy, create value propositions for resilient construction, and address the enormous stock of existing buildings;
- assess the evolving standard of care and associated legal liabilities;
- collaborate with a growing network of partners to advance the Industry Statement on Resilience; and
- encourage case studies and research of design processes and practices that strengthen community resilience.

Additionally, the AIA will advance the bold actions of the speakers by encouraging a collaborative process



Members analyze gaps in current professional education offerings during the AIA Resilience Summit at the National Building Museum. PHOTO: LINDSAY BRUGGER, AIA

of deliberate investigation. It is tempting to fix the problem in front of us without knowing the full impact of our actions, but if we are to be problem-seekers, we will not only fix the issue in front of us but uncover the root causes and address them in the process.

Struggles to meet a growing demand for affordable housing, drying out from unprecedented rainfall, and surviving sizzling temperatures in high rise apartments are now daily news, and the challenges ahead of us are new territory altogether. A swelling urban population intensified

by a growing global refugee crisis, an escalating demand for sufficient sources of clean water to sustain life, and chaotic meteorological events that transform typically rain-drenched regions into fuel for wildfire. These issues are symptomatic of complex challenges impossible to resolve with status quo tactics.

It is without question that these issues will bring new disasters, and while opportunity for innovation is most often recognized post-disaster, that same opportunity is ripe at this very moment. Today we have the chance to influence our future.

**“It is tempting to fix the problem in front of us, without knowing the full impact of our actions, but if we are to be problem-seekers, we will not only fix the issue in front of us, but uncover the root cause(s) and address them in the process.”**

Special thanks from the AIA resilience program team and summit facilitators:

We commend the building industry for recognizing the challenges ahead. It is their systems-solution methodology, stewarded by revolutionary scientific minds and collaboration with architects - mediators of social, environmental, and building science priorities in the built environment to execute and implement strategies of resilience and adaptation - that will allow us to answer the question that is before us now: how are the places designed today able to outlast the critical circumstances of tomorrow?

Rachel Minnery, FAIA + Lindsay Brugger, AIA

**Connect:** [resilience@aia.org](mailto:resilience@aia.org)





# Participants

Thank you for joining the AIA 2015 Resilience Summit

## Speakers



**ILLYA AZAROFF, AIA, +LAB Architects,**  
A recognized expert in disaster mitigation and community resilient planning strategies; Illya has worked at the federal level with

the National Disaster Recovery Framework, the Department of Homeland Security, FEMA, and the Regional Catastrophic Planning Team. Locally, Illya has contributed to the New York DCP Housing Retrofit Guidelines and the Federal Alliance for Safe Housing's Resilient Housing Guidelines. In 2011 he co-founded the AIA Design for Risk and Reconstruction committee, leading the Post Sandy Initiative with AIANY. He is also an instructor for the National Disaster Training Preparedness Center, a subject matter expert for the Rockefeller Foundation 100 Resilient Cities, and was honored with the AIA National Young Architect Award in 2014.



**ROSE GEIER GRANT, AIA, State Farm Insurance,** Ms. Grant is responsible for liaison activities within the building research community. She identifies construction trends

conducts research to determine performance attributes of buildings. Rose also assists with policyholder and public education on risk recognition and loss mitigation. Rose is the Executive Board Secretary of the National Consortium of Housing Research Centers and served as the Vice Chair for Research (2008-9). She serves as the staff liaison between State Farm and the Insurance Institute for Building and Home Safety's Research Laboratory. In 2011-12 she was a Steering Committee member on the EERI New Madrid Earthquake Scenario Task Group. Rose holds bachelor's and master's degrees in Architecture from the University of Illinois and is a licensed architect.



**ANN KOSMAL, AIA, U.S. General Services Administration,** Twenty plus years of diverse architectural experience from Walt Disney Imagineering and the Culver City colony with

Eric Owen Moss have tuned Ann's insights to outcome delivery. Ann has specialized knowledge in adaptive management and climate ready design. She is the Convener of the GSA Agency Climate Adaptation and Resiliency team. The team develops and implements GSA's climate change risk management plan and is a winner of the White House Green Gov Climate Champion Award. She uses her strengths as an integrator and technical resource to hone agency processes toward a climate ready enterprise.



**DOUGLAS PIERCE, AIA, Perkins+Will,** Doug is a pioneering Architect, Speaker and Writer with a passion for integrating art + science through poetic innovation. Working closely

with an original founder of the US Green Building Council + LEED, Doug is now defining a new integrative framework for sustainable design through development of the RELi Resiliency Action List + National Consensus Standard. RELi was launched in 2015 with support by the Minnesota Pollution Control Agency, Minnesota Green Step Cities, AREA Research, AIA Minnesota, USGBC Minnesota, the Capital Markets Partnership, and MTS. It is available on-line at [C3LivingDesign.org](http://C3LivingDesign.org).



**JAY RASKIN, AIA**, *Jay Raskin Architect*, An architect and leader in Cascadia earthquake and tsunami preparation for over 20

years, Jay championed both emergency preparedness and pre-disaster mitigation efforts in Cannon Beach and coastal communities, as a private citizen and elected official. He was instrumental in the creation of the Oregon Resilience Plan from its inception to completion and has an understanding of the vulnerabilities of buildings, infrastructure, and the community from a large seismic event. He is currently the Vice-Chair of the Oregon Seismic Safety Policy Advisory Commission, the chair of the AIA Oregon Resilience Committee and was selected as chair of Restore Oregon's roundtable workgroup that produced the Special Report: Resilient Masonry Buildings: Saving Lives, Livelihoods, and the Livability of Oregon's Historic Downtowns.



**Z SMITH, AIA**, *Eskew+Dumez+Ripple*,

Z Smith is Principal and Director of Sustainability and Building Performance at Eskew+Dumez+Ripple, winner of the 2014

AIA Firm Award. His built work includes academic, laboratory, and residential buildings earning LEED Gold and Platinum certification. He brings training and experience in physics (MIT) and engineering (Princeton) to the field of architecture (UC Berkeley), named as inventor on 10 patents and author on over 50 peer-reviewed scientific publications. He teaches at the Tulane School of Architecture, is Chair Ex Officio of the USGBC Louisiana Chapter, and serves on the national Advisory Group of the AIA Committee on the Environment (COTE).



**DONALD WATSON, FAIA**, An architect with focus on sustainability and resilience, recognized by numerous AIA Design Awards and USBGC certifications. He is author of

*Design for Flooding: Resilience to Climate Change*, co-authored with Michelle Adams, P.E., and Editor of the McGraw-Hill Time-Saver Standards Series, *Architectural Design* (2003) and *Urban Design* (2001). He is a member of the ACSA College of Distinguished Professors, and founding member of the Trumbull Connecticut Conservation Commission. He has served on the AIA Energy Committee 1976-1986, Joint AIA/ACSA Research Council 1990-94, and Committee on the Environment 1994-98 (Chair 1996).

## Participants

**Fernando Arias** American Society of Interior Designers  
**Debra Ballen** Insurance institute for Business & Home Safety  
**Janice Barnes, AIA** Perkins+Will  
**Joshua Barnes** DOC - Economic Development Administration  
**Dan Bass, AIA** FEMA Building Science  
**Jim Brewer** American Society of Interior Designers  
**Chrysanthe Broikos** National Building Museum  
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**Mark Carson** American Society of Landscape Architects  
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**Ryan Colker** National Institute of Building Sciences  
**Scott Davis** Visiting Fellow, Rand Corporation  
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**Jessica Grannis** Georgetown Climate Center  
**James "Butch" Grimes, AIA** Grimes+Architects  
**Robert Harris, AIA** NAVFAC HQ  
**Jason Hartke** Department of Energy  
**Drew Herseth** FEMA Building Science  
**Sam Higuchi** NASA  
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**Whitford E. Remer** American Society of Civil Engineers  
**Brian Rich, AIA** RICHAVEN PLLC  
**Brandi Richard** DHS - Center for Faith-based and Neighborhood Partnerships  
**Lynn Richards** Congress for the New Urbanism

**John Robinson, AIA** John A. Robinson Architect  
**Dean Sakamoto, FAIA** Dean Sakamoto Architects LLC  
**Jessica Sheridan, AIA** Gensler  
**Jeremy Sigmon** United States Green Building Council  
**Joseph Simonetta, CAE** AIA New Jersey  
**Catherine Tehan** American Society of Civil Engineers  
**Robert Thiele, AIA** Robert Thiele Associates  
**Melinda Tomaino** Associated General Contractors of America  
**Sam Warlick** Congress for the New Urbanism  
**Nathan Woiwode** The Nature Conservancy

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**Sherry-Lea Bloodworth Botop** Executive Director



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This report was prepared by Rachel Minnery, FAIA and Lindsay Brugger, AIA of the American Institute of Architects with contributions from the 2015 AIA Disaster Assistance Committee.

Published January 2016.

# REFRAMING RESILIENCE

Proceedings of the AIA Member Working Session  
Washington, DC, October 16, 2015



**AIA Member Supplement**



# AIA Member Supplement

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# AIA Member Supplement

## Overview: the AIA 2015 Resilience Summit member working session

### For AIA members

This supplement relays key discussion points of the 2015 AIA Resilience Summit members-only working session and provides a comprehensive set of resources for a beginner or intermediate architect of resilience.

### Summit overview

Across the country, substantial progress is being made when it comes to understanding what it means for our communities to be “resilient” to forces ranging from natural and manmade disasters to the impacts of climate change. Equally important, significant movement is taking place in developing and implementing resilience programs—from statewide resilience plans to new incentives to attain resilience goals. Architects in many cases are—and should be—at the forefront of resilient design as they uniquely grasp the interdependence of the natural, social, and built environment systems and the

**“It is the goal of the AIA program to enable all members to be architects of resilience. The AIA will empower members by defining and refining the unique role of architects, making members aware of emerging issues research, providing resources and education to equip members with the knowledge and skills needed to address problems of the future, and advocating for policies to support new practices.”**

### AIA Position Statement on Resilience

Buildings and communities are subjected to destructive forces from fire, storms, earthquakes, flooding, and even intentional attack. The challenges facing the built environment are evolving with climate change, environmental degradation, and population growth. Architects have a responsibility to design a resilient environment that can more successfully adapt to natural conditions and that can more readily absorb and recover from adverse events. The AIA supports policies, programs, and practices that promote adaptable and resilient buildings and communities.

effects of interventions on those systems. The 2015 AIA Resilience Summit built on this momentum and worked to drive collaboration, encourage thoughtful research and experimentation, capture case studies, and inspire new solutions.

Members and partners gathered to identify key objectives, explore emerging policies, and recognize the partnerships and collaborations that have brought success to resilience goals during a day of interactive panel presentations, discussions, and strategic planning to overcome hurdles to resilient built environments. An in-depth discussion of the keynote addresses and each summit panel presentation is available in the 2015 AIA Resilience Summit proceedings report, *Reframing Resilience*.

Following the keynote addresses and panel presentations, AIA members participated in a members-only working session to advance the architect's role in the field of resilience. Members are encouraged to continue the conversation by sharing their interests and expertise in [this short survey](#).

### **From here to resilience: implementation strategies**

When the AIA Board of Directors adopted a position statement on resilience, it committed the AIA to support its members in addressing imminent environmental issues, to educate and train its members to more fully address these issues, and advocate for the practices and policies to be successful. The AIA has identified four crucial levers of change for making our communities more sustainable and resilient:

- education of architects;
- tools and resources;
- practice-based research; and
- policy-focused resources.

These strategies served as focal points of the working session, which included a diverse group of members from the private and public sectors dedicated to resilience and sustainability; including summit speakers, Disaster Assistance Committee members, educators, component leaders, emerging professionals, and AIA Strategic Council members, along with architects representing small and large firms, the Federal Emergency Management Agency (FEMA), the National Institute of Standards and Technology (NIST) and the Navy, as well as specialists in historic preservation, mitigation work, and futureproofing.

The working session provided the opportunity to discuss current challenges and opportunities the profession faces when it comes to being resilience leaders. This included topics like risk communication with clients; design teams and communities; prioritizing resilience; utilizing projected climate data to improve long-term building performance; and addressing changing liability and standard of care.

The participants broke into small groups to discuss the topics of:

- Education + Knowledge Sharing
- Practice + Policy
- Advocacy + Public Awareness

Reference materials with AIA's goals, challenges, and proposed objectives for the given topic were provided to help to facilitate a fruitful and informed conversation. At the end of the day, special guest Jesse Keenan, Research Director of Columbia University's Center for Urban Real Estate, thoughtfully synthesized the priorities and outcomes of the working session within the larger context of resilience and the architectural profession. These combined results will enable the AIA to incorporate and share member knowledge and experience, and further inform the AIA resilience strategy and programs.

## Working session goals:

### Education + Knowledge Sharing:

- Develop tools that build the expertise of members in resilience, hazard mitigation, climate adaptation, and other sustainability focus areas.
- Recommend topics for a resilience curriculum for professionals.

### Practice + Policy:

- Identify regulations that are barriers to resilient design and practice.
- Strategize policy changes that could make a difference.

### Advocacy + Public Awareness

- Identify synergies and allies to elevate the public's awareness of critical issues that affect community resilience.
- Create a culture of advocacy. Create key talking points suitable for different audiences: the public, clients, and funders.



AIA members participate in small groups to address challenges in education, policy, and advocacy during the summit working session. SOURCE: LINDSAY BRUGGER, AIA

# Scoping a resilience curriculum

**THE EDUCATION + KNOWLEDGE SHARING** work group identified emerging resources to support a burgeoning resilience practice, and areas of need to equip architects with the skills necessary to provide resilience services. Architects would gain the knowledge and skills to address risks associated with shocks and stresses, and processes for an integrated, multidisciplinary, systems-approach to design, including vulnerability assessments, capital needs assessments, service life assessments, hazard mitigation techniques, and real estate development.

Dean Sakamoto, former Disaster Assistance Committee member and co-creator of *HURRIPLAN*, *Resilient Design for Coastal Communities*, moderated a discussion on developing tools that build the expertise of members in resilience, hazard mitigation, and climate adaptation. Key questions included:

1. What resources currently exist, and what is needed?
2. How can architects mainstream resilience into their own practices?
3. What are the best communication tools for knowledge sharing (member to member, member to Institute, member to public)?

## What's been done

- *HURRIPLAN*, created in part by AIA members, was added to the AIA's suite of resilience courses. *HURRIPLAN* is a 1-2 day course on resilient community planning and building design strategies for civic and commercial projects located in hurricane-prone areas. Courses have been provided at AIA Convention and by request with instructors from the AIA and the National Disaster Preparedness Training Center.
- Design tools including the *FLASH Resilient Design Guide for High Wind Wood Frame Construction*, were co-authored by AIA members including Ilyia Azaroff, AIA, Michael Lingerfelt, FAIA, Rose Grant, AIA, and Brandon Dake, AIA.
- FEMA, with input from architects, provides numerous technical resources for hazard design and project planning.
- AIA members have been instrumental in advancing resilience design tools. Douglas Pierce, AIA, was a key developer of the *RELi resilience rating system*; the details of which are discussed earlier in this report. In addition to Pierce's work, MaryAnn Lazarus, FAIA; Betsy Del Monte, FAIA; and Rachel Minnery, FAIA were co-authors of the new *LEED Resilience Pilot Credits*. These credits include Credit IPpc98 Assessment and Planning for Resilience, Credit IPpc99 Design for Enhanced Resilience, and Credit IPpc100 Passive Survivability and Functionality During Emergencies.
- Existing AIA platforms for resilience education include *AIA Convention*, AIAU, and AIA Component Chapter committees and events. Many webinars, courses, and events on sustainability, building science, urban design, and community participation support resilience goals.

“The complexity of resilience requires that roadmaps for new actors and networks be developed to create new standards.”

—Jesse Keenan

### Key themes that emerged

- Architects need to communicate with clients and building users about the risk associated with hazards, climate change, and other environmental factors and work within the community to design solutions that promote social resiliency.
- Public awareness is most successful when localized community needs have a sense of urgency—future problems are distant problems when today’s issues are yet to be addressed. See *100 Resilient Cities sidebar* on “shocks and stresses” (pg. 50).
- Old solutions may not solve new problems. In order to create buildings that are more resilient and adaptable to changing conditions, architects need to understand the interdependent issues that create synergies or trade-offs with other project goals, learn effective resilience strategies, and guide decision-making that incorporates resilience.
- Architects will work differently with their current teams and engage experts beyond the building industry to tackle new, complex and dynamic problems.
- Resilience should be institutionalized through research and practice, and disseminated with educational materials and other resources.
- Resources must include education around the performance capacity of a city (centered on economics) and region (addressing the environment). These aspects are the foundation for the built environment. A resilient building in a non-resilient community isn’t resilient.
- Architects need to advocate within their own profession for application of resilience principals and learn from others outside the field to enhance their knowledge and skills



AIA members participate in breakout groups to address challenges in education, policy, and advocacy during the summit working session. SOURCE: LINDSAY BRUGGER, AIA

## Areas of opportunity

- Resilience across scales is crucial: resilient buildings rely upon resilient infrastructure, resilient people, and a resilient ecosystem. The National Institute of Standards and Technology and others are engaging in research to provide recommendations and metrics for community resilience. As system-thinkers and professionals who regularly work with diverse stakeholders, architects have the skills to comprehend, organize, relate, and prioritize complex issues, and therefore contribute to the decision-making power behind community resilience.
- In order to encourage shifts in priorities and different decisions, architects and their clients rely upon case studies, cost-benefit data, models, and measurement tools—and much more of this research is needed. Green building rating systems are one successful example, and it is critical that the architectural profession inform and develop these tools as they have with RELi and LEED.
- To respond to resilience goals, we expect common practices associated with performance-based design to change, and will impact architects' professional liability and the professional standard of care. These practices will need to be assessed, analyzed, and institutionalized into AIA contract documents and other policies.
- A centralized location for knowledge-exchange is recommended. Such a tool would enable the architectural community to share resources and best practices with one each other. Building Research Information Knowledge Base (BRiK), co-hosted by the AIA and National Institute of Building Sciences, is one opportunity to share resilience-related peer-reviewed research and case studies.
- Architecture firms would benefit from business continuity resources such as strategies for risk management, emergency communication, data capture, operations, and functional performance requirements, and technology back-up. Resilient businesses make for a more resilient community when functional capacity is maintained. Architects and their firms “walk their talk” when their places of business and staff are able to respond more quickly to clients' damage assessment, repair, renovation, retrofit, and rebuilding needs.
- A resilience-focused continuing education curriculum would augment existing courses in sustainability, building science, urban design, and community participation, and guide professionals seeking the most pertinent data, research, and models to support their resilient practices. Suggested topics include key terminology, goal setting for performance, client education, climate and hazard resilience approaches, hazard risk assessment, retrofit strategies, risk and liability, natural resources, and other regional issues.

## Speaking resilience:

### **Hazard:**

#### **Poses a threat to safety**

- Hazards such as hurricanes, tsunamis, earthquakes, tornadoes, blizzards, drought, and wildfires are responsible for injury, death, and property damage as well as social and economic disruption. These events are no longer a one-off, once in a lifetime event; particularly when we look at the impacts of climate change.

### **Risk:**

#### **Quantifies hazard threat**

- Risk defines the likelihood of occurrence and intensity of the hazard. Determining the level of “acceptable risk” is critical to designing for the associated level of building performance. It is important to ask: What is the projected lifespan of the building? What are the building’s critical functional requirements before, during, and after a hazard strikes? And how long is it acceptable for the building to be out of service due to the impacts of a hazard?

### **Vulnerability:**

#### **Personalizes risk**

- Vulnerability assesses the capabilities and interdependencies of individuals and communities associated with risk. A resilient building in a vulnerable community isn’t truly resilient. Infrastructure, utilities, food supply and services are all necessary for adequate functionality.

### **Mitigation:**

#### **Reduces negative impact**

- Mitigation measures are often developed in accordance with lessons learned from prior incidents. Measures may include zoning and building codes or floodplain buyouts as well as efforts to educate governments, businesses, and the public on measures they can take to reduce loss and injury. Mitigation is most successful when policies and decision-making support appropriate development, land use, site selection, and adoption of model building codes.

### **Resilience:**

#### **Inherent durability or flexibility**

- When working within the built environment, it’s important to have foresight: incorporating changing environmental, social, and economic conditions into projects. This requires designs that are tough as well as flexible; providing the ability to not only bounce back, but forward.

### **Adaptation:**

#### **Accommodates needs throughout service life**

- Hazards aren’t the only threat. It is critical to acknowledge the changing conditions in the physical, economic and social environment as well. Communities are ultimately successful when they are adaptable to change.

# Creating a culture of change-making

**PRACTICE + POLICY** leveraged policy development as a channel for change and a means to influence legislative action and professional practice. With this lens, the policy working session explored how architects can inform building code development and regulations, including green building ratings systems and other resilience indicators that inspire changes in codes and regulations. The session also empowered member advocates with resources and guidance.

Joseph Simonetta, CAE, Component Executive Liaison to the Disaster Assistance Committee, led a conversation on regulations that are barriers to resilient design and practice, and guided a discussion of policy recommendations that could lead to change. Key questions included:

1. What resources do AIA component chapters need to be effective?
2. How do we capture lessons learned in community resilience?
3. What is the additional liability risk for “above code” design and construction?
4. How do professionals perform duties in the face of uncertain future conditions?

## What’s been done

- The AIA contributed to the National Institute for Standards and Technology’s report *Community Resilience Planning Guide for Buildings and Infrastructure Systems* which provides policy and practice recommendations to aid communities in developing resilience plans. AIA members continue to be a part of the Expert Panel for implementation.
- With the National Institute of Building Science, the AIA co-authored the *Building Industry Statement on Resilience* unifying planners, architects, engineers, contractors, and manufacturers to work towards resilience in the built environment.
- The Applied Technology Council’s report *Strategies to Encourage State and Local Adoption of Disaster-Resistant Codes and Standards to Improve Resiliency* incorporated AIA member input. It contains a series of stakeholder-defined recommendations on the best means to encourage and/or aid state and local communities in the nationwide adoption of current disaster-resistant codes and standards.
- The AIA brought an architectural perspective to the National Institute of Building Science’s report *Developing Pre-Disaster Resilience Based on Public and Private Incentivization* which discusses private/public-sector opportunities for incentivizing resilience, including implementation strategies.
- The AIA joined the *Build Strong Coalition* of designers, first responders, and insurance industry representatives to advocate for safer building codes and improvements to federal disaster programs.

“Much of the work of advancing resilience has to do with identifying and addressing regulatory barriers and policy goals.” —Jesse Keenan



### Key themes that emerged

- Site selection is a critical first step to achieving building resilience. Municipal plans, land use, and zoning regulations need to be reassessed and aligned to reflect risk and associated vulnerability for informed development decision-making.
- Financial incentives need to be formalized. Policies that encourage responsible reuse, retrofits, and upgrades of existing building stock may enhance community resilience—and should consider owner’s performance goals, community resilience levels, and the cost-effectiveness of proposed interventions.
- Market incentives and voluntary actions will have limited effect as risk and vulnerability increases over time. Insurance and lending institution requirements are changing the development patterns; however regulations implemented across federal, state, and local levels are needed to supplement these incentives. Combined, these changes will cause disruption yet may ensure longer-term community resilience.
- Existing policies and regulations that address sustainability or climate change may be stepping stones to resilience. Optimizing existing incentives and identifying synergies and co-benefits within other policies may also help meet resilience goals.
- Architects actively advise and guide policy recommendations including code development.

### Areas of opportunity

- Amend AIA policies on standard of care to reflect new expectations related to resilience.
- Investigate incentive and funding opportunities including loan guarantees, community development block grant funds, and public-private partnerships.
- Encourage and assist in the creation and adoption of a federally-required Resilience Impact Statement that would require documentation of hazard and climate risk, resilience strategies, and anticipated consequences to both the natural and built environment. Federally required state clean power plans are an example of this type of regulation.
- Adopt and apply model building and zoning codes for development and building practices that provide minimal public safety and afford some level of property protection.
- Implement performance codes that incorporate evidence-based outcomes that enhance resilience.
- Encourage the development of local and state Resilience Action Plans that would standardize the planning and coordination process, eliminate silos, and incorporate existing community, hazard mitigation, and climate action plans.
- Amend existing laws to mandate correlated planning and provide a standard for disclosure of hazard risk.
- Amend zoning and land use legislation to allow for shared/joint resilience projects across property lines and city/county limits

# Resilience intersections + synergies

**ADVOCACY + PUBLIC AWARENESS** explored techniques to enhance public awareness of resilience issues and the value of architects. This working group was also tasked with identifying partnerships to enhance advocacy efforts.

Paula Loomis, FAIA, a Disaster Assistance Committee member, led a discussion to identify synergies and allies to help move the industry forward and elevate the public's awareness of critical issues and goals in resilience. Key questions included:

1. What project and policy barriers exist?
2. Who benefits from maintaining the status quo? Why? and how can those existing benefits be addressed?
3. Who do we need to work with to be successful?
4. How do we educate clients (via architects) on the performance of a 30 year building versus a 100 year building?

## What's been done

- The AIA supports the [Safe Building Code Incentive Act](#) which would increase FEMA disaster assistance grant funding to states that adopt and enforce up-to-date model building codes.
- The AIA has endorsed the PREPARE Act which creates an inter-agency council on resilience and codifies agency efforts to undertake resilience and climate planning.
- Through its participation in the Build Strong Coalition, the AIA has supported the FEMA Disaster Assistance Reform Act of 2015 which reauthorizes FEMA and initiates a study to review federal disaster policies.
- The Disaster Assistance program maintains a network of members who respond to community disasters and have demonstrated the value of architects in preparing for, responding to, and mitigating disasters.
- The AIA maintains a [website](#) on resilience, adaptation, and other related programs with information for members, other design professionals, and the general public.

“Value needs to be communicated in terms of a quantitative return on investment and qualitative livability.”

—Jesse Keenan

### Key themes that emerged

- Resilience needs to be differentiated from Emergency Management. The building industry and the general public should understand the differences between short-term goals of response, recovery, and mitigation, and long-term goals of resilience and adaptation.
- Risk comes in many forms: multi-hazard, unknown, long-term, and short term. It is important to define and distinguish these terms.
- Architects should be empowered through education, preparation, and the provision of adequate tools and materials to convey why resilience is needed and what unique assets architects bring. They can also connect with international colleagues to share best practices and resources.
- Public messaging should be consistent and be relatable to both the lay person and technically rich to inform and advise collaborators and decision makers.
- Public awareness about resilience could be enhanced by collaborating with industry partners and allies via the various associations members of the public already have.
- It is important to develop policies to encourage resilient design in all market sectors, especially those that are directly or indirectly touched by architects and are of critical importance to community function. Once these policies are established, key stakeholder groups could then work with advocacy teams to advance and implement them.
- Advocacy should be tailored to fit both the needs of the small town architect and their clientele and multi-national firms who can move the needle on the global scale.

### Areas of opportunity

- Partnerships with organizations or business that represent a diverse group of stakeholders and consumers may help to advance the AIA's goals and the role of the architect. Building industry colleagues, as well as commercial entities like hardware stores that cater to do-it-yourself homeowners, would be valuable partners.
- Lead and participate in coalitions that promote resilience in private industries and in the public space. Coalitions should include diverse stakeholders, including building industry professionals, financial experts, and environmental scientists.
- Develop specific, clearly articulated policies and positions that advance resilience goals. Garner support for these resilience policies from the public by differentiating long-term action from short-term reaction.
- Develop tools and materials that empower architects to convey the importance of resilience to policymakers, clients, and colleagues. Such tools and materials may include talking points, issue briefs, elevator speeches, well-designed documents that are graphically appealing and convey a story, and marketing materials.
- Create an ambitious, actionable advocacy campaign with the building industry to rally the community and facilitate broad advancement on the topic of resilience. Federal and state public buildings have an opportunity to lead by example with new development and design practices—and architects must be prepared to provide those services.
- Advance resilience goals by engaging in cross-sectorial discussions and working groups with local decision makers such as local planning commissions, building commissions, and emergency management offices. Architects and AIA components who partner with community development corporations and other non-profit organizations can collaborate on public awareness, provide community level audits and assessments, and develop community-based solutions.

## 100 Resilient Cities:

Pioneered by the Rockefeller Foundation this nonprofit organization is “dedicated to helping cities around the world become more resilient to the physical, social and economic challenges that are a growing part of the 21st century.”

The American Institute of Architects is a platform partner of the 100 Resilient Cities (100RC) initiative. As such, AIA works with 100RC and local components serving named cities to advance the resilience goals of their communities.

### **Shocks: sudden, acute events that threaten a community:**

- Infrastructure failure
- Hurricanes
- Earthquakes
- Wildfires
- Heat waves
- Blizzard
- Health epidemics
- Flooding
- Tornadoes
- Acts of terrorism
- Civil unrest
- Dam failure
- Subsidence
- Liquefaction

### **Stresses: systemic challenges that weaken a community on a daily or cyclical basis**

- Affordable housing
- Aging population
- Environmental degradation
- Sea level rise
- Growing wealth gap
- Drought
- Species extinction
- Aging infrastructure
- Population growth
- Unemployment
- Melting polar ice caps
- Global warming
- Food scarcity
- Increasing pollution

### **Selected cities**

#### **Berkeley, CA** | AIA East Bay

- Shocks: earthquake, wildfire, heat wave

#### **Boston, MA** | Boston Society of Arch

- Shocks: flooding, infrastructure failure, terrorism
- Stresses: lack of affordable housing, rising sea level/coastal erosion, social inequity

#### **Boulder, CO** | AIA CO

- Shocks: disease outbreak, flooding, wildfire
- Stresses: drought

#### **Chicago, IL** | AIA Chicago

- Shocks: flooding, infrastructure failure
- Stresses: aging infrastructure, endemic crime + violence

#### **Dallas, TX** | AIA Dallas

- Shocks: flooding, infrastructure failure, terrorism
- Stresses: aging infrastructure, chronic energy shortage

#### **El Paso, TX** | AIA El Paso

- Shocks: flooding
- Stresses: drought, epidemic of drug + alcohol abuse, poor health infrastructure, social inequity

#### **Los Angeles, CA** | AIA Los Angeles

- Shocks: earthquake, tsunami, wildfire
- Stresses: aging infrastructure, drought

#### **Jacksonville, FL** | AIA Jacksonville

- Shocks: heat wave, flooding, hurricane
- Stresses: aging infrastructure, drought

#### **New Orleans, LA** | AIA New Orleans

- Shocks: hurricane, tropical storm
- Stresses: aging infrastructure

#### **New York City, NY** | AIA New York City

- Shocks: heat wave, tropical storm
- Stresses: poor transportation system, rising sea level/coastal erosion

#### **Norfolk, VA** | AIA Hampton Roads

- Shocks: flooding
- Stresses: rising sea level/coastal erosion

#### **Oakland, CA** | AIA East Bay

- Shocks: earthquake, flooding
- Stresses: lack of affordable housing, social inequity

#### **Pittsburgh, PA** | AIA Pittsburgh

- Shocks: flooding, infrastructure failure
- Stresses: aging infrastructure, environmental degradation

#### **San Francisco, CA** | AIA East Bay

- Shocks: earthquake, heat wave, wildfire
- Stresses: drought

#### **San Juan, PR** | AIA Puerto Rico

- Shocks: earthquake, flooding, tropical storms
- Stresses: social inequity

#### **St. Louis, MO** | AIA St. Louis

- Shocks: heat wave, hurricane, riot
- Stresses: aging infrastructure, endemic crime + violence

#### **Tulsa, OK** | AIA Eastern Oklahoma

- Shocks: flooding, hurricane, tropical storms
- Stresses: social inequity

# Design. Learn. Engage.

Architects can not only address the challenges of climate change, but can enhance the quality of livability for their communities. The 2015 AIA Resilience Summit began with stories from six member colleagues sharing how architects are spearheading statewide resilience planning, rebuilding post-disaster, designing cost effective hazard mitigation, and making policy recommendations for recovery and climate risk assessments.

The Summit made clear that architects need to be part of the client solution and the community solution—to initiate new ideas that will create policies, regulations, and incentives that lay the groundwork for sound development, design, and construction. Reducing vulnerability does not have to be synonymous with sacrifice. If we are pragmatic, flexible, and carefully manage the challenge ahead of us, we can design a better world.

### Resilience is a priority. Now what?

Architects can address current community challenges and the risk associated with climate change, natural hazards, and other threats beginning at the predevelopment, programming, and planning phase of new development or renovations. We know that technology and financial incentives will make great strides in achieving resilience goals, but will fall short of what is needed to ensure prosperity into the future. Built environments are always changing and resilience is a dynamic quality, unique to the host, time, and place. A one-size-fits-all prescriptive approach can disillusion those looking for a quick fix. Good designers and their

**Resilience: why architects?**

- **Public Duty.** Licensure obligates architects to “protect the health, safety, and welfare” of the public.
- **Systems Thinker.** Architects are “generalists” within the built environment who grasp the interdependencies of the natural, social, and built environment systems and the effects of interventions on those systems.
- **Project Leadership.** Architects serve as project and team coordinators and leaders—they are the primary point of contact for the client, building department, and design team. They have the unique ability and responsibility to translate complex information.
- **Engages Stakeholders.** Architects facilitate agency, owner, user, consultant, and community participation in the design process to reveal information for decision-making and ensure buy-in.
- **Visionary.** Architects visually communicate a future reality. Very few professions have the skills to convey future conditions in a meaningful and impactful way. Informed and innovative ideas communicated thoughtfully earn confidence and trust, allowing architects to provide value in new ways.
- **Mediator + Translator.** Architects respond to programmatic elements; incorporate data, input and feedback; and consider societal and environmental needs to prioritize goals and make design choices.

good decision-making haven't been more imperative: a thoughtful systems-approach that considers the service life of a building within the performance characteristics of a given community will provide significantly better outcomes.

Resilience goals, however, may not be most effectively achieved individually or at the building scale, but rather through collaborative approaches at the regional level. This level of cooperative decision-making and investment is a cultural shift. Your colleagues share their rules of thumb here, in the following appendix, and continued updates at [aia.org/resilience](http://aia.org/resilience).

- Architects are in a unique position to convey critical concerns and translate complex environmental data for clients and building users. Strive for design implementations that regenerate natural resources and reduce stressors.
- Align local, regional, and national priorities for optimal impact and reduced financial burden. Share the resulting ideas with local leaders and pursue pilot projects to test innovations.
- Create systems and infrastructure that are flexible and adaptable to changing needs and technologies. Develop scenarios to model the anticipated performance of proposed design alternatives. Align performance goals with design and selection of building components.
- Ideal solutions are multi-purpose, provide co-benefits to offset costs, create opportunities, or provide additional value. The design decisions you make today may last 80 years or longer.
- During the design process, arrive at final choices through an integrated, multi-disciplinary approach to problem solving. This will include new collaborators such as sociologists and environmental scientists and will require designers to examine long-term goals and effects.

- Keep in mind that solutions should consider and avoid unwelcome consequences within the larger community and region. For example, a flood barrier may protect one structure, yet may divert flood waters into a neighboring property.

**RESOURCES** are available on the [AIA website](http://aia.org) and web hyperlinks to additional resources can be found throughout this document. The appendix also contains the following reference items:

- **Understanding Resilience** demystifies the often interchanged or misused terms of mitigation, resilience, and adaptation. It clarifies the various challenges each strategy is best suited to and empowers architects with a common language that will enhance their credibility.
- **Qualities of Resilience** discusses qualities and indicators of resilience in the face of an ever-changing set of circumstances, variables, and environmental conditions. Resilience is not a static state of being—certain design characteristics facilitate greater success in being resilient or resistant to harm and unwanted change and provide a partial answer to the question “what is a resilient building?”.
- **A Framework for Resilience** outlines the AIA's approach to resilience awareness, education, and training.
- **Resilience to Adaptation** describes a process for resilient and adaptive design, referencing the inherent challenges and opportunities.

Numerous practice-based resources from agencies, academic institutions, and other research providers will continue to provide useful information to the architect of resilience:

- **Local Hazard Mitigation Plans** will provide the best analysis of localized risk. Architects can incorporate this information in predesign, and throughout design and construction.

- **Climate databases** that anticipate future climatic environments, such as [Climate Central](#) and the [US Climate Resilience Toolkit](#), provide architects with enhanced baseline design data.
- **Design guides** such as the FLASH Resilient Design Guide for High Wind Construction and [ASCE's Flood Resistant Design and Construction guide](#) provide construction details that enhance the robust quality of a structure. Additionally, [FEMA's Building Science branch](#) offers a wide range of design guidance resources for a diverse set of hazard risks.

**ENGAGE** on this critical issue.

- **Take this short survey** to share your interests and expertise and become part of our growing resilience network.
- **Connect** on [aia.org/resilience](http://aia.org/resilience) and on social media ([@AIA\\_Resilience](#)) to find resources, data, guidance, and more: information is continually updated.
- **Code advocacy** promotes the development and application of a comprehensive and coordinated set of model codes—the baseline standard for resilience—while “stretch codes,” or other code-plus design strategies, achieve deeper performance goals. When evaluated and disseminated, they enable the development of data-driven case studies that make policy change possible. To assist in the review and development of model building codes, email [codes@aia.org](mailto:codes@aia.org).
- **Continuing education.** Resilience education will be available at the 2016 AIA Convention. [A Resilience Track](#) will highlight sessions on metrics, case studies, and professional practice tools for a changing climate. Additionally, attendees will have the opportunity to take part in [HURRIPLAN Resilient Coastal Design training](#). Can't make Convention? AIAU offers a series of topical resilience courses.
- **Join.** AIA chapters, as well as many firms, have established committees and working groups that advance the issue of resilience. Additionally, there are coalitions such as the [National Institute of Standards and Technology's Expert Panel on Community Resilience](#) that is open to public participation.
- **Volunteer.** Local planning commissions, building commissions, and emergency management offices are entry points to cross-sector dialogue.
- **Advocate.** Learn more and talk with others: colleagues, clients, and your community. The challenge is complex, but with creative minds, coordinated efforts, and dedicated engagement, we can design a better future.





# Participants

Thank you for joining the AIA 2015 Resilience Summit Working Session

## Participants

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# Appendix

## AIA Resilience program materials

- Understanding Resilience
- Qualities of Resilience
- A Framework for Resilience
- Resilience to Adaptation

# Understanding Resilience

Buildings and communities are subjected to destructive forces from fire, storms, earthquakes, flooding, and even intentional attack. The challenges facing the built environment are evolving with climate change, environmental degradation, and population growth. Architects have a responsibility to design a resilient environment that can more successfully adapt to natural conditions and that can more readily absorb and recover from adverse events. The AIA supports policies, programs, and practices that promote adaptable and resilient buildings and communities.

**1.**

## **Hazard:** poses a threat to safety

Hazards such as hurricanes, tsunamis, earthquakes, tornadoes, blizzards, drought, and wildfires are responsible for injury, death, and property damage as well as social and economic disruption. These events are no longer a one-off, once in a lifetime event; particularly when we look at the impacts of climate change.

**2.**

## **Risk:** quantifies hazard threat

Risk defines the likelihood of occurrence and intensity of the hazard. Determining the level of “acceptable risk” is critical to designing for the associated level of building performance. It is important to ask: What is the projected lifespan of the building? What are the building’s critical functional requirements before, during, and after a hazard strikes? And how long is it acceptable for the building to be out of service due to the impacts of a hazard?

**3.**

## **Vulnerability:** personalizes risk

Vulnerability assesses the capabilities and interdependencies of individuals and communities associated with risk. A resilient building in a vulnerable community isn’t truly resilient. Infrastructure, utilities, food supply and services are all necessary for adequate functionality.

## **Mitigation:** reducing negative impact

Mitigation measures are often developed in accordance with lessons learned from prior incidents. Measures may include zoning and building codes or floodplain buyouts as well as efforts to educate governments, businesses, and the public on measures they can take to reduce loss and injury. Mitigation is most successful when policies and decision-making support appropriate development, land use, site selection, and adoption of model building codes.

## **Resilience:** inherent durability or flexibility

When working within the built environment, it’s important to have foresight: incorporating changing environmental, social, and economic conditions into projects. This requires designs that are tough as well as flexible; providing the ability to not only bounce back, but forward.

## **Adaptation:** accommodating needs throughout service life

Hazards aren’t the only threat. It is critical to acknowledge the changing conditions in the physical, economic and social environment as well. Communities are ultimately successful when they are adaptable to change.

# Qualities of Resilience



## OVERARCHING QUALITIES//

**ADAPTABLE:** Design to accommodate changing environmental and social conditions by utilizing data and research for the service life of the building

**REGENERATIVE:** reduce demand on fossil fuels and infrastructure systems, regenerate natural resources and improve air quality

**REDUNDANT:** Integrate duplicative systems that can support the operation of a structure for the well-being of occupants and reduce other negative impacts should a disruption or failure occur.

**FLEXIBLE:** Position infrastructure and buildings to be adaptive to changing needs

**RECOGNIZES INHERENT INTERDEPENDENCIES**  
Utilize a systems approach to address the building, site, and community holistically; avoiding maladaptation

**PRIDE of PLACE:** Create a space that provides social, environmental, and economic benefits to the community year round.

**PREPARED:** Building social capital with staff, occupants, and neighbors improves social resilience. Implement redundancy in routine systems and supplies. Strive for self-sufficient individuals, communities, and buildings.

**DESIGNED for its FULL LIFE CYCLE:** Balance first costs and long-term value of the intended service life in the decision-making process for total value

## DESIGN ATTRIBUTES//

**ADDRESSES RISKS:** a vulnerability assessment informs the design process. emergency preparations are made and maintained, and staff and occupants are trained in emergency procedures.

**SMART SITE SELECTION:** some locations and orientations are safer or more problematic than others- a resilient building in a non-resilient community isn't resilient

**of LOCAL PLACE:** design strategies address localized risks and opportunities

**STRIVES for SELF-SUFFICIENCY:**  
Individuals, buildings, and communities can meet their own vital needs without depending on institutionalized systems

**SAFE and SECURE:** Provides for physical protection and mental comfort from acute shocks and daily stresses

**DURABLE and ACCESSIBLE:** Can withstand the impacts of identified hazards while remaining physically functional and socially approachable

**MINIMIZES NEGATIVE IMPACTS:** Design strategies successfully mitigate risk without compromising the integrity of dependent systems

**MAINTAINABLE/SERVICEABLE:** Design provides for maintenance access and regular improvements to building systems and envelope

**LOW CARBON:** Building systems, materials, and construction methods limit greenhouse gas emissions

**MAXIMIZES DAYLIGHTING:** Optimizes natural light without compromising thermal comfort or harsh glare and provides access and views to green space.

**USES QUALITY MATERIALS:** Materials contribute to a healthy environment and are long-lasting and are made of rapidly renewable resources

**CRADLE to CRADLE:** Materials, systems, and products are part of a closed-loop system that does not produce any waste

# RESILIENCE



The AIA is committed to creating safe, secure, and resilient communities. We provide our members with advocacy, research, and training tools to engage in all phases of disaster mitigation, response, recovery, and adaptation.

## FRAMEWORK FOR COMMUNITY RESILIENCE //



Education of Architects



Component Innovation & Support



Communications



Practice Based Research



Policy-Focused Resources



Partnerships

- Issue Brief: [The Safe Building Code Incentive Act](#)
- [Safety Assessment Program Training](#) for Post-Disaster Building Safety Evaluations
- [Hurriplan](#): a FEMA Certified course on Resilient Building Design for Coastal Communities
- [Resilience to Adaptation](#): The crucible for an ethical practice in architecture
- Resilience Building Coalition: [Industry Statement on Resilience](#)

## THE ARCHITECT + THE DISASTER CYCLE //

### Response

“Rapid” Building Safety Assessments

Policy recommendations

Permitting Assistance

### Preparedness

Building Performance Analysis

Business Continuity Plan

Vulnerability Assessment

### Recovery

Community and Land-Use Planning

Detailed Building Assessments

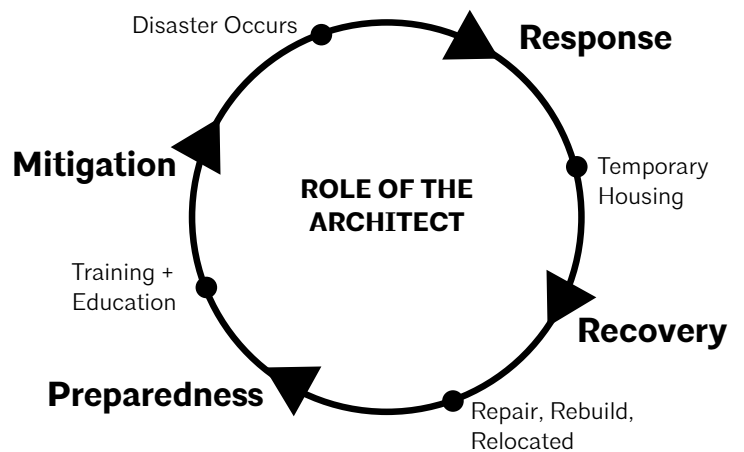
Transitional Housing

### Mitigation

Building Code and Land Use Updates

Design Innovation

Renovations & Retrofits



## AIA POSITION STATEMENT ON RESILIENCE//

*Buildings and communities are subjected to destructive forces from fire, storms, earthquakes, flooding, and even intentional attack. The challenges facing the built environment are evolving with climate change, environmental degradation, and population growth. Architects have a responsibility to design a resilient environment that can more successfully adapt to natural conditions and that can more readily absorb and recover from adverse events. The AIA supports policies, programs, and practices that promote adaptable and resilient buildings and communities.*

AIA FEATURE

# Resilience to Adaptation

The crucible for an ethical practice in architecture.

By [RACHEL MINNERY, FAIA](#)

[Published in the AIA pages of Architect Magazine \(July 2015\)](#)

Climate change may still be a political hot potato, but the scientific community is almost unanimously on the same page: It is real, and it is already impacting our planet. The 21st century has already seen 14 of the 15 hottest years since record-taking began in the U.S. in the mid-19th century. As President Obama stated in an [April radio address](#), “Climate change can no longer be ignored [and] 2014 was the planet’s warmest year on record.”

We cannot ignore extreme temperatures any more than we can ignore precipitation that has intensified in recent years. We cannot deny imperiled air quality any more than we can deny the increased severity of hazardous weather-related events. However, it isn’t just rhetoric, as the administration has implemented a wide range of regulations and policies which require federal agencies to include climate change risks and impacts in their deliberations. When the leader of the free world has made this a priority and matter of national security, we can be sure that the presidential directives and executive orders will have a ripple effect on the codes and regulations that architects will utilize.

While we may yet be unable to calculate with pinpoint accuracy the long-term effects of climate change, it is clear that, in the short-term, a paradigm shift among professionals designing for the built environment is necessary. Indeed, a swelling global population and rapid

urbanization are placing greater pressures on an aging infrastructure in many quarters. By 2050, global demand for water is projected to increase by 55 percent. By 2035, global demand for energy will increase by 35 percent.

Climatologists have been Malthusian about pointing out that our natural resources—oil, freshwater, nutrient-rich soil—may be depleted to an unsustainable level for the future global population. And food scarcity is not just about an immediate lack of food; it's also about the impossibility of growing more food in overworked soil—and that's assuming the required agricultural land has not been developed or otherwise taken over.

The Rockefeller Foundation's [100 Resilient Cities](#) (100RC) initiative refers to these profound shifts—economic, social, and environmental—as acute “shocks” and chronic “stresses.” Natural disasters are the shocks to a system, and the stresses are the daily pressures or barriers that prevent communities and individuals from thriving. In a natural disaster, these stresses can be the difference between those who recover and those who suffer.

Cities are systems, so it is important to view all issues, understand their interdependencies, and make decisions that do not harm the other components. To attract investment and development, cities sometimes have to hide or deny their vulnerabilities. So 100RC asks communities to name vulnerabilities and seek support to identify solutions that allow cities to respond and adapt. Resilient design strives for environmental, social, and economic sustainability with the ability to adapt to known



and unknown risks and vulnerabilities. Community problems require community-based solutions. Applying creative systems-thinking in design innovation can result in thriving and sustainable communities that allow both people and the planet to prosper.

If the sustainability movement of the last 45 years taught all of us to reduce/reuse/recycle—to tighten our belts, as it were—then resilience calls for a belt-and-suspenders approach. In our effort to be more resilient as individuals, families, businesses, and communities, architects will need to carefully plan buildings, select products, and design systems that are easily adaptable to changing needs, holistic in acknowledging adjacencies and regional impacts, and finally see the environment as their client inasmuch as they see their paying patron as their client.

What, then, does adaptability look like? Do we build structures that are temporary or permanent? Robust or lightweight? Rigid or flexible? Are these structures to be designed based on historical data or future models?

### **Resilience: A Principled Approach**

Before we can define adaptability, we have to look at the term “resilience” as an area of study that was born out of ecology and, at its core, holds the mandate for architects promoting it to solve problems without creating new ones. Indeed, its scientific definition is the ability of a substance or object to spring back into shape after suffering a trauma.

It's about elasticity, an innate quality of adaptability, and the connection to architecture is twofold. First, resilience means designing adaptable structures that can “learn” from their environments and sustain life, even in the face of disaster. Second, resilience means architects can learn from their buildings and deploy evermore-refined designs. Third, resilience means involving people directly in the design and creation of strong and inclusive cities.

These two objectives are accomplished by talking to experts outside of architecture, by coordinating with dozens of agencies and partners, and by modeling and analyzing project performance—so that if there's any surprise at all down the line, it has to do with better-than-projected outcomes rather than worse-than-projected outcomes.

The development of the Toyota Prius (first available in Japan in 1997) is an example of this feedback loop. With successive models, Toyota managed to gradually increase the number of miles-per-gallon for its 1.5-liter engines, even after switching to a standard 1.8-liter engine. Overall, it was a positive evolution—with a twist: Hybrid cars like the Prius run so silently that they pose a risk for pedestrians. As reported by [Paul Collins in Slate](#) in 2012, some automakers are thinking of ways to make gas-sippers at least sound more like gas-guzzlers for that audible signal in an intersection. In this sense, an innovation can also be a new problem when created in isolation.

In other words, resilience and adaptation don't always unfold in a straight line. It is a process. Architecture relies on the capacity of architects to embody what Robert Venturi, FAIA, called “messy vitality.”

Messiness aside, architects need a set of principles for resilience and adaptation—prescriptive guidelines that address practice, business, and how the AIA may contribute to an emerging framework to not only define the concept for practitioners but also for the public.

“Resilience is fundamentally about the elasticity of a building, a community, or, more generically, a host to revert to the full operations of the status quo,” says Jesse M. Keenan, the research director for Columbia University’s [Center for Urban Real Estate](#). “Adaptation is about a transformation to alternative domains of operations, which in one application means we must design, produce, and consume the built environment differently than we do now as we flexibly respond to the uncertainty associated with climate change.” Keenan argues that resilience is best thought to be a response to extreme weather events, maintaining the status quo through recovery and a reduction in vulnerability; however, “with long-term climate change, we will have no other option other than to adapt.”

If architects can all start moving in the same direction, then a natural evolution of resilience and adaptation will occur in terms of technical specificity. And as our environment shifts and changes—for better or for worse—then that evolution in thinking will become more vital than ever. What follows are principles that may serve as the foundation for an emerging value system which imparts new professional ethical obligations.

## **Principles of Resilience**

1. Discuss and incorporate resilience measures during predevelopment, programming, and planning phases so as to think across scales in regards to the passive ability of a building to operate in the face of extreme events. Mitigation planning includes six steps:

- Identify hazards
- Assess vulnerabilities
- Analyze impacts
- Modify programming with desired outcomes
- Create performance targets
- Design and implement; measure and evaluate

2. Think about how resilient interventions can create value in terms of the underwriting of building operations and in terms of mitigating harm to users and communities.

3. Balance first costs and long-term value over the intended service life in the decision-making process for total value. Position resilient interventions to provide co-benefits which might also serve sustainability and mitigation ends.

4. Pursue a multiscale ecological systems approach through an integrated, multidisciplinary process to problem-solving.

5. Communicate to clients and building users about hazards, climate and extreme weather events that fall outside of historical precedent and build social resiliency between owners, operators and users. Implement some redundancy in daily systems and supplies, and have your emergency preparedness kit with you. Strive for self-sufficient individuals, communities, and buildings.

## **Principles of Adaptation**

1. Because current practices may not be effective in solving future problems, architecture should be designed to have the capacity to accommodate changing environmental and social conditions within a building's useful life. Utilize data and research on hazard and climate projections to perform risk and vulnerability assessments.
2. Develop systems of intelligence within buildings and owners to measure incremental changes in environmental and human conditions, which are often indirect to the impacts of climate change.
3. Strive for design that aligns life cycle assessment with potential periods of uncertainty. (Consider how buildings can facilitate regeneration of natural resources and improve air quality.)
4. Position resilient infrastructure and buildings to be able to become adaptive through incremental capital investment and accretive physical interventions.
5. Acknowledge that some standards and techniques may be obsolete with the advent of climate change.

## **Principles of Climate Change**

1. Identify and discuss effective development and land use policies that protect individuals, build the economy, and enrich communities and the environment.

2. Advocate for the adoption of model building codes. In the permitting process, strive to streamline design review and approval processes so innovation is not synonymous with delay.
3. Identify and advocate for incentives for resilient design, construction, and operations.
4. Identify and develop public and professional networks which serve as resources for promoting social resiliency.
5. Promote small scalable prototypes and experiments which lead to scalable innovations which offset the costs of climate change.

*For more on the AIA's resilience efforts, visit [aia.org/resilience](https://www.aia.org/resilience).*

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This report supplement was prepared by Rachel Minnery FAIA, and Lindsay Brugger, AIA of the American Institute of Architects.

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