National Institute of BUILDING SCIENCES™

Existing Buildings Webinar: Retrofitting for Resilience
October 24, 2023 | Session Overview

Panel
Will Lavy, Policy Director, Office of Recapitalization, U.S. Department of Housing and Urban Development
Dr. Sean Becketti, Principal, Elliott Bay Analytics
Robert G. Pekelnicky, S.E. (CA), P.E. (CA), Senior Principal, Degenkolb Engineers

Moderator
Dr. Jiqiu (JQ) Yuan, Vice President, Engineering, National Institute of Building Sciences

Retrofitting for Resilience Overview

Data from Architecture 2030 shows that by 2040, approximately two-thirds of the global building stock will be buildings that exist today. Without widespread existing building decarbonization across the globe, these buildings still will be emitting CO2 in 2040, and we will fall short of the Paris Agreement's 1.5°C reduction target.

While retrofitting to meet energy efficiency and net-zero emissions is crucial, what about retrofitting to withstand increasing climate risks?

Most of our existing building stock is not prepared to handle the increase in climate-related hazards, including increased winds, seismic activity, heatwaves, droughts, wildfires, floods, and rising sea levels. As climate and hazard risks intensify, resilient buildings need to become the status quo.

Resilient retrofits also open the door to indigenous populations, people of color, and low-income communities achieving social equity, as they are typically the communities most exposed to hazards.

On October 24, 2023, the National Institute of Building Sciences hosted a Retrofitting for Resilience webinar as part of the Existing Buildings 2023 series. Nearly 900 registrants signed up for the event.

The panel included Will Lavy, Policy Director, Office of Recapitalization, U.S. Department of Housing and Urban Development; Dr. Sean Becketti, Principal, Elliott Bay Analytics; and Robert G. Pekelnicky, S.E. (CA), P.E. (CA), Senior Principal, Degenkolb Engineers. Dr. Jiqiu (JQ) Yuan, Vice President of Engineering with NIBS, served as moderator.

Drawing the Lines of Resilience

Kicking off the webinar was Robert G. Pekelnicky, S.E. (CA), P.E. (CA), Senior Principal with Degenkolb Engineers,

discussing the existing building paradigm.

"We have buildings that were built to conform to the codes in effect at the time of construction, but our knowledge of the codes changes," he said. "And in some cases, the hazards themselves change over time."

Earthquakes, floods, hurricanes, and tornadoes demonstrate that code-conforming buildings can be inadequate.

Pekelnicky shared photos of buildings that collapsed years ago due to earthquakes, including a fairly new, state-of-the-art hospital in San Francisco.

The building code does not require retroactive mitigation of natural hazard deficiencies.

Pekelnicky said the three biggest challenges to retrofit include:

- Meaningful evaluations are expensive.
- Most existing buildings fail the evaluations.
- Retrofits can prohibitively be expensive.

In addition to construction cost, there's the cost of disruption, Pekelnicky said.

"For major work, you need to find a place for those people to go," he said. "With every challenge, there are opportunities, including improved screening tools and more accurate evaluation methods."

HUD's Green and Resilient Retrofit Program

Will Lavy, Policy Director in the Office of Recapitalization with the U.S. Department of Housing and Urban Development, opened his presentation, covering HUD's Green and Resilient Retrofit Program (GRRP).

GRRP includes $837.5 million and up to $4 billion in loan authority provided through the Inflation Reduction Act to HUD to distribute to multifamily property owners.

Retrofits will reduce properties' climate impact while making them more efficient, safe, and healthy for residents through things like carbon emission reduction, enhanced energy and water efficiency, energy and water benchmarking, improved indoor air quality, building electrification, and low-emission building materials or processes.

Through the Comprehensive Cohort, Lavy said HUD will be involved.

Properties will undergo a series of GRRP-funded assessments with support from a HUD-provided contractor to develop the scope of work, including standard improvements and green features.

The climate resilience assessment makes the program unique.

"[We're looking at] what are the basic vulnerabilities of the property," Lavy said. "On the climate side, there is no routine standard analysis. So, we set out to create this assessment for the first time."

Site reference:

- U.S. Department of Housing and Urban Development – Green and Resilient Retrofit Program

The Resilience Incentivization Roadmap 2.0

Dr. Sean Becketti, Principal with Elliott Bay Analytics, covered the 6:1 benefit-cost ratio with mitigation investment.

"If the return is so large, why is the investment so low?" he asked.

The problem lies with externalities that contribute to underinvestment in resilience. Homeowners and developers bear the cost of resilience investment, yet many share in the benefits.

Becketti shared findings from the Resilience Incentivization Roadmap 2.0, which recently was unveiled by NIBS and Fannie Mae.

The Roadmap 2.0 aims to have stronger and safer buildings and resilient communities by catalyzing collaboration across the building science, finance, insurance, and real

estate industries and increase mitigation investment and develop coordinated resilience guidelines and tools for community implementation.

The project team worked with experts from building science, lending, insurance, developer, owner, real estate, appraiser, and public assistance to understand who can promote, participate in, or resist incentivization, and what drives their decisions.

“Homeowners don’t know they’re at risk or the risk never happened before,” Becketti said. “What we see is that financial incentives are necessary for a lot of communities. But even financial incentives are not adequate alone.”

The team now is speaking with a variety of entities that might be interested in partaking in a pilot project, Becketti said.

Site reference:

- National Institute of Building Sciences – Resilience Incentivization Roadmap 2.0

What’s Next

The final installment of the Existing Buildings 2023 webinar series takes place December 6. It will cover building technology and retrofits, including building information management and modeling. Our expert panel will discuss the use of building technology (e.g., digital twins, BMS, IoT) and how these technologies help achieve sustainable and resilient retrofitted buildings while achieving ratings and certifications in shorter periods of time. Register now.