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April 17, 2018

Assemblymember Adam C. Gray
Chair, Governmental Organization Committee
California General Assembly – Legislative Office Building
1020 N Street, Room 156
Sacramento, CA 95814

RE: Support AB 2681 on seismic safety for potentially vulnerable buildings

Dear Assemblymember Gray:

On behalf of the U.S. Green Building Council (USGBC), a non-profit organization with 12,000+ member companies nationwide, and our strong community in California,¹ we thank you for your leadership of the Assembly Governmental Organization Committee and for your consideration of this important bill. USGBC is committed to transforming the way all buildings and communities are designed, built and operated through high-performance, cost-effective, green buildings that save energy, water and money. See **attached** brief for more about USGBC and our work in California.

USGBC urges your support for AB 2681. If adopted, the bill would go far to more comprehensively identify the set of California buildings with the most potential vulnerability to seismic events, establish processes to address these buildings' safety risks with the help of licensed professional engineers and, ultimately, fund both the building retrofits and the associated costs to local governments to enforce the law.

Beyond-code green building rating systems like LEED are designed to work as a complement to building codes and standards that establish fundamental protections for public health, safety and general welfare. Earthquakes and seismic events in California pose serious threats to health, safety, the economy and the environment. To protect California residents, businesses, and taxpayers from these compounding risks, seismic risk to buildings should be carefully and comprehensively understood and addressed for all occupancies. It is imperative that California buildings stand tall in the face of these unfortunately predictable events.

Green building is both a way of thinking and also a range of healthier, more efficient, more resilient, and more valuable outcomes that can be achieved in our buildings through thoughtful, integrated, and intentional design, materials, and methods. Before attempting beyond-code measures in energy savings, water efficiency, CO2 emissions reduction, improved indoor environmental quality, or stewardship of resources and sensitivity to their impacts, green buildings have always required compliance with baseline codes in any jurisdiction.²

¹ Learn more about USGBC in California through our several local communities in [Northern California](#); [Redwood Empire](#); [Central California](#); [California Central Coast](#); [Los Angeles](#); [Orange County](#); and [San Diego](#).

² For more information, see USGBC's white paper: "[Greening the Codes: Building Codes Begin to Broaden Their Charge to Include Human and Environmental Impacts of Buildings into Their Health and Safety Mission.](#)"



In California, these minimum requirements for buildings now also include many elements of sustainability that are incorporated throughout state and local laws, reflecting an evolving expectation for better, greener buildings.³ By contrast, the expectation for sturdy buildings that can withstand predictable seismic events has remained constant and must be prioritized if we are to maintain the sustainability benefits that are being designed and built into California's new and existing buildings.

Codes provide an important means to reduce risks to an acceptable level. By themselves, however, neither codes nor public inventories of potentially vulnerable buildings can eliminate all potential building-related hazards. There is a shared role for the construction industry – including building owners and operators, licensed professionals and the code enforcement community – that requires diligence, commitment and a common recognition that not all hazards related to the built environment are tied to acute building failures or cataclysmic events. Indeed, we must certainly manage for acute, long-term, and cumulative risks if we are to ensure a truly sustainable future.

USGBC has expanded its work on resilience to more directly address risks and opportunities posed by human-caused and natural hazards, including earthquakes. Through an expanding suite of measurement and certification tools, USGBC and GBCI can help governments and the private sector ensure that resilience outcomes are prioritized and delivered.

LEED Rewards Enhanced Resilience in Buildings and Communities

USGBC is perhaps best known as the developer of the [Leadership in Energy and Environmental Design \(LEED\)](#) green building rating system, administered by USGBC and our sister organization, Green Business Certification, Inc. (GBCI). LEED is the industry standard in green building and is demonstrated to reduce energy consumption and related costs for families, businesses, and taxpayers. LEED anchors a \$300 billion dollar green construction industry in the U.S. that's estimated to employ approximately 3 million Americans.

LEED requires, rewards, and inspires project teams to incorporate systems thinking into every project, enabling informed decisions that manage for a wide range of risks and opportunities. The [LEED Climate Resilience Screening Tool](#) evaluates the resilience potential of each LEED credit, demonstrating potential vulnerabilities and adaptation opportunities. For example, LEED v4 requires all certified projects to avoid floodplains, and offers credit for [assessing site conditions](#) to evaluate more sustainable options for site design, among many others.

³ USGBC recently announced significant [streamlining](#) of all LEED v4 prerequisites and up to six credits when projects built to California's building codes seek LEED certification. An 50 additional points are within reach via LEED credits that exceed code minimums but are complementary to state requirements. While at least 40 points are needed to earn LEED certification, California's green codes support LEED better than ever.



A 2018 study by the University of Texas at San Antonio focused on how LEED v4: New Construction (NC) specifically addresses building resilience. The research identified 14 types of natural disasters relevant to the built environment, and then analyzed how LEED v4 credit requirements enhance building resilience against these adversities. The study concluded that 64.8% of all LEED v4 credits contribute to increased resilience against flooding, and that 63% of LEED v4 credits enhance resilience to hurricanes or typhoons.⁴ By offering flexible credit-based solutions, LEED inherently addresses challenges faced by projects in withstanding and recovering from natural disasters through greater resilience.

USGBC's [Profiles of Resilience: LEED in Practice](#) (also **attached**) explores several examples of LEED-certified buildings that have demonstrated exceptional resilience.

USGBC Invests in Tools Supporting Resilient Buildings and Communities

Throughout recent years, USGBC and GBCI have expanded their suite of programs by building and integrating additional rating systems that guide, measure and validate sustainability and resilience in built infrastructure. Resilience is a core component of many of these programs, including:

- [Performance Excellence in Electricity Renewal \(PEER\)](#) for enhanced resilience, sustainability, governance, and performance in power systems, microgrids, and utilities;
- The [RELi Resilience Rating System \(RELi\)](#) for resilience assessment and planning for acute hazards (including seismic events), preparedness to mitigate against them, and designing and constructing for passive survivability.
- The [Sustainable Sites Initiative \("SITES"\)](#) for enhanced sustainability and resilience in lands and landscapes;
- The [Global Real Estate Sustainability Benchmark \(GRESB\)](#), for real estate portfolios, companies and funds; and also for infrastructure projects and investors – each now including a [resilience evaluation](#);
- The [STAR Communities Rating System \(STAR\)](#) for tracking social, economic, and environmental progress in cities, including resilience; and

For more information, see USGBC's brief: [Resilient by Design: USGBC Offers Sustainability Tools for Enhance Resilience](#) (also **attached**).

On behalf of our member organizations and credentialed professionals in California, **USGBC wishes to express its strong support for AB 2681.**

USGBC members and partners look forward to working with the State of California to ensure that all buildings are safe and strong, and also meet a high bar of sustainability performance for all California citizens, businesses and the environment.

⁴ Langar, Sandeep and Suchismita Bhattacharjee. "[Focus of Resilience Within Building Rating Systems \(BRS\) LEED 4.0 Review.](#)" University of Texas at San Antonio. January, 2018.



Please do not hesitate to contact us if you have any questions or wish to discuss this issue further.

Sincerely,

Jennifer Gunby

Jennifer Gunby
Manager, State & Local Advocacy
U.S. Green Building Council
jgunby@usgbc.org

A handwritten signature in black ink, appearing to read "Jeremy Sigmon".

Jeremy Sigmon
Director, Technical Policy
U.S. Green Building Council
jsigmon@usgbc.org

CC: Assemblymember Adrin Nazarian, bill author, District 46

Attachments:

- USGBC in California
- Profiles of Resilience: LEED in Practice
- Resilient by Design: USGBC Offers Sustainability Tools for Enhance Resilience



A PROSPEROUS, HEALTHY AND SUSTAINABLE FUTURE

ABOUT USGBC

The U.S. Green Building Council (USGBC®) is committed to a prosperous and sustainable future through cost-efficient and energy-saving green buildings.

USGBC works toward its mission of market transformation through its LEED® green building program, robust educational offerings, an international network of local community leaders, the annual Greenbuild International Conference & Expo, the Center for Green Schools and advocacy in support of public policy that encourages and enables green buildings and communities.

LEED, or Leadership in Energy and Environmental Design, is a green building certification program that provides a framework for identifying and implementing practical and measurable green building strategies for all building types from commercial buildings to entire communities. Research finds that LEED-certified spaces use less energy, save money for families, businesses and taxpayers, reduce carbon emissions, and contribute to a healthier environment for residents, workers and the larger community.

LEED has transformed how the building industry and the public consider sustainability in real estate. The most recent update to LEED, known as LEED v4, is the new standard for high-performance green buildings worldwide.

USGBC and LEED continue to expand as the green building industry continues to grow. According to the Dodge Data & Analytics *World Green Building Trends 2016 SmartMarket Report*, the global green building sector will double every three years, contributing millions of dollars to the state, national and global economy.

LEED-CERTIFIED BUILDINGS' IMPACT

To date, there are more than 38,600 LEED-certified commercial projects worldwide, comprising more than **6 billion square feet** of construction space across all 50 states and 165 countries and territories. In addition, there are more than 350,000 LEED-certified residential units.

Between 2015 and 2018, LEED-certified buildings in the United States are estimated to generate **\$1.2 billion in energy savings, \$149.5 million in water savings, \$715.2 million in maintenance savings and \$54.2 million in waste savings.**



“LEED is a powerful economic development tool for revitalizing and advancing sustainable communities. Buildings, homes, schools, warehouses, infrastructure development and even entire cities are realizing their potential through green building and LEED.”

—MAHESH RAMANUJAM
PRESIDENT AND CEO, USGBC AND GBCI



USGBC IN CALIFORNIA: COMMUNITIES LEAD BY BUILDING GREEN



USGBC is driving education, advocacy, and services to keep green building growing in California. Bold new partnerships, education workshops, service activities and annual conferences are facilitating innovation, spurring industry growth and spreading green building industry knowledge across the state.

Our community's signature events include GreenerBuilder (statewide), the Water Conservation Showcase (SF), the Municipal Green Building Conference & Expo (LA), and annual meetings in USGBC's communities across the state. California regularly hosts Greenbuild, USGBC's trademark event that brings together professionals from all over the world in the green building industry.

GREEN BUILDING JOBS AND IMPACT

Government leadership and policy initiatives play a critical role in the fast growing green economy by investing in responsible practices and creating conditions that spur market activity. California is a national leader in its commitments to green public buildings (including state universities), enacting bold policies that address climate, energy performance, and sustainability finance. In addition to the statewide CALGreen building code, dozens of local governments promote leadership with LEED in municipal

policies and initiatives.

As the 8th largest economy in the world, California's decisions matter—and so do its green buildings. The state's annual construction spending is valued at more than \$50 billion annually, greater than 10% of the U.S. total. USGBC is deeply engaged in ensuring green building successes statewide.

Green construction in California will support more than **1 million jobs**, contribute **\$91.22 billion** to GDP, and provide **\$60.59 billion** in wages between 2015-2018. The LEED rating system's economic impact on green construction in California is substantial, projected to **employ 668,000 people**, contribute **\$58.4 billion** to GDP and **\$39.15 billion** in wages during this time period.

LEED can be a useful tool for governments to work towards their own adopted goals around energy, sustainability, resilience and/or climate change. An array of federal, state and local bodies reference LEED as a core element of their green building policies. With LEED v4, governments can expect an ever higher performance—along with more flexibility.

Working together, we can advance the sustainability goals of our members and the well being of all Californians. We look forward to working with you.

CALIFORNIA BY THE NUMBERS

(As of August 2017)

4,800+

Certified Commercial Projects

679+ million

Certified Commercial Square Feet, the most in the country

46,000+

Certified Residential Units

12,000+ member companies nationwide, many of which are in California.

Represented in CA by local communities and chapters in every corner of the state comprising thousands of individual members.

USGBC Communities in California:

Northern California, Redwood Empire, Central California, California Central Coast, Los Angeles, Orange County and San Diego



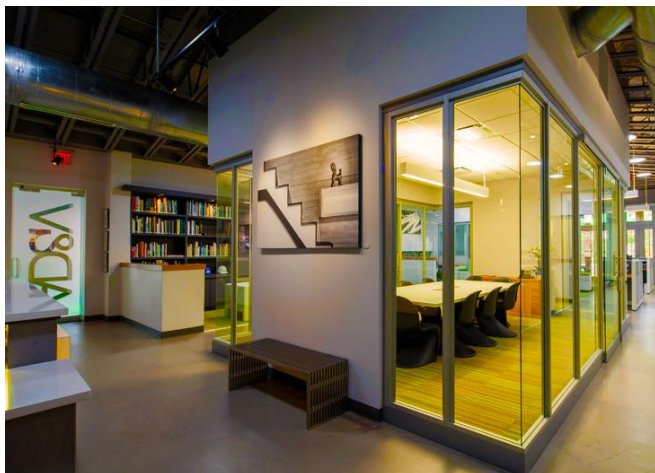
PROFILES OF RESILIENCE: LEED IN PRACTICE

As part of our commitment to building a more resilient future for the built environment, USGBC defines resilience as “**the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.**” To meet this goal, USGBC is driving [resilience](#) in more ways than one by making buildings more sustainable, durable, and functional through the application of LEED. Through integrative design and key credits, LEED guides project teams to invest in climate adaptation strategies to enhance building and community resilience.

This brief dives into several examples of LEED-certified buildings that have been tested and have demonstrated exceptional resilience. These LEED project teams attest that the LEED process – including purposeful design and third-party validation – has helped these projects achieve critical resilience outcomes.

ÁLVAREZ-DÍAZ & VILLALÓN OFFICES SAN JUAN, PUERTO RICO

Originally built in the early twentieth century, the building that is home to the offices of Álvarez-Díaz & Villalón (AD&V) was [renovated](#) in 2013 to maximize sustainability and resilience. In 2014, the AD&V offices became the first architecture and interior design firm in Latin America to earn [LEED Platinum](#) certification. The resilient features of both the office space and the building at large (outlined below), contributed to its quick recovery from Hurricane Maria in 2017.



AD&V Offices

FEATURES

AD&V recognized that, as architects and designers who put [sustainability](#) into practice, they had a responsibility to “walk the walk” as well. To do so, the firm committed to implement green features and practices in their own offices by pursuing LEED

certification. Each energy conservation measure (ECM) implemented as part of the project’s renovation helped contribute to overall greater efficiency, cost savings, and a shorter period required to restore building operations.



AD&V Offices

Following the devastation of Hurricane Maria, the AD&V office space returned to a fully functional work space within a few days, a feat not typical in the area at the time. Because of this quick recovery, the office also served as a community gathering place and a temporary command center. Critical features include:

- A back-up power generator and satellite internet reduce reliance on ground infrastructure, which was heavily damaged following the storm.
- Air conditioning units with 20 SEER rating minimizes energy consumption, thus facilitating running cooling operations off the generator.
- Solar tube lighting enables people to work without the need for electricity by using natural light.
- Lighting control systems minimize energy use helping reduce the load on the generator.
- A rainwater cistern allows occupants access to running water when municipal systems are compromised.
- Location in a dense area of the city enables many workers to walk to work or use non-motorized transport when vehicles are compromised.

These features not only helped fortify the AD&V offices to serve a makeshift shelter for employees during the recovery but also broadcast a beacon of hope to the community that more resilient buildings could solve many of the problems in the wake of the hurricane.

At Greenbuild 2017, Founder and Principal of AD&V Ricardo Álvarez-Díaz recounted stories of his offices' immediate recovery, while also stressing the importance of resilience in particular in rebuilding efforts. As devastating as it has been, the hurricane may help prioritize resilience in the long-run, he argued. "In a way, sometimes when things like this happen, it is a great opportunity for us to look within ourselves and actually do things better... not only to save money and energy, but because you can create a better quality of life for you and your family."

For more details, check out the project's LEED credit [scorecard](#).

SILVER STAR APARTMENTS LOS ANGELES, CALIFORNIA

This 49-unit apartment building was completed in 2017, achieving LEED Platinum certification. The development also earned the distinction of being the first Zero Net Energy multi-family affordable housing project in Los Angeles. [Silver Star Apartments](#) fully serves veterans with disabilities or those who were previously homeless. The project's physical resilience and reliability can serve as a consistent, beneficial environment for its residents, as well as contributing to the social resilience of the neighborhood and city.



Silver Star Apartments courtyard, photo credit Natalia Knezevic Photography

FEATURES

Silver Star is a prime example of how high-performance buildings can be achieved within budget and with the resilience-enhancing features necessary to properly serve its residents. This Zero Net Energy [project](#) exhibits social resilience by accommodating many of its residents' unique physical needs, while also supporting their individuals returning to civilian life. The project also provides an

overall welcoming, community-centric environment. The project achieves high levels of efficiency while also addressing the unique needs of its occupants:

- First commercial on-site greywater system for indoor use in the City of Los Angeles, offsetting irrigation demand and allowing for indoor usage of recycled non-potable water.
- Passive solar design and thoughtful building orientation utilizes natural light and reduces need for artificial light sources.
- Photovoltaic system offsets 105% of all site energy use, and enhances project resilience by providing backup power to the community room in the event if power from the grid is lost.
- Publicly accessible herb garden at the street front and edible landscaping throughout the site promotes healthy eating and sustainable practices.

The project's greywater system is expected to reduce on-site potable water demand by 40%, saving around 700,000 gallons of water each year. Varied outdoor spaces and naturally flowing indoor areas promote healthy lifestyles and a sense of community.



Silver Star Apartments community room, photo credit Natalia Knezevic

The Silver Star Apartments project was designed and built on the [premise](#) that integrated supportive services along with permanent affordable housing is the most effective way to reduce homelessness, promote wellness, support recovery, and build individual resilience among its residents.

COLD CLIMATE HOUSING RESEARCH CENTER'S RESEARCH AND TESTING FACILITY

FAIRBANKS, ALASKA

Located on the campus of the University of Alaska Fairbanks, this project is the world's northernmost [LEED Platinum](#) commercial building. The Cold Climate Housing Research Center's Research and Testing Facility (RTF) [building](#) is a living laboratory for building technologies for use in circumpolar regions around the world.



CCHRC Research and Testing Facility

FEATURES

The 22,000 square foot building provides office and laboratory space for building energy research, product testing, and also hosts a classroom, library, and meeting space. The RTF is resilient to the effects of extreme subarctic temperatures, exhibited by certain features inspired by the LEED certification process:

- Adjustable foundation enables building to adjust to effects of permafrost.
- Ground source heat pump transfers energy from the earth for heating purposes.
- Two [solar thermal](#) storage systems are self-regulating and heat water for the building, including during a power outage, helping to offset energy demand and related emissions.
- More than 400 [sensors](#) throughout the RTF enable monitoring of building system operations and performance
- [Rainwater](#) is caught from the roof and stored in two 2,500 gallon storage tanks in the basement, to operate all toilets and the fire sprinkler system. This system has also allowed the University of Alaska to study the corrosive potential of the rainwater on plumbing systems.

The RTF research team is able to research and develop tactics to exhibit resilience to the effects of cold weather – and doing so within a building that demonstrates the effectiveness of many of these features.

For more information, see the project's LEED credit [scorecard](#).

GAF HEADQUARTERS BUILDING

PARSIPPANY, NEW JERSEY

In 2016, GAF's headquarters building was the first building in the world to earn a LEED pilot credit for resilient design. North America's largest roofing manufacturer, GAF ensured that its [LEED certified](#) facility in Parsippany, New Jersey would be resilient in the event of an emergency. Previously offered for a limited time (and now being incorporated into the RELi resilience standard in partnership with USGBC), this pilot credit (IPpc98) required a pre-design hazard assessment, including identification of and specific assessment requirements for potential natural hazards, such as flooding, tornados, high winds, and earthquakes.



GAF Headquarters Building

FEATURES

For this project, GAF wanted to ensure the building's resilience in the event of a severe hurricane, like what the area experienced following Hurricane Sandy in 2012. Some of the project's features contributed to its hurricane-readiness:

- Flood preparation and backup capabilities allow operations to continue during long-term outages.
- Roof exceeds local code requirements, meeting FEMA Wind Zone II velocities.
- Site selection process included assessment of floodway mapping of roads for a complete look at all flood-prone areas.
- GAF's Business Continuity Disaster Recovery Plan details chains-of-command, POCs, departments, and contact information to access in the event of a disaster event. This implemented plan exceeds LEED pilot credit requirements.

Each of these resilience-enhancing features helped the GAF Global Headquarters earn the LEED pilot credit(s) on resilient design, and ensure both the facility and the company stand strong in the face of a future storm.

For more details, check out the project's LEED credit [scorecard](#).

RESILIENT BY DESIGN: USGBC OFFERS SUSTAINABILITY TOOLS FOR ENHANCED RESILIENCE



USGBC is committed to transforming the way communities are designed, built, and operated by harnessing market forces that can drive widespread uptake of green building practice. Resilience is a clear extension of this work, since more sustainable buildings are the first step to more resilient communities.

In order to meet standards required by LEED, projects must adhere to rigorous criteria for sustainability and efficiency. This feat favorably positions them to maximize their overall resilience as well. USGBC's brief [Profiles of Resilience: LEED in Practice](#) explores several diverse examples of LEED-certified buildings that have demonstrated exceptional resilience.



*Silver Star Apartments, Los Angeles CA
Photo credit Natalia Knezevic Photography*

Through LEED and other programs and initiatives, USGBC promotes and advocates for principles of design, construction, operation, and maintenance that address and emphasize resilience in buildings, landscapes, power systems, and communities. Beyond sustainability, green building and infrastructure certifications are driving resilience-enhancing designs, technologies, materials and methods.

Green buildings often include practices such as the use of durable materials, thoughtful site selection, rainwater collection, demand response, grid islanding, maximal energy efficiency, on-site renewable energy generation, and more. Green buildings can form the cornerstone of more resilient communities and deliver significant benefits. A 2018 National Institute of Building Sciences (NIBS) study found that each \$1 spent on mitigation activities - such as strengthening buildings and improving drainage conditions - saves \$6 in response and recovery costs.¹

DEFINING RESILIENCE

In a joint building industry statement on resilience in 2014, USGBC and partners [committed](#) and continue to [re-commit](#) to build a more resilient future. These leading organizations define resilience as “the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events.”²

Through the lens of USGBC's and GBCI's rating systems that offer metrics-based approaches to assessing resilience and measuring impact, USGBC further finds that resilience means:

- Proactive design, planning and construction for reasonably expected natural disasters to incur minimal damage
- Creation and execution of a site development plan that promotes healthy vegetation, soils, and aquatic ecosystems to provide ecosystem services such as flood control
- Design, building, and maintaining of the project site and adjacent landscapes to reduce risk of wildfire
- Support for community recovery during catastrophic events and extended bulk power grid outages by enabling islanding and power reliability to essential services and passive survivability in built structures

RESILIENCE ASSESSMENT & MEASUREMENT TOOLS

USGBC promotes the design, construction, and operation of resilient buildings and communities through programs, practice and policy, with a growing suite of market-facing leadership tools for just about any project.

The certification systems LEED, SITES, and PEER incorporate strategies with resilience outcomes, and the nascent RELi system focuses exclusively on the resilience of buildings and communities. Each empowers stakeholders to make conscious decisions that can help achieve resilience including facility longevity, ability to withstand extreme weather events, reducing energy and water dependence, while protecting public health, safety and the environment. The rating systems guide teams to measures that address opportunities for planning, mitigation, adaptation, response and recovery; certification to the rating systems ensures goals are realized.

¹ <https://www.nibs.org/news/381874/National-Institute-of-Building-Sciences-Issues-New-Report-on-the-Value-of-Mitigation.htm>

² http://aiad8.prod.acquia-sites.com/sites/default/files/2016-05/Res-StatementOnResilience_2.pdf



[LEED](#) is the gold standard for how buildings and communities are designed, constructed, maintained, and operated. LEED promotes resilience in these areas as well (see [LEED Climate Resilience Screening Tool](#)). The

tool evaluates the resilience potential of each LEED credit, demonstrating potential vulnerabilities and adaptation opportunities. For example, LEED v4 requires all certified projects to avoid floodplains, and offers credit for [assessing site conditions](#) to evaluate more sustainable options for site design, among many others.

A 2018 [study](#) by the University of Texas at San Antonio focused on how LEED v4: New Construction (NC) specifically addresses building resilience. The study, presented at the National Institute for Building Sciences (NIBS) Building Innovation [Conference](#), identified 14 types of natural disasters relevant to the built environment, and then analyzed how LEED v4 credit requirements enhance building resilience against these adversities. The study concluded that LEED v4 credits and prerequisites provide a multitude of opportunities to enhance resilience. By offering flexible credit-based solutions, LEED inherently addresses challenges faced by projects in withstanding and recovering from natural disasters through greater resilience.

UT Study charts LEED credits' nexus with resilience

Specific findings include:

- **64.8%** of all credits contribute to increased resilience against flooding, and
- **63%** of credits enhance resilience to hurricanes or typhoons.



The [RELi](#) resilience rating system is emerging as the new leadership benchmark for resilient buildings and neighborhoods. RELi focuses on resilience – including recovery – by means of requiring assessment and planning for acute hazards, preparedness to mitigate against them, and designing and constructing for

passive survivability. Specific requirements and credits include providing fundamental access to first aid, emergency supplies, water, food, and communications; planning and outreach to develop social cohesion,; and innovative adaptive design for resilient management of extreme weather events. In 2017, USGBC announced a new partnership with the Institute for Market Transformation to Sustainability to refine RELi and to synthesize or LEED's Resilient Design pilot credits with RELi's Hazard Mitigation and Adaptation credits. A new Resilience Steering Committee has already been established, and is working to lead these efforts.



[SITES](#) is the sustainable land development and management program that aims, in part, to “create regenerative systems and foster resiliency.” SITES accomplishes this by

deploying green infrastructure to provide ecosystem services, protect

and restore natural resources and mitigate the effects of natural disasters. SITES can be applied to landscapes of virtually any type, from building landscapes to public parks.

Because SITES was modeled after LEED, the system optimizes resilience efforts by enabling some projects to concurrently pursue both certifications. During the SITES pilot phase from 2010 to 2014, a third of the SITES-certified projects that participated also achieved LEED certification. This diverse set of projects – which included national and local parks, museums, commercial buildings, botanic gardens, and more – helped optimize the SITES program for projects pursuing LEED.

MICROGRID AND POWER SYSTEM RESILIENCE



[PEER](#) is the certification program that measures power system performance and electricity infrastructure, and aims to improve the sustainability, reliability, and resilience of these systems.

PEER can be applied to all types of power systems, and includes guidance for cities, utilities, campuses, and transit. The program evaluates improvements across the full range of electricity infrastructure from microgrids and smart grid development to the integration of renewables. PEER works to ensure resilient and reliable delivery of electricity, reduce emissions, improve safety and security, catalyze economic growth, and support green jobs. By working to drive sustainability in the electricity sector, PEER helps position power system workers and professionals for opportunities in renewable energy, energy efficiency, and clean technologies related to grid management.



The City of Hoboken, NJ applies both PEER and SITES to ensure resilience outcomes via a downtown microgrid and a park that serves as part of the city's seawall system.

Hoboken, N.J. recently developed a downtown [microgrid](#) in the wake of Superstorm Sandy and is pursuing PEER certification. This network is designed to be as green as possible, employing a

combination of solar power and cogeneration plants that produce heat and electricity. The microgrid will enable critical facilities to share power and communication networks during a mass power outage. This is crucial for Hoboken's residents, many of whom do not have cars and could not evacuate easily during a weather emergency.

COMMUNITY- AND PORTFOLIO-SCALE RESILIENCE

USGBC recognizes the value of incorporating resilience into specific projects, while also emphasizing resilience-enhancing practices on a larger scale. Pursuing resilience on a community or portfolio level can encourage greater collaboration among residents and property owners, thus collectively strengthening the overall survivability and functionality of multiple projects at the same time. USGBC has developed several tools to reinforce resilience-enhancing practices on a larger scale.

[LEED for Cities](#), available through the [Arc](#) performance platform, is a pilot certification program that supports continuous progress towards better cities. It provides cities with a framework for measuring and managing the performance of water consumption, energy use, human experience, waste and transportation on a city-wide level. LEED for Cities aims to empower cities with the tools they need to improve the quality of life of residents by adopting supporting policies to reduce energy usage and improve air and water quality.



The STAR Communities Rating System ([STAR](#)) is a framework and certification program for local sustainability, designed by and for local governments and administered by

[STAR Communities](#). STAR is used by cities and counties to track social, economic, and environmental progress, and is flexible in allowing communities to define what improved sustainability means for their jurisdictions. Developed in part from input from local leaders and experiences from STAR-certified communities, STAR developed its [Climate Change Guide](#), which serves as a resource for new climate action planning and existing efforts. In 2017, STAR and GBCI [formed](#) a partnership to further advance sustainability and resilience in cities around the globe by integrating STAR into LEED for Cities. This collaboration enables STAR to scale and offer valuable tools for communities of all sizes to implement resilience and sustainability strategies, while tracking performance and sharing that data with other participating communities.

For policymakers and executives seeking to establish policy frameworks, goals, and metrics to capture the benefits of sustainability and resilience, these tools can serve as an important foundation.

USGBC RESILIENCE ADVOCACY

For several years, USGBC's work on resilience was defined by our work on our response to Hurricane Katrina – including developing the [New Orleans Principles](#), the [Sustainability Guidelines for Gulf Coast Reconstruction](#), and placing a Green Schools Fellow in the city to assist with integrating sustainability into the recovery process, with dozens of schools having earned LEED certification (see [video](#), see [brief](#)). In parallel, USGBC also hosted a [national leadership speaker series](#) on resilience. These efforts paved the way for USGBC to examine resilience on a larger scale.

To further facilitate stakeholder information sharing and collaboration on resilience, USGBC hosts such events as the Resilient Cities Summit (ongoing since 2015)³ and focused learning sessions at the annual Greenbuild International Conference & Expo.⁴ These conferences allow representatives from the public and private sectors the chance to learn about how to better incorporate resilience tactics into policy and practice.

Specifically, the Resilient Cities Summit culminates with an annual [report](#) summarizing the discussion, findings, and themes, while also providing resources that can be used to achieve greater resilience.



Participants of the 2017 Resilient Cities Summit, held in Stowe, VT

When disaster strikes, immediate response typically falls to state and local governments, which has been driving an important focus on improving preparedness and infrastructure to be strong in the face of future events. To [better prepare](#) for at least the predictable shocks a community may expect to experience, it's important for communities to understand their risks and vulnerabilities and also the various resources that can help.

Of course, federal agencies and departments also play an important role for setting policy and delivering much-needed funding for planning and recovery. Importantly, Congress decides whether to fund these programs and at what levels. The 2018 NIBS Study found that over the past 23 years, Congressional funding for resilience, administered through multiple agencies, resulted in \$27 billion spent in mitigation grants that has yielded \$158 billion in societal savings.

USGBC has compiled all resilience-related resources in one place for those who wish to learn more. The learning pathway [The Road to Resilience](#) provides a comprehensive look at USGBC offered

³ <https://www.usgbc.org/resources/2017-resilient-cities-summit-report>

⁴ <http://www.usgbc.org/sites/default/files/GB-Resilience-sessions.pdf>

courses, policy briefs, articles, and some examples of how our rating systems support resilience strategies.

RESILIENCE AS A COMPREHENSIVE APPROACH TO INFRASTRUCTURE

It is well recognized that the most effective way to reduce risk is to build better and to incorporate mitigation in advance of disasters. A proactive approach can save money and protect lives.

When resilience risks are understood and handled in advance, resilience success can look as if nothing happened – effectively business as usual. But when things go wrong, it’s vital to have a plan for how to use resilience planning to put communities back on track. A 2015 [report](#) by the UN World Conference on Disaster Risk Reduction found that rebuilding structures and communities simply to pre-disaster standards will “recreate the vulnerabilities that existed earlier and expose them to continuing devastation from future disasters.” Alternatively, the concept of “building back better” takes a comprehensive approach to preparedness and recovery, where actions to strengthen resilience are taken both before and after disasters occur.

Additionally, USGBC partnered with Capital E on its 2018 report [researching](#) the benefit-cost analysis of deploying smart surfaces (such as green roofs) in three U.S. cities. Smart surfaces, which include alternative roof and surface treatments, have the [potential](#) to transform heavily paved areas to benefit cities and residents.⁵



A green roof of a LEED certified building at Georgia Tech, Atlanta GA

Any investment in buildings and community infrastructure should enhance resilience by incorporating adaption measures, mitigating future harm, and enabling better post-disaster response. By applying green and resilient practices, usually at low to no added cost, buildings and infrastructure can also enhance health, spur investment in local economies, and save energy, water and money, too. USGBC promotes the use of third-party verified measurement, assessment,

planning, and validation tools to get the most out of any infrastructure investment.

High quality, certified, resilient approaches are increasingly attractive to investors – and in the future, project owners and communities may find enhanced finance and insurance options for incorporating these tactics in their projects. One way that USGBC is supporting this market trend is through GRESB.



[GRESB](#) is an investor-driven organization that assesses the sustainability performance of real estate and infrastructure portfolios and assets worldwide. More than 200 [members, largely comprised of real estate and investor companies](#), use GRESB data and tools to monitor and manage the sustainability risks of real estate and infrastructure investments, and prepare for increasingly rigorous environmental, social, and governance (ESG) obligations for enhanced resilience.

Launched in 2018, the GRESB [Resilience Module](#) was developed by the Industry Working Group in response to increased investor demand for information on resilience and strategies employed by companies to assess and manage risks. The module examines how real estate companies and funds are preparing for changing conditions and disruptive events, and also assesses long-term trends in resilience planning. The GRESB Resilience Module is an optional supplement to the 2018 GRESB Assessments, including Real Estate, Infrastructure, and Debt.

MORE ON RESILIENCE

USGBC and our extended green building network actively support resilience programs through advocacy, local engagement in community resilience efforts, and aligned technical tools. We welcome the chance to support government officials and advocates in identifying and crafting policies to meet local goals for resilience; please contact us with inquiries and for help.

Tools offered by USGBC and GBCI can enable your project to take action on resilience, measure progress, and validate results. Beyond our rating systems and certifications, our education platform and events provide opportunities for practitioners, government officials, and advocates to learn and engage on resilience strategies. Our articles and briefs offer new ideas, successes, and local perspectives – such as our state government-focused resilience article [series](#).

For more on resilience, USGBC encourages you to join us at Greenbuild and to connect with your local community. With your help, we can make progress towards a more resilient future. For more info, contact: publicpolicies@usgbc.org

⁵ <https://www.usgbc.org/articles/capital-e-shares-how-green-your-city-costeffectively-podcast>