National Institute of
BUILDING SCIENCES™

2022

Annual Report
to the President
of the United States

Innovative Solutions for the Built Environment

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Dear Mr. President:

On behalf of the National Institute of Building Sciences, it is an honor to provide you with the 2022 NIBS Annual Report to the President of the United States. The report highlights our work to improve the safety, performance, and resilience of the nation's buildings and communities; enable innovation and responsible use of technology across the building industry; and ensure that we have a skilled, competent, and future-focused workforce.

Remaining true to the objectives in our enabling legislation, NIBS convenes building industry leaders across all sectors of our economy to look to the future and foster alignment on challenging topics that threaten the economic and social vitality of the U.S. built environment. NIBS also offers a plethora of resources that not only allows the nation's building professionals to maintain a solid foundational base of knowledge but also keeps them up-to-date on the latest trends in emerging technologies and skills development.

NIBS establishes performance criteria, standards and other technical provisions to maintain life, safety, health, and public welfare. We develop recommendations suitable for adoption by the jurisdictions and agencies that regulate buildings, including test methods and other evaluative techniques relating to building systems, subsystems, components, products, and materials with due regard for addressing consumer problems.

This work is primarily led by talented staff and enhanced by the subject matter experts who comprise our eight volunteer bodies – the Building Enclosure Technology and Environment Council, Building Information Management Council, Building Seismic Safety Council, Consultative Council, Facility Management and Operations Council, Off-Site Construction Council, Multi-Hazard Mitigation Council, and Whole Building Design Guide Workgroup.

These councils engage with private organizations, institutions, agencies and federal, state, and local government entities, giving attention to the development of practices that encourage representation from all sectors of the economy, ensuring national interests are protected and promoted for the best results.

In 2022, we maintained the development of tools to help the industry evolve as we have become more proficient than ever in deploying innovative technology to advance our mission.

Among the highlights:

- The implementation and launch plan of the U.S. National BIM Program to achieve a new level of industrial efficiency through digitalization, transforming lifecycle work processes to be more efficient and resilient, less expensive, and safer to build and maintain.
- The development of a roadmap on mitigation investment with Fannie Mae, as part of a mitigation needs assessment study requested by Congress. The goal of the Resilience Incentivization Roadmap 2.0 is to identify ways to work with lenders to explore financial products that support resilient buildings, help developers properly evaluate risk and recognize values of resilient buildings and lower the upfront cost, and collaborate with insurers to promote insurance programs that reward safer structures.
- The Moving Forward report by our Consultative Council stressed the importance of diversity, equity, and inclusion as essential characteristics of the built environment. Ultimately, DEI will lead to a diverse, robust, and sustainable workforce.

Our plans for 2023 build on these and more.

Our work is made possible by the dedication and support of our members. The National Institute of Building Sciences represents the building sciences community, including designers, architects, builders, tradespeople, engineers, building owners, property managers, agencies, code officials, facilities managers, and operations representatives.

While 2021 was a year of building resilience for the industry, in 2022, we focused on infrastructure, due in large part to your passage of the Infrastructure Investment and Jobs Act.

Mr. President, the Bipartisan Infrastructure Law is helping the nation and its communities place much-needed federal aid to where it's needed most – broadband access, clean water, electric grid renewal, highways, highway safety programs, and transit programs.

NIBS created the Infrastructure 2022 webinar series to cover transportation infrastructure, goods and supply chain challenges, lifelines and access to high-speed networks, and preparedness and mitigating the climate crisis.

In addition to horizontal infrastructure, increased emphasis has been placed on revitalizing and retrofitting our existing building stock for improved performance, sustainability, health, and resilience, with particular emphasis being placed on decarbonization efforts and methodologies. We believe that in order to address existing buildings, we must innovate. This is vital to protect these assets, extend their purposefulness, improve their performance, and reduce the negative environmental impacts from embodied carbon.

It's no secret that the climate emergency is dictating a lot of where the built environment must place resources. The 2022 Moving Forward Report: Findings and Recommendations from the Consultative Council at the back of this annual report breaks down specific recommendations to decarbonize the U.S. building sector.

NIBS supports every endeavor to move our nation into net-zero carbon emissions. It has been our honor to join the U.S. Department of Energy in the Better Climate Challenge as an ally this year. We plan to continue building alliances to reduce greenhouse gas emissions by at least 50 percent within 10 years across as much of the built environment as possible. You have our commitment.

Thank you for this opportunity to share our work with you.

AC Powell, JD, CPS, President & CEO, NIBS

Anne Ellis, P.E., HON.M.ACI, F.ASCE, NAC
Chair, Anne Ellis, LLC, McLean, VA

ABOUT NIBS

About NIBS

Forty-nine years ago, the U.S. Congress established the National Institute of Building Sciences in the Housing and Community Development Act of 1974, Public Law 93-383.

Congress recognized the need for an organization to serve as an interface between government and the private sector – one that brings together local, state, and federal representatives, the professions, industry, and labor and consumer interests by supporting advances in building science and technology to improve the nation's built environment.

NIBS leads conversations to ensure our buildings and communities remain safe, and we work to seek consensus solutions to mutual problems of concern.

Vision

Improving lives through collaboration by integrating science into the built environment.

Mission

To serve the public interest by advancing building science and technology to improve the built environment.

NIBS represents an industry that has more than 745,000 employers* and creates over 7.77 million construction jobs, as of December 2022. Each year, the industry creates nearly $1.4 trillion worth of structures.**

NIBS is a 501(c)(3) non-profit organization that conducts research, establishes performance criteria, standards and other technical provisions to maintain life safety, health and public welfare. NIBS' work is supported through membership, contributions, events, and government and private sector contracts.

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* https://www.agc.org/learn/construction-data
** https://www.bls.gov/iag/tgs/iag23.htm

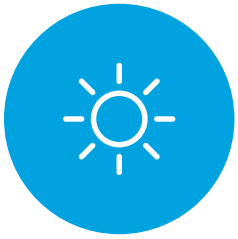
Strategic Plan

Whether in your home, office, or out in the community, the walls you surround yourself with must be safe, structurally sound, and sustainable.

The National Institute of Building Sciences improves communities by accelerating collaboration between public and private stakeholders and advancing transformational technologies across the built environment.

This year, the NIBS Board of Directors developed a new three-year strategic plan to guide the organization under these cultural values: collaboration, innovation, inclusion, and accountability.

Objective: The 2023-2025 Strategic Plan includes four major goal themes, each with very specific strategies.



Climate Adaptation, Mitigation and Resiliency

The goal of climate adaptation, mitigation, and resilience requires advancing climate solutions and their adoption in the built environment. Building alliances with public and private sector organizations to develop and deploy innovative solutions is critical to this mission. NIBS also must drive interdisciplinary and interorganizational collaboration resulting in the development of policies, codes, and standards and share knowledge to advance resilient and sustainable communities.

Transformational Building Sciences and Technologies

NIBS aims to promote convergent research and transformational technologies. Strategies to this goal involve nurturing and promoting creativity and innovation to advance technology. NIBS also aims to remove barriers to accelerate technology acceptance and adoption and advance innovative technology awareness and implementation.

Industry Development and Diversification

NIBS encourages collaboration across the public and private sectors to increase diversity, equity, and inclusion within the workforce and communities. Strategies to this goal include expanding the industry's understanding of how building science, the built environment, and social equity are related and championing diverse, equitable, and inclusive communities. It's also important to advance initiatives to enhance the recruitment and development of the building industry workforce.

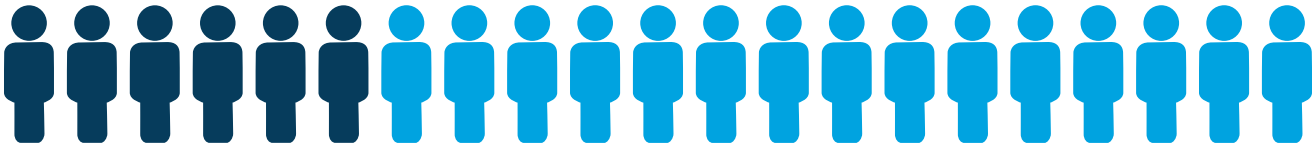
Visibility and Recognition

NIBS is a trusted authority and resource in the built environment. The organization aims to amplify its congressionally-authorized purpose as the nationally recognized authoritative voice. Strategies include increasing NIBS' brand visibility and stakeholder engagement among government and the private sector as well as attracting new stakeholders and business partners.

Board of Directors

The National Institute of Building Sciences Board of Directors has up to 21 members. The President of the United States, with the advice and consent of the U.S. Senate, appoints six members to represent the public interest. The remaining 15 members are elected from the nation's building community and include both public interest representatives and industry voices. A majority of board members is required by the authorizing legislation to be in the public interest category.

In 2022, we welcomed to the board two new members. They included 84 Lumber Company Building Ambassador Judy Dinelle, CGP, CAPS, AMA, who joined the board on May 5, and Yvonne Castillo, Esq., Senior Vice President of Risk Management with Victor US. Castillo joined the board in October.



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Anne Ellis, LLC, McLean, VA

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STG Design, Austin, TX

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Gilbane Building Company, Boston, MA

William "Bill" Holloway, AIA, LEED AP
Bernardon, Wilmington, DE

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International Code Council, Denver, CO

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Lori Peek, PhD
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School of Engineering, Penn State University, University Park, PA

NIBS Staff - Senior Leadership

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Bob Payn
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Vice President, Technical Solutions

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Project Director

Kyle Barry, PMP
Director, Technical Solutions Group

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Director, Project Management

Johnny Fortune
Executive Director, U.S. National BIM Program

Chelsea Kline, LC
BIM Manager

Omar Martinez
BIM Manager

Stephanie Sneary
BIM Manager

Zoe Maymon
BIM Data Analyst

Pratik Solanki
BIM and Project Cost Manager

Zoe Bourne
BIM Coordinator

Mira Papinova
Project Manager

Robert Johnson, PMP
Project Manager, Building Energy and Resilience

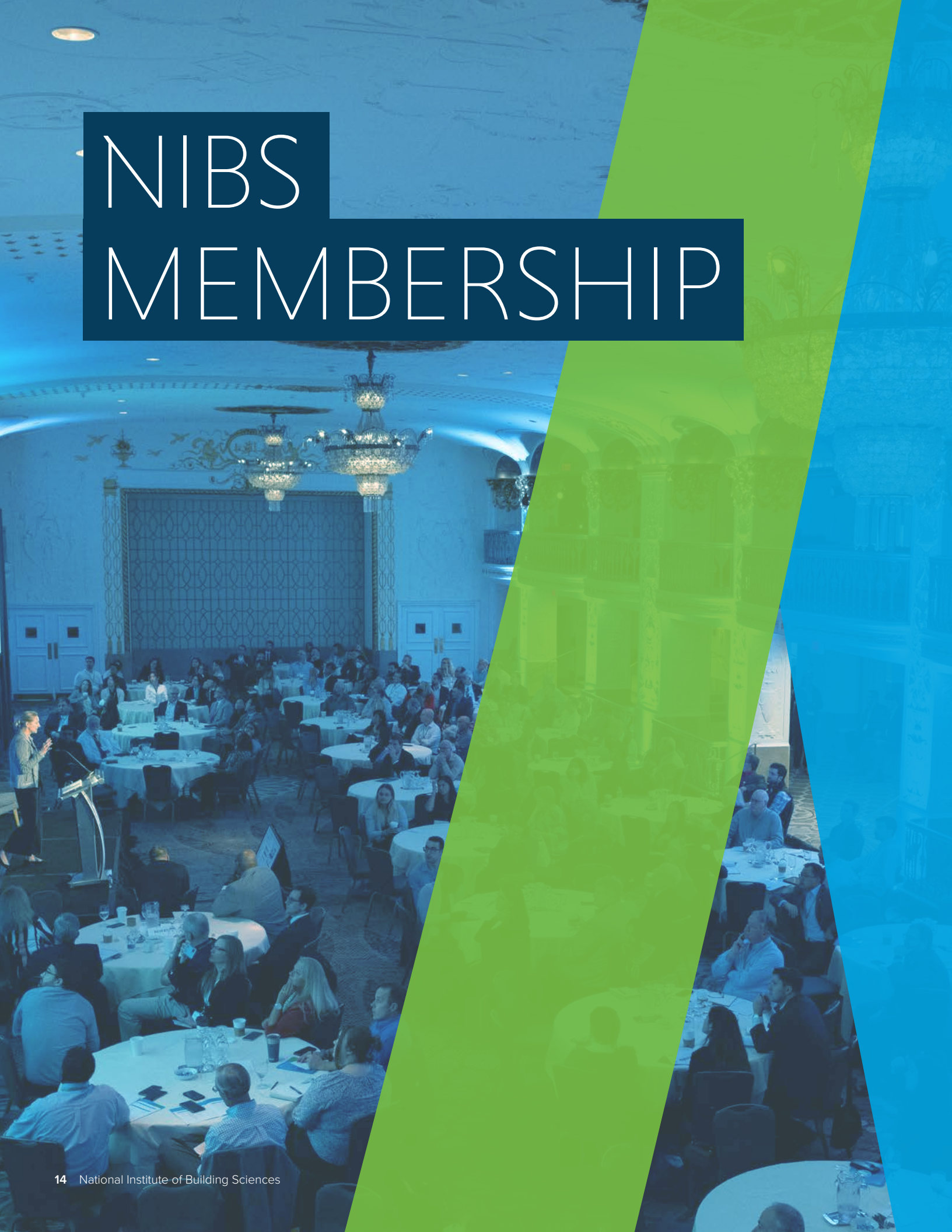
Katherine Bittner
Project Management Administrator, Technical and Government Solutions

Ben Nolan
Web Manager

Kelly Lloyd
Web Content and Criteria Manager

Brittany Kitchens
Web Project & Distance Learning Coordinator

NIBS MEMBERSHIP



Membership Overview

Sometimes, it just takes joining the right network of professionals.

In today's world, networking is a necessity.

"A mountain of research shows that professional networks lead to more job and business opportunities, broader and deeper knowledge, improved capacity to innovate, faster advancement, and greater status and authority," reported the Harvard Business Review in 2016.

The National Institute of Building Sciences serves the public interest by advancing science and technology to improve the built environment.

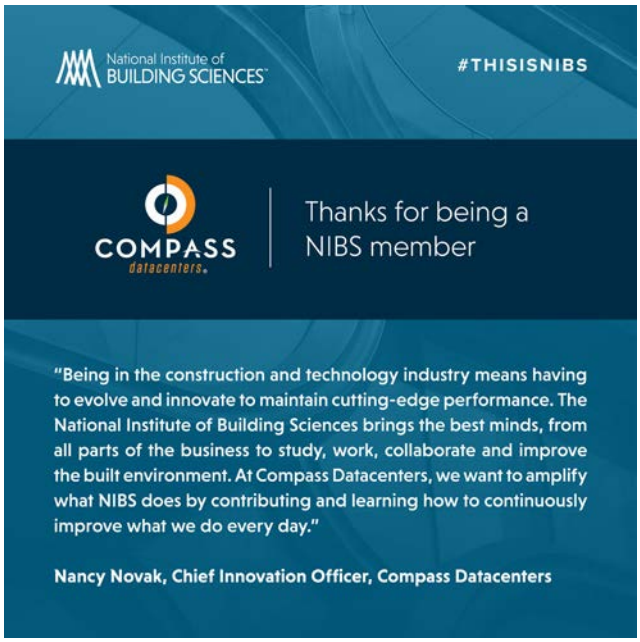
Our members are building industry professionals – representatives of academia, non-profit associations, local, state and federal government, and the public and private sectors. Members develop and implement technical and procedural improvements through collaboration on our councils, events, and programs.

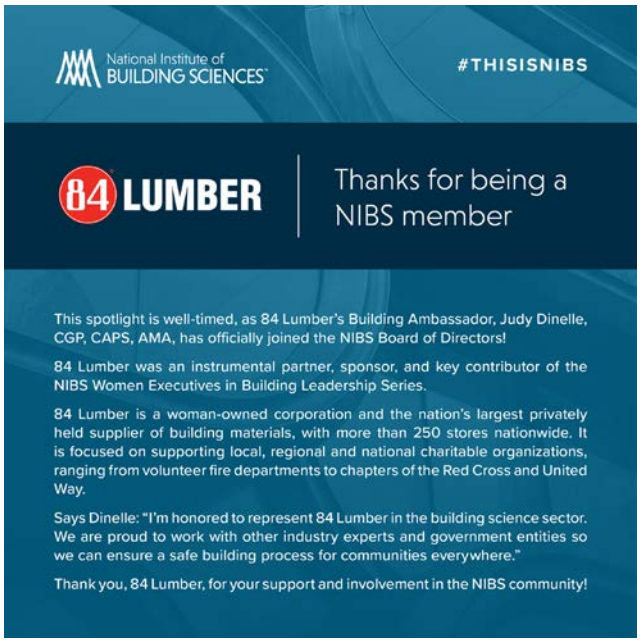
In 2022, NIBS continued #ThisIsNIBS, a campaign to raise awareness, attract, and recruit individual and organizational members, and honor our organizational members who support our mission and success.

Every month, #ThisIsNIBS shed a spotlight on one organizational member who significantly contributed to NIBS, answering why they feel it is important to be a part of the NIBS community. Featured 2022 organizations included BSI, McCarthy, University of Washington College of Built Environments, Ohio Facilities Construction Commission, Compass Datacenters, STG Design, National Ready Mixed Concrete Association, International Institute of Building Enclosure Consultants, and The Pew Charitable Trusts.

NIBS saw a significant boost in membership, growing by 5% in January alone.

We offer three different individual membership packages and two organizational member packages, offering a membership level that will suit any interested individual or organization seeking membership with our organization representing all aspects of the built environment.





Organization Members

Membership provides access, at an individual or organizational level, to weigh in on member projects that shape our future. Organizational members often have multiple individuals, representing a variety of job roles, participating in NIBS councils.

Unlimited Member Organizations

Unlimited Organizational Membership is for organizations seeking unlimited access for their employees to participate in NIBS communities.

American Institute of Architects
Autodesk, Inc.
FM Global
Gilbane Building Co.
National Institutes of Health
NBBJ
Ohio Facilities Construction Commission
U.S. Department of State
U.S. Department of Veterans Affairs

Member Organizations

84 Lumber
AABC Commissioning Group (ACG)
American Institute of Steel Construction
American Iron & Steel Institute
American Wood Council
APA - The Engineered Wood Association
Architect of the Capitol
Armatherm
Armstrong World Industries
ASHRAE
BOMA International
BSI Group America, Inc.
Charles Pankow Foundation
College of Built Environments at the U of Washington
Compass Datacenters
Component Assembly Systems
Concrete Masonry Association of California and Nevada
Connex
Construction Specifications Institute
Dell Technologies
Design-Build Institute of America
DOE: Better Climate Challenge
ESRI
Façade Tectonics Institute
Federal Aviation Administration
General Motors Company
Green Building Initiative
IIBEC
Insurance Institute for Business & Home Safety
International Association of Plumbing and Mechanical Officials
International Code Council, Inc.
McDonough Bolyard Peck, Inc.
MOD X
Modular Building Institute
National Association of Home Builders
National Fire Protection Association
National Ready Mixed Concrete Association
National Building Museum
New Horizons Foundation
NCSEA
NOAA
Onuma, Inc.
Precast/Prestressed Concrete Institute
Procore Technologies, Inc.
Professional Roof Consultants, Inc.
Protogetic
Simpson Gumpertz & Heger
SpaceIQ
STG Design
Structural Engineers Association of California
Testing, Adjusting, and Balancing Bureau
Total Systems Commissioning, Inc.
U.S. Army Corps of Engineers
U.S. General Services Administration
U.S. Green Building Council
U.S. Navy
U.S. Resiliency Council
Wipro Limited

Member Spotlight

Charles J. Carter, SE, PE, PhD
President, American Institute of Steel Construction
Past Chair, Building Seismic Safety Council Board of Directors

AISC has been part of the Building Seismic Safety Council since the beginning in 1979.

If you go back to the 1970s, seismic design was a California thing and pretty much rare everywhere else that wasn't the west coast.

The reality is you can have impacts from earthquakes from sea to shining sea. The potential for seismic risk is heightened by bad soil, which tends to describe a lot of the country east of the Rockies.

When it comes to structures, you often mix steel and concrete or steel and wood; you need those standards and the design load standard to be well coordinated.

That started happening in the 1970s because BSSC had the people who knew how writing the standards. BSSC became this proving ground for seismic design provisions and the place where everyone could coordinate.

A pre-standard – the National Earthquake Hazards Reduction Program (NEHRP) Provisions – facilitated the BSSC drive for coordination of standards and also allowed the consolidation of model building codes from three to a single dominant one. This was magical for building design and construction. Today, there's a single set of coordinated standards.

And earthquakes are just one type of load. There are others – wind, live load, the dead load of a building, ice, and other hazards that you have to deal with. While BSSC was primarily focused on just one hazard, the NEHRP Provisions provided the forum for other things to get coordinated, too.

Ultimately, the biggest win is public safety. I wish more people knew the role that BSSC and NIBS play in coordinating standards ahead of time to the benefit of the general public, the design community, and the construction industry.

NIBS is the forum, where you get to work with people who are there to do better for seismic design and design in general. We develop ideas, think them through, and put them into practice.

AISC is a technical institute and trade organization that serves a variety of members. Our biggest membership groups are structural engineers and steel fabricators. We also serve steel mills and steel service centers.

We strive for safety, efficiency, and economy of design in construction in steel. Safety, especially, is very important to what we do.

INDUSTRY SOLUTIONS

- **Solutions for Natural Hazards**
- **Technology and Strategies to Promote Efficiency**
- **Building our Workforce**

Solutions for Natural Hazards

In June 2022, federal officials announced an initiative to modernize building codes so communities can be more resilient to disasters brought forth by climate change.

The Associated Press story published by NBC News was entitled, Here's how the government wants to disaster-proof your home. It featured Federal Emergency Management Agency (FEMA) Administrator Deanne Criswell, who quoted information from NIBS' Natural Hazard Mitigation Saves study.

"The adoption of hazard resistant building codes saves communities $11 per every $1 invested," Criswell said.

Toward the end of 2022, The Guardian published a story that found weather disasters hit 90% of U.S. counties in the last 11 years.

That story also quoted Mitigation Saves research.

"Some [counties] endured as many as 12 federally declared disasters over those 11 years," reported The Guardian. "More than 300 million people – 93% of the population" live in those counties."

Assessing Need: A New Mitigation Initiative of NIBS and FEMA

In 2022, NIBS kicked off a major natural hazard resiliency initiative with FEMA called the Natural Hazard Mitigation Needs Assessment.

FEMA awarded the project to NIBS to support the development of a methodology to estimate the nation's unmet natural hazard mitigation needs and determine the respective roles that the private sector, public sector, and federal government should play in addressing mitigation needs.

A project technical committee (PTC), consisting of eight national experts, was selected by NIBS and FEMA to conduct the study. Between October 2022 through September 2023, the PTC will develop a methodology by natural hazard peril, geographic location, stakeholder (payor) group, and beneficiary group.

At the beginning of December 2022, the project team had a successful in-person session, during which the PTC members presented and reviewed with FEMA and NIBS the natural hazard perils and sectors to be included in the study. They are flood, wind, wildfire, earthquake, tsunami, landslide, extreme heat, and drought.

The project team also covered future weather conditions and will further discuss how the benefits of resilience programs reach communities overburdened by pollution and historic underinvestment.

Coordinating the Experts

Following the in-person meeting in December 2022, the technical committee developed a list of subject matter experts to serve on a project review panel (PRP). The PRP will provide expertise and advice to the eight-person technical team. Additionally, with the assistance of FEMA, a 24-member federal advisory panel (FAP) was formed.

The FAP will review the overall framework of the study, feedback from stakeholders, analysis results and interpretation, and final recommendations, in a similar manner to the PRP. The FAP will include representatives from the U.S. Army Corps of Engineers, Cybersecurity and Infrastructure Security Agency, U.S. Department of Energy, U.S. Department Housing and Urban Development, White House Council on Environmental Quality, National Oceanic and Atmospheric Administration, U.S. Department of Agriculture, National Institute of Standards and Technology, FEMA (Risk Management, Mitigation Directorate, Earthquake and Wind Programs, Building Sciences), and representatives from all FEMA regions.

Resilience Investment

Also last year, Fannie Mae partnered with NIBS for the Resilience Incentivization Roadmap 2.0.

Led by the Multi-Hazard Mitigation Council (MMC) Committee on Finance, Insurance and Real Estate (CFIRE), this initiative aims to develop a roadmap on mitigation investment to help Americans and the nation's built environment prepare for and better respond to the devastating effects of climate change.

Banks, insurance companies, appraisers, and real estate firms all play a significant role in how buildings are procured, designed, and constructed. How these different segments evaluate the risk associated with particular projects, technologies, and practices can have an enormous impact on whether an idea gets the funding and insurance needed to move forward to fruition.

The goal of the Resilience Incentivization Roadmap 2.0 is to identify pathways to work with lenders to explore financial products that support resilient buildings, help developers properly evaluate risk and recognize the value of resilient buildings and lower the upfront cost, collaborate with insurers to promote insurance programs that

reward safer structures, and support communities to develop layered mitigation investment packages.

Roadmap: Where It's Headed

Example incentives include insurance policy riders (i.e., premium breaks), realtor literature (MLS statements, open-house literature), mortgage riders (lower points, lower rates), and government incentives (i.e., if a developer takes mitigation action, then the city offers an incentive).

NIBS appointed three project principal investigators (PIs) to carry out the study and serve as the primary authors of the report. Additionally, more than a dozen industry subject matter experts formed a project technical committee (PTC) with the following subgroups: lending, insurance, developers, real estate, appraiser, engineering/evaluation, public assistance, disadvantage groups, climate change, and investors.

The PTC team will provide expert advice in a related field and any needed resources for roadmap development. After a series of successful virtual meetings, the project team will hold its in-person workshop in May 2023.

Officials from all sectors of the building industry and public and private sectors will be invited to hear about the report findings, provide recommendations, and suggest examples for a pilot study. This event will allow the project team to gather input and seek participation and support from all stakeholders of the built environment to solve America's resilience problem.

When It Comes to Wildfires, Homeowners Are Not Powerless

In August 2022, NIBS Vice President of Engineering Dr. Jiqiu Yuan and Anne Cope, PhD, PE, chief engineer with the Insurance Institute for Business & Home Safety and vice chair of the Multi-Hazard Mitigation Council co-authored an opinion piece in The Hill newspaper called, A push for wildfire-resilient homes.

"Wildfires are a significant and increasing threat to our nation," Dr. Yuan and Cope wrote. "Recently, the White House amplified its efforts to address the growing wildfire crisis and launched multiple initiatives with a primary focus to prevent and minimize ignition of wildfires and increase our nation's response capacity. There are measures homeowners and the building industry can take to better prepare homes in the wildland-urban interface."

Among the most important measures homeowners may take: Complying with the International Code Council's International Wildland-Urban Interface Code (IWUIC). On a national average, this could save $4 for every $1 of additional construction and maintenance cost.

Mitigating Seismic Risk

Dr. Yuan partnered with Mai Tong, Physical Scientist and Project Officer with the National Earthquake Hazards Reduction Program (NEHRP), Federal Emergency Management Agency, on a paper published in Structure Magazine in August 2022.

Their piece, Mitigating Seismic Risk, discussed seismic code and standard development and the NEHRP Recommended Provisions, as they relate to protecting the built environment.

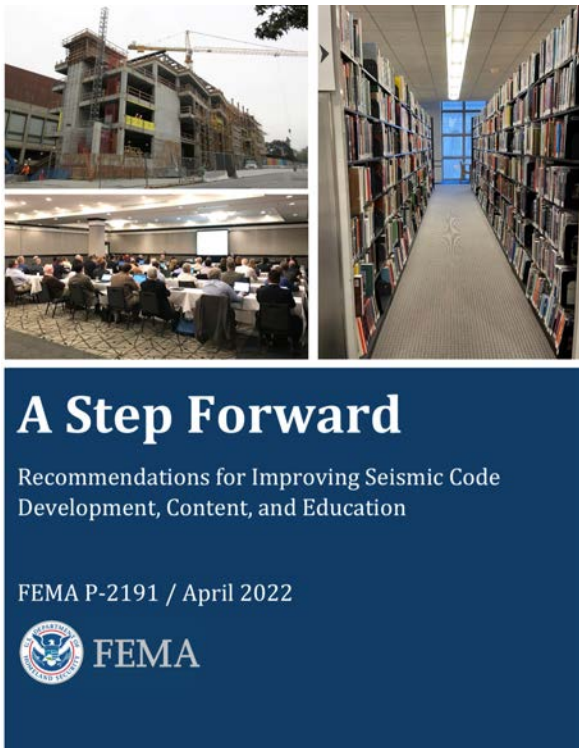
"In dealing with earthquakes, it is essential to understand that the risk of building failure or collapse is real and more significant than many other natural hazard impacts," they wrote. "Buildings are designed to survive damage and be robust enough to provide sufficient stability to minimize the risk of collapse. However, designing structures resistant to major earthquakes is a complex process, and developing seismic design provisions and codes applicable across the nation is even more daunting."

BSSC Earthquake Design Webinar Series

Last year, the BSSC hosted an 11-webinar series to educate the building industry on new code changes in seismic design and construction.

The series was organized by the eight chapters of the 2020 NEHRP Recommended Provisions: Design Examples, which were published in January 2022.

The Design Examples were developed by the BSSC for FEMA to illustrate and explain new changes in the 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures (FEMA P-2082), ASCE/SEI 7-22, and the material design standards referenced in design applications.



Background on the 2020 NEHRP Recommended Provisions

The 2020 NEHRP Recommended Seismic Provisions for New Buildings and Other Structures marked the 10th edition of this technical resource document, since its first publication in 1985.

As with prior editions, this FEMA document is a national seismic code resource for design professionals and the U.S. standards and code-development organizations.

Most of the recommended code changes in Part 1 of the NEHRP Provisions were adopted by ASCE/SEI 7-22, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, which is to be adopted by reference by the 2024 International Building Code.

Leading the Development of the 2026 NEHRP Provisions

In 2022, the BSSC formed 20 committees with more than 200 national subject matter experts from both the private and public sectors to collaborate to develop the 2026 NEHRP Recommended Seismic Provisions.

These provisions are aiming for adoption by ASCE/SEI 7-28 and IBC 2030.

Also last year, FEMA and the BSSC published the report – A Step Forward – with recommendations to improve seismic code development, content, and education.

Member Spotlight

Francesca Maier, PE
Principal, Fair Cape Consulting LLC
Vice Chair, Digital Twin Integration Subcommittee, BIM Council

My journey with BIM started in 2009.

That's when I first came to NIBS, which was the local chapter of the buildingSMART Alliance. It was a lifeline for me, this one, young engineer in a tiny office in Nashville with no connection to a broader community.

My area of expertise – transportation and horizontal infrastructure – makes me different from those who typically volunteer with NIBS.

I found NIBS when I was frantically searching for resources to try to understand how this BIM thing related to my work. I had recently designed a subdivision, and I worked through the capability maturity model. I still remember the feeling of triumph when it qualified as "minimum BIM."

I appreciate NIBS for being a leader in standardization because it makes such a huge difference, often in ways that are invisible.

Today, the Federal Highway Administration and several State Departments of Transportation have begun to lead the sector with BIM, supporting implementation and standards.

I came back to NIBS at NBIMS v4 and joined the BIM Use and BIM Execution Planning subcommittees. I also was appointed vice chair – one of three – for the newly formed Digital Twin Integration Subcommittee of the BIM Council.

The main attraction for NIBS membership is the opportunity to contribute and represent the horizontal transportation industry. In this moment, the sector is maturing quickly, in terms of BIM adoption and experimenting with digital ways to deliver 3D design information instead of PDF plans.

On a personal level, I feel welcomed as a volunteer and that my contributions are valued. Where many organizations are still fumbling through transformation, NIBS has always elevated the voices of diverse individuals. I feel energized by volunteering because I get to meet and interact with new people and hear new ideas.

Member Spotlight

Grace Yan
Associate Professor, Missouri University of Science and Technology
Chair, Board of Directors, North American Alliance for Hazards and Disaster Research Institutes

I do hazards/disaster research, and I regularly attend Multi-Hazard Mitigation Council meetings.

The North American Alliance for Hazards and Disaster Research Institutes includes 100 hazards/disaster research centers in the United States, Canada, and the Caribbean.

NIBS has a very powerful network that can help NAAHDRI researchers disseminate research findings on community resilience, climate change adaptation, and disaster risk reduction.

Last year, several NAAHDRI centers partnered with NIBS to conduct a National Science Foundation Civic Innovation Challenge planning project.

This project proposed an innovative way to raise money for implementing resilience projects.

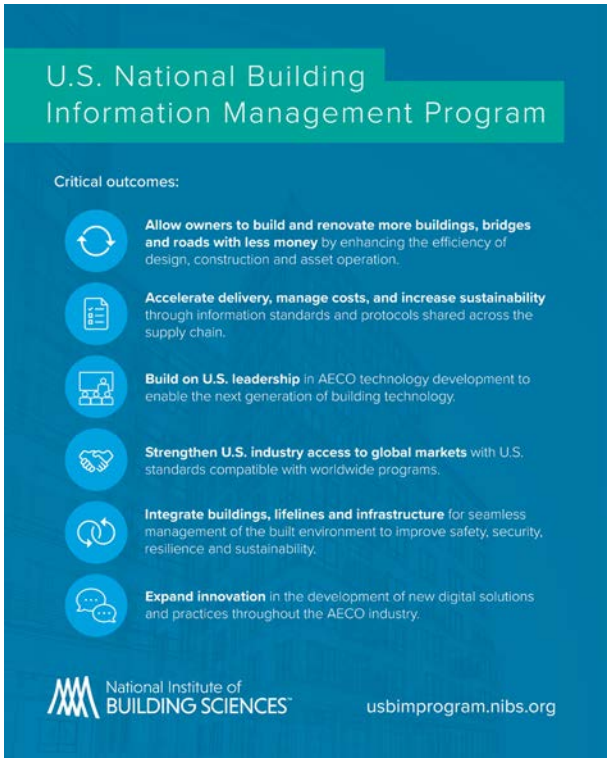
The idea is to facilitate local governments to raise money from the capital market by issuing bonds. Then, the government will have money to conduct different resilience projects, from large projects (e.g., building a sea wall) to small projects (e.g., issuing grants to households for retrofitting).

To enhance equitable resilience, community consensus building should be conducted to allow stakeholders – the community, chief resilience officers, urban planning and building code councils – to figure out the resilience priorities for the benefit of the entire community.

NIBS plays an important role in consensus building at the national level.

As a university researcher, we dig deep in our scientific and engineering research. NIBS' reports and initiatives always inspire us to think of how we can implement our research findings to better people's lives.

NIBS is a very important organization that can help our research reach a higher level of impact.



Digitally Transforming the Built Environment

Last fall, NIBS announced the development of an implementation and launch plan for the U.S. National BIM Program (NBP).

Construction Dive reported in September 2022 that "unlike other sectors such as manufacturing, the construction industry hasn't realized significant productivity gains through the implementation of technology. Indeed, construction has averaged just 1% productivity growth in the past 20 years."

And while the U.S. has been a global leader in the development and implementation of BIM applications, the transition to full adoption by the industry has been slow. The U.S. National BIM Program aims to accelerate that process, Construction Dive reported.

"The U.S. National BIM Program will be successful through collaboration between public and private sectors and across the diversity of project stakeholders, namely owners, designers, constructors, suppliers, vendors and other involved parties," said Stephen T. Ayers, interim CEO of NIBS, in a press release.

The U.S. National BIM Program

NIBS began the planning process for the U.S. National BIM Program in 2021, meeting and collaborating with industry leaders and partners.

Since then, many volunteers and NIBS staff members worked to develop the implementation plan, which included key activities and an estimated budget for the first five years.

The construction industry employs more than seven million people to create or renovate nearly $1.4 trillion in buildings, infrastructure, and other built assets each year.

The NBP aims to help government and private sector asset owners harness this significant investment by better using digital practices to improve efficiencies and generate outcomes that address safety, security, and performance of the built environment.

Design and Construction of the Nation's Bridges

In other BIM-related news, NIBS provided advisory support on bridge model standardization to The American Association of State Highway and Transportation Officials (AASHTO) BIM for Bridges pooled fund project (TPF5-372) to continue developing and deploying BIM for design and construction of bridges.

Supporting the Federal Highway Administration (FHWA) Global Benchmarking Study on BIM for Infrastructure, NIBS officials organized a workshop with study participants from England, Finland, Netherlands, and Norway.

NIBS Vice President of Building Technology Roger Grant engaged with the FHWA on NIBS' role in the new BIM for Infrastructure pooled fund project and the Bipartisan Infrastructure Legislation (BIL) Advanced Construction Management Systems (ADCMS) component.

State Department Bureau of Overseas Building Operations BIM Program

NIBS continued with its multi-year project to develop and follow the U.S. Department of State Bureau of Overseas Building Operations Building Information Management Program Roadmap.

A third BIM Maturity Survey conducted biennially showed continued progress adopting BIM and taking advantage of the benefits of BIM. Improving BIM standards and integrating them completely into project procurement was an important accomplishment, ensuring value across projects.

The project expanded focus on other BIM Uses, including construction phase documentation; integrating BIM processes with OBO's evolving GIS capabilities; integrating with and supporting facility maintenance and management; and developing space management standard operating procedures that incorporate BIM data for new and existing facilities.

Evolution of central data management for BIM from projects and within OBO systems continued with the goal of providing additional efficiencies. NIBS will continue to support implementation of existing BIM uses and supporting information systems while helping OBO develop new uses and supporting data following the OBO BIM Roadmap for related design, specification, construction, and operations phase uses, as shown in the OBO BIM Uses plan.

Additional OBO Program Support

As part of another multi-year project, NIBS continued to provide operations and maintenance and system enhancement support for the U.S. Department of State Bureau of Overseas Building Operations cost estimating system (CES).

NIBS will continue to support the CES operations and maintenance, along with adding enhancements to improve analysis and reporting. NIBS began integrating the cost management process with the building information management program. BIM integration will continue with a focus on developing a prototype that utilizes spatial and component data from BIM.

BIMC Plans Upcoming Release of COBie 3.0

At the end of 2022, NIBS announced the BIM Council's upcoming release of COBie 3.0, as an update to the Construction to Operations Building information exchange (COBie 2.4) Specification.

COBie 3.0 also will be published as an integral part of the upcoming version 4.0 of the National BIM Standard – United States®.

COBie is a U.S. national specification of facility handover requirements based on original research by the U.S. Army Corps of Engineers.

NIBS further developed this specification, which describes the information required for facility operations and maintenance upon completion of a building project relating to the commissioning and handover of building systems and equipment.

"NIBS and the BIMC have collaborated with buildingSMART International for many years to create specifications and standards for the building industry," said AC Powell, JD, CPS, President and CEO of NIBS, in a press release. "We are excited about the efforts underway by our COBie Workgroup to create the 3.0 version, which complements and extends our previous work to develop COBie for U.S. agencies, building owners, and facility managers."

buildingSMART International (bSI) leads the development of industry open standards for information management and data exchange for implementation by software vendors in applications used by architects, engineers, contractors and owners in the design, construction, management and operations of buildings and infrastructure. COBie utilizes both the buildingSMART IFC (Industry Foundation Class) Schema and buildingSMART FM Handover MVD (Model View Definition) under creative commons license from bSI.

U.S. Strategic Roadmap for Off-Site Construction

In the area of offsite construction, NIBS, with MOD X, was awarded a competitive solicitation by the U.S. Department of Housing and Urban Development to develop an Offsite Strategic Plan for fostering growth and advancement in the U.S. Industrialized Construction (IC) sector.

The overall objective of this study is to assess the past, present, and potential future role of Federal agencies in facilitating and accelerating growth in the domestic IC sector to respond to the dual challenges of housing affordability and climate change.

The 18-24 month project will consist of three phases:

- **Phase 1:** Study the Federal Government's direct and indirect roles in U.S. IC by identifying and evaluating the costs of past and present domestic IC initiatives and programs, especially HUD's Operation Breakthrough, and assessing their impacts on housing delivery at various scales.
- **Phase 2:** Perform comparative studies of international IC programs and initiatives in Sweden, Japan, and the United Kingdom to identify and analyze key public, private, and non-governmental actions that have moved the IC industries forward in each country.
- **Phase 3:** Facilitate three workshops to analyze and compare domestic and international lessons learned and develop an Offsite Strategic Plan of actionable and sustainable strategies and tactics for HUD, other Federal agencies, local governments, universities, businesses, and other stakeholders to foster growth and advancement in of the U.S. IC housing sector.

HUD Offsite Construction Research Roadmap Summit

Also, as part of the partnership with NIBS and MOD X, HUD's Office of Policy Development and Research hosted a half-day workshop on June 10, 2022, to review and discuss the findings and recommendations of a new PD&R report, the Offsite Construction for Housing: Research Roadmap.

The roadmap identifies barriers and challenges to offsite construction for housing and recommends topics and questions to guide industry-wide research and development efforts to overcome obstacles preventing growth and market penetration for the U.S. offsite construction sector. The roadmap was developed by NIBS and MOD X, working in close collaboration with HUD and a Project Technical Committee (PTC) comprised of national and international stakeholders and cross-sector experts.

Members of the NIBS Offsite Construction Council (OSCC) also made key contributions to the development of the roadmap, by seeding the proposed research topics and questions and recruiting stakeholders from across the offsite construction housing industry to participate in the workshop to review proposed content.

The summit was held at the National Building Museum in Washington, DC. It was scheduled to coincide with HUD's Innovative Housing Showcase, a three-day event on the National Mall to highlight and demonstrate new building technologies and housing solutions, including modular, panelized, and manufactured housing as well as additive construction. A pre-publication draft of the roadmap served as the basis of the summit's presentations and discussions and was distributed to summit registrants in advance of the event.

ProjNet™: Migrating to the Government Cloud

In 2022, the U.S. Department of Veteran's Affairs agreed to sponsor the ProjNet.org migration to the government cloud as a FedRAMP certified application.

NIBS and its O&M Contractor OM Group worked with cloud security sub-contractor, Project Hosts, to build out and certify the application through the FedRAMP process.

ProjNet.org is migrating to the Microsoft Azure Government (MAG) cloud as a FedRAMP Moderate application.

The cloud migration for ProjNet.org will exercise a collaborative approach in ensuring common services are identified and integrated, and the migration and operation of ProjNet domains will be completed in a secure manner.

FedRAMP certification of the ProjNet application will comply with the standards for assessing, authorizing, and

monitoring applications and websites in the cloud environment. FedRAMP certification is anticipated to take up to nine months from start to accreditation.

The FedRAMP approval process is ongoing, with a scheduled completion date of August 2023.

Evaluating Federal Offices: GSA Post Occupancy Evaluations

The GSA POE Program for 2022 conducted post occupancy evaluations (POEs) on six GSA-owned buildings to enable the General Services Administration to improve design, construction, and operations for the Federal building stock, existing and future.

Using a multidisciplinary team of subject matter experts, the POE team evaluates in-use buildings and their surrounding sites, in terms of structural, mechanical, architectural, interior, lighting, and energy performance.

In these evaluations, the experts collect firsthand data through direct observations and on-site interviews to determine how an existing GSA facility actually is functioning.

Last year, the team evaluated Federal offices in St. Louis, Kansas City, and Oklahoma City; a restored and a new courthouse in Mobile, and a land port of entry in Columbus, New Mexico.

Additional GSA Project Work

In 2022, NIBS worked on a number of projects used by the General Services Administration to help the agency, its regional divisions, tenants in Federal buildings, and its myriad A/E contractors understand and manage the costs of designing and operating Federal buildings across their lifecycle.

The cost-study projects for the year centered on updating the National Cost Management Tool (NCMT) used for planning, estimating, tracking and reconciliation; developing project benchmarking tools; and revision of the P120 Public Buildings Services General Cost and Schedule Management Policy.

There also were other new areas of exploration with regard to GSA projects. NIBS initiated a number of projects in new areas, including net-zero energy calculations, calculating the cost of carbon in building operations, and revising the agency's fire protection engineering standards.

Strategic Prioritization of Capital Investments for Military Healthcare Facilities

NIBS continued to assist the U.S. Department of Defense (DoD) Defense Health Agency (DHA) with the planning, administration, and implementation of DHA's strategic process for prioritizing capital investment requirements across military healthcare facilities, an initiative known as the Capital Investment Decision Model, or CIDM.

The CIDM process combines real property data sets with expert evaluation of the contributions made by medical facilities toward DoD's operational and strategic priorities and uses a facilitated scoring process to inform planning for future construction and renovation projects throughout the military health system.

NIBS supported execution of the seventh prioritization event of the CIDM 6 program, and provided guidance and recommendations to DHA on future iterations of the CIDM process. In 2023, NIBS will continue to support the achievement of operational excellence within DHA's Facilities Enterprise division and advance the use of lifecycle management principles to sustain and maintain military healthcare facilities.

In Tribute to Katherine (Casey) Martin

10/22/1969 - 12/22/2022

The world at large and the National Institute of Building Sciences in particular lost a champion of goodness with the passing of Katherine “Casey” Martin, AICP, AIA, at the end of 2022.

Martin, titled Senior Consultant & Program Manager, was a facility and asset management subject matter expert with Jacobs Engineering Group Inc.

An architect by training and passion, Martin brought the long-term view and full-spectrum lifecycle perspective to all of her work. She served as the infrastructure condition assessment and environmental specialist for Jacobs, providing environmental impact analyses and other technical support to the National Park Service for more than 300 national parks, as well as for the U.S. Bureau of Land Management and other Federal agencies. Her far-reaching contributions influenced the passing of legislation in 2019 that supported funding for maintaining infrastructure within the national parks she loved.

Martin also shared her formidable skills and abiding interest in improving facilities for all people as a member of the U.S. mirror committee for International Standards Organization/Technical Committee ISO/TC 267 Facilities Management, where she served as co-chair for five years. Martin was very active in all aspects of TC 267, for which she also served as convener for Working Group 1 – Concepts and Context.

We, at NIBS, were fortunate to benefit from Martin’s participation on our Facilities Management and Operations Council from 2017 on. She brought her enthusiasm and hard work to a broad range of projects for FMOC, including two terms as Chair in 2018 and 2019. Along with her lifetime’s worth of technical achievements, Martin’s radiant competence, bright smile, easy laugh, and can-do attitude will be sorely missed, but not forgotten.

Building Our Workforce

Forward Momentum: Social Equity in the Built Environment

Diversity, equity, inclusion, access, and belonging (DEIAB) have always been of critical importance to NIBS.

In spring 2020, when the world was closed because of COVID-19, NIBS launched the Women Executives in Building webinar series to reach C-suite leaders at their home offices and talk about challenges faced in what historically has been a male-dominated building industry.

These leaders opened up about serving customers in a time of crisis, strategies to increase diversity and inclusion at work, balancing work and life, mentorship and career growth, and personal branding, among other topics.

The message was clear: These women dared to confront stereotypes and would come together to share ideas and solutions to current challenges.

The following year, in 2021, NIBS and our partners surveyed the greater U.S. built environment on social equity to get the pulse on things.

Our partners included consulting firm Avenue M Group and 18 participating organizations, including the American Institute of Architects, American Society of Civil Engineers, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Building Owners and Managers Association International, Construction Management Association of America, Construction Specifications Institute, A Council for the American Society of Interior Designers, Design-Build Institute of America, Energy & Environmental Building Alliance, Green Building Initiative, Institute of Real Estate Management, International Code Council, International Institute of Building Enclosure Consultants, New Buildings Institute, Northwest Energy Efficiency Council & Smart Buildings Center, Regional Hispanic Contractors Association, RMC Research & Education Foundation, and U.S. Green Building Council.

The First Built Environment Social Equity Survey

Collectively, we gathered 12,000 responses for the 2021 Built Environment Social Equity Survey.

More than two in five (43%) employed/working respondents indicated their company had a program or initiative dedicated to diversity, equity, and inclusion.

Other findings:

- Around two-thirds (65%) of employees indicated it is important or extremely important to increase the diversity of the built environment.
- The majority of survey respondents were employed full-time (71%) and had been in the built environment for more than 20 years.
- Nearly two-thirds (65%) of respondents were men, and almost three in 10 (28%) were women.
- Sixty-six percent of women respondents indicated they experienced discrimination or prejudice in the built environment based on gender.

This information laid the foundation for more work in 2022. The Consultative Council released its 2021 Moving Forward report last year, and the report covered in great detail the work that remains to improve DEIAB in the building industry.

Where We're Going with DEIAB

At the start of 2023, NIBS held an executive workshop, convening 30 industry executives to discuss social equity and goals to steer the future of the built environment workforce. A new Built Environment Social Equity Survey with consulting firm Avenue M Group and industry partners will be released in May.

"A successful workforce hinges on companies and organizations championing and nurturing DEIAB," said AC Powell, JD, CPS, President and CEO of NIBS. "Inclusion, diversity, social equity, and opportunity must be embedded into all aspects of built environment operations."

Additionally, NIBS is hosting several important events in 2023 – the Women Executives in Building Symposium on May 24, a follow-up workshop with built environment executives on May 25, and Building Innovation: Women's Leadership Forum in November.

Stay tuned for more information.

Workforce Collaboration: A Study for USACE

2022 marked the fourth year of NIBS' work with the University Research Institute (URI) on a study of collaborative analytics for the U.S. Army Corps of Engineers.

Highlighting the importance of collaboration, the study employs monthly surveys to measure and predict the performance of various team members on the Fort Leonard Wood Hospital construction project in Kansas City, and immediately alerts Corps project managers when a conflict occurs or is about to occur.

Due to the success of the Fort Leonard Wood hospital project, the Corps signed up NIBS and URI to take on two additional projects: another in the Kansas City region and a third covering three projects in the Galveston, Texas area.

INDUSTRY ENGAGEMENT

Association Collaboration

The National Institute of Building Sciences brings together a variety of interests from across the building industry. Our mission is to serve the public interest by advancing building science and technology to improve the built environment. Each organization and association represent a vital piece and specific constituency of the greater building sciences map.

American Association of State Highway and Transportation Officials – NIBS provided support for the American Association of State Highway and Transportation Officials (AASHTO) Committee on Bridges and Structures T-19 Software.

American Institute of Architects – NIBS worked with the Documents Committee to communicate updates to BIM documents to federal agencies.

American Society of Heating, Refrigerating and Air-Conditioning Engineers – Building on the National BIM Guide for Owners, NIBS and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) continued working on and advanced the BIM Standard for Owners that will complement the NBIMS-US and ISO 19650 Organization and digitization of information about buildings and civil engineering works, including a building information modeling (BIM) standard to public review with publication expected in 2023.

BIMForum – The NBIMS Planning Committee provided review of the 2022 update of the LOD specification.

Building Enclosure Technology and Environment Council/Building Enclosure Councils – The Building Enclosure Councils (BECs) are a joint venture between NIBS and the American Institute of Architects (AIA). BECs host some 4,000 members in 34 local chapters. The BECs, each with its own personality and focus, bring together members of all facets of the building industry on a local level. In 2022, many BECs chapters, including Boston, Nebraska, and Research Triangle, added in-person social and educational events back to their schedules.

Building Seismic Safety Council – The BSSC held a session at the 2022 Structural Engineers Association of California Convention to share with the engineering community topics to be considered by the 2026 National Earthquake Hazards Reduction Program (NEHRP) PUC.

Member Spotlight

Alex Belkofer, CM-BIM
VDC Director, Virtual Design & Construction, McCarthy Building Companies, Inc.
Secretary, Board of Directors, BIM Council
Workstream Lead, Stakeholder Engagement, U.S. National BIM Program

As a VDC director, at this point in your career, you have to have lived a lot of stories and tales from both the perspectives of designer and builder.

I got a dual degree from The Ohio State University in architecture and construction systems management. I'm a proud Buckeye being native to Ohio. As a process-oriented person, construction management best fit my curiosity. I always knew I wanted to build.

After school, I found a construction firm and over the course of six years, I got to work on a variety of project types both in-office and boots on the ground - from being an owners rep to working pre-construction – you name it. I got to experience working on over 20 different jobs which is quite unique for a young person in our field, and they helped shape who I am today.

The owners rep role really opened my eyes to what owners see. BIM was becoming hot in the marketplace in the late 2000s, and it was a game changer in how to build and deliver construction work. I came to realize that BIM needed a dedicated focus for the construction trade; it could not be done by a project manager "just dabbling in it." Enter the opportunity for "VDC Management."

I joined a mid-size GC in 2014 and finally landed at McCarthy Building Companies in 2017. After joining McCarthy, I became a member of NIBS in 2019 through the advocacy of our internal quality program. At the time, our national quality director was a member of NIBS. He had a big belief that going beyond the company and going into the industry was where we can collectively move the needle. And I shared that same passion for "digital transformation," BIM, and VDC.

McCarthy was established in 1864. It's the oldest privately held general contractor, with currently $5 billion in annual volume. McCarthy is not just a vertical builder. It does a lot between a diversity of sectors, such as water, solar, aviation, marine, mission critical, and industrial, to name a few.

NIBS is a great avenue and right group of people to collaborate with to drive the AEC industry ever-forward.

As I talk with people about BIM, VDC, and digital transformation, we're all looking for the same things – common understandings, standards, and advancement. People are willing to listen, they're not just coming to the table and saying something needs to be this way.

We are all fundamentally on board with an alignment on how we choose to connect people, process and technology will help move us in the right direction.

It's an open exchange among peers and this radical belief in doing things better. Common value streams. This is the way forward, together.

buildingSMART International/buildingSMART International U.S. Chapter – NIBS developed and released a joint communication on the updating of the Construction to Operations Building information exchange (COBie) module of the NBIMS-US. NIBS also prepared a draft memorandum of understanding for finalization in 2023. NIBS team members participated in and presented at the bSUSA annual meeting and bSI Standards Summit, along with members John Messner, Professor with Penn State University, and Will Sharp, Senior Vice President with HDR.

Connected Places Catapult/Global BIM Network – NIBS participated as a member of Global BIM Network Steering Committee, along with architect and BIM Program Lead Andy Blackmore, with the U.S. Department of State. NIBS collaborated on the development of the U.S. National BIM Program with guidance from UK experience provided by the CPC following the memorandum of understanding with the UK Department for Business, Energy & Industrial Strategy (BEIS).

Design Build Institute of America – NIBS team members continued discussions with Design Build Institute of America (DBIA) on involvement in the U.S. National BIM Program and a possible memorandum of understanding.

Digital Twin Consortium – NIBS held discussions on the integration of BIM and digital twins of facilities that led to a memorandum of understanding between the BIM Council and DTC. This paved the way for the formation of a new Digital Twin Integration Subcommittee of the BIM Council.

Federal Emergency Management Agency National Advisory Council – NIBS Vice President of Engineering Dr. Jiqiu (JQ) Yuan, P.E., PMP, was appointed by Federal Emergency Management Agency Administrator Deanne Criswell to serve on the FEMA National Advisory Council (NAC). Dr. Yuan is a professional engineer with more than 15 years of research and development experience. His three-year term began December 1, 2022.

The Pew Charitable Trusts – NIBS attended the State Resilience Partnership meeting convened by The Pew Charitable Trusts on October 24, 2022. The State Resilience Partnership is a network of organizations committed to supporting state leaders as they develop resilience strategies. In partnership with the American Flood Coalition, the event involved breakout sessions focused on opportunities to improve state technical assistance with local governments and promote building design standards.

U.S. Congress – NIBS supported the Community Disaster Resilience Zones (CDRZ) Act of 2022. The CRDZ Act is a critical, foundational step toward prioritizing and directing a whole-of-nation focus on the most vulnerable communities facing the risk of potentially life-threatening and economically devastating climate and natural disaster events. The Act passed both the U.S. House of Representatives and U.S. Senate and has become law.

U.S. Senate Homeland Security and Governmental Affairs Committee and the Senate Armed Services Committee – NIBS, The Pew Charitable Trusts, U.S. Chamber of Commerce, and dozens of organizations sent a letter in August 2022 to the leadership of the Senate Homeland Security and Governmental Affairs Committee and the Senate Armed Services Committee in support of the National Climate Adaptation and Resilience Strategy Act. Pew wrote: “The letter emphasizes the damage and economic losses that disasters have caused the United States. It also underscores the need for more coordinated approaches to disaster preparedness that proactively reduce risk and break down the tendency of federal resilience efforts to take place in siloes, which can result in inefficiencies and challenges for state and local partners.”

BIM Event Series

NIBS Hosts Series on Information Privacy and Cybersecurity

The Building Information Management (BIM) Council hosted a three-part hearing entitled, The State of Digital Delivery in the Age of Information Privacy and Cybersecurity in 2022.

The series convened a group of experts within the built environment to discuss the impacts of security regulations on the drive toward BIM-enabled project delivery and operations. Series moderators included Rachel Riopel, AIA, NCARB, Digital Practice Leader, HDR; Brok Howard, Product Manager, dRofus; Connor Christian, PE, Senior Product Manager, Procore Technologies; and Nathan C. Wood, Executive Director, CPC.

The series was sponsored by the NIBS Building Information Management Council, BSI, Compass Datacenters, dRofus, Newforma, and Autodesk.

Information Privacy and Cybersecurity in Three Parts

The BIM series included:

- A webinar on June 7, 2022, entitled, Collaborative Digital Delivery in the Age of Information Privacy and Cybersecurity. Presenters included Robert “Bobby” Prostko, Deputy General Counsel, Intellectual Property and Cybersecurity, and Chief Privacy Officer, Allegion; Lynn Burns, ISSM & FSO, HDR Engineering; Horatio McDowney, Information Technology Applications Project Specialist, U.S. General Services Administration; Rahul Shah, Sector Development Director, BSI Group Inc.; and Alexandra Luck, Fellow, the Institution of Civil Engineers. Key contributors included Dr. Ivan Panushev, Principal Partner Solutions Architect for Engineering, Construction, and Real Estate, AWS; Johnny Fortune, BIM Manager, PRIME AE Group; Wanda Lenkewich, CEO, Chinook Systems Inc.; and Dr. Carrie Sturts Dossick, P.E., Professor of Construction Management, Associate Dean of Research, College of Built Environments, University of Washington.
- An in-person workshop on June 7, 2022, in Washington, DC. The workshop allowed U.S. National BIM Program leadership the opportunity to meet with industry stakeholders. Participants and stakeholder organizations included Allegion, Amazon, Autodesk, British Standards Institute, Burns & McDonnell, Center for Digitally Built Britain (CDBB), Chinook, Compass Datacenters, Construction Progress Coalition (CPC), U.S. Department of State, DPR, dRofus, ESRI, Federal Highway Administration, U.S. General Services Administration, HDR Inc., Hensel Phelps, International Code Council, McCarthy, Microsoft, Newforma, Penn State University, Prime AE Group, Procore Technologies, Sundt Construction, University of Washington, United States Army Corps of Engineers, and WSP.

- A presentation on September 27, 2022, during Building Innovation 2022 at The Mayflower Hotel in Washington. Here, event moderators discussed the findings and analysis of the series.

The Road Ahead – Levers of Change

Three objectives were identified in the summary at the Building Innovation 2022 meeting.

These include assessing the capability of organizations to implement new security requirements, comparing the costs implementation to the benefits of using new security requirements, and identifying how current security practices fail and determining what will make them most likely to succeed.

The recommended approaches: gap, cost-benefit, and root cause analyses.

Closing the session, Dr. Carrie Sturts Dossick, P.E., Professor of Construction Management, Associate Dean of Research, College of Built Environments, University of Washington, mentioned that there's a lot of talk around building cybersecurity cultures.

"It seems like a really technical problem, that we deal with firewalls," she said. "We need to build a cybersecurity culture with a vocabulary and practices. It seems like a technical problem, but it's really about people and process."

A final report with series results is available on NIBS website. Another installment in the BIM series as well as new workshops on BIM standards and project delivery using models are planned for 2023.

Building Innovation 2022

BI2022 Highlights: Decarbonization, BIM, Resilience, and Building Awards

Building Innovation met in-person for the first time since 2019, with a robust lineup of 15 educational sessions, covering a spectrum of built environment topics. The meeting took place September 26-28.

Among the highlights: Decarbonization, building information modeling, digital transformation, climate resiliency, mitigation planning, building codes, and risk management.

The National Institute of Building Sciences hosted BI2022 at the Mayflower Hotel in Washington, DC.

Keynote speaker Stacy Smedley, Executive Director with Building Transparency, kicked off the meeting on September 27, with a talk on decarbonizing the building sector. Smedley said disasters like forest fires, flash floods and other hazards, while called natural disasters largely are caused by things we consume.

"Forty percent of global carbon emissions is from the built environment," Smedley said.

To begin turning this around, she said: "Life is like an onion. You peel it back one layer at a time, and sometimes you weep." The message: This is how you attack carbon.

A Roadmap to a Decarbonized Built Environment

In addition to Smedley's keynote, another session that addressed decarbonization included a panel entitled, Building a Roadmap to a Decarbonized Built Environment: Resources & Recognition Opportunities.

The panel included Ryan Colker, Vice President, Innovation, International Code Council; Luke Leung, Principal, Sustainability Engineering Studio, Skidmore, Owings and Merrill LLC; Mariana Egea-Casalduc, ORISE Science,

Technology, and Policy Fellow, U.S. Department of Energy, Building Technologies Office (BTO); and Josh Jacobs, Director of Sustainability, WAP Sustainability.

“Look at your supply chains,” said Jacobs. “Where things are actually coming from? Carbon will not change everything, but it will start to make things more understandable.”

BI2022 Sessions

Building Innovation covered a lot of territory. Sessions included:

- BIM Provides Fuel for Data-Driven Change at the Department of State
- Data and AI in Construction
- Design for Resilience and Sustainability: Concrete Protects Life and Resiliency and Zero Energy for Educational Facilities Case Study
- Resilient and Smart Interiors: Protecting Occupant Wellness and Reducing System Construction Costs
- Beyond Drawings: Engaging Owners and Users with Digital Twin and Mock-Up Technologies
- Landscape of Federal and State Resilience Planning & Policies and the Role of Modern Building Codes and Standards
- Keynote: Half, with Kelly Alvarez Doran, Senior Director of Sustainability and Regenerative Design at MASS Design Group and Director of the Ha/f Research Studio at the University of Toronto
- Risk Management in the Built Environment: Resilience as the Antidote to Litigation in a Changing Climate
- Hazard Resilience & Building Codes in Action: NEHRP, NWIRP & Modern Codes and Standards

FEMA and NIBS: A Multi-Faceted Partnership

Day 2 began with a breakfast keynote by David Maurstad, Deputy Associate Administrator for Federal Insurance and Mitigation and Senior Executive of the National Flood Insurance Program with the Federal Emergency Management Agency.

Maurstad talked about the impacts felt by then-Hurricane Ian, which had been downgraded to a tropical storm, moving across Florida and leaving more than 2.6 million people without power. Maurstad mentioned that FEMA had prepositioned supplies and personnel in strategic locations in the south, with thousands of reservists and surge capacity force personnel ready to deploy, if needed.

“The changing climate doesn’t care about our mitigation efforts,” he said. “This is the issue of our generation.”

Maurstad spoke of the importance of the longstanding, multi-faceted partnership between FEMA and NIBS to meet the evolving needs of the nation.

“Climate change is an existential threat that we have every reason to believe will increase in gravity and intensity,” he said. “FEMA can’t do this alone. The stakes are too high.”

Annual Awards

NIBS Recognizes Built Environment Award Recipients at BI2022

The National Institute of Building Sciences recognized several built environment leaders during Building Innovation 2022.

The 2022 award recipients included:

- NIBS Distinguished Service – Bryan Koon, Vice President of Homeland Security and Emergency Management, IEM
- Exceptional Woman in Building – Cheryl J. Lyman, Executive Director, Ohio Facilities Construction Commission
- Future Leaders – Jamie Leigh Price, Mitigation Investment Lead, Federal Emergency Management Agency
- NIBS Innovator – Microsoft Silicon Valley Campus
- NIBS DEI Leadership – GEI Consultants, Inc.
- Mortimer M. Marshall Lifetime Achievement – Philip Schneider, retired

Scholarship Award Recipients

NIBS named two recipients of the Betty and Mort Marshall Memorial Scholarship, which was established to promote diversity in the building sciences and benefit students pursuing a career in architecture and engineering at a historically Black college or university. The scholarship was started in 2020, in memory of the Marshalls. Mort was the first member of the National Institute of Building Sciences.

The 2022 scholarship recipients were Jose Portillo, a civil engineering student with Tennessee State University, and McKenzie Cleveland, an architecture student with Hampton University. Each student received $5,000 toward their tuition.

NIBS leadership also recognized retiring board member Paul Bertram, president of consulting firm PRB Connect. Bertram has served the NIBS board since 2016.

INFRASTRUCTURE 2022

In 2022, NIBS dug deep with a quarterly series called Infrastructure 2022.

Sponsored by Procore Technologies, Infrastructure 2022 covered key infrastructure topics, including:

- Transportation infrastructure. The passage of H.R.3684 – the Infrastructure Investment and Jobs Act (IIJA) – ensures daily commutes across metropolitan cities and small towns will be improved. The bill reauthorizes surface transportation programs for five years and invests $110 billion in additional funding. It also guarantees $89.9 billion for public transit over the next five years between reauthorizations and new funding.
- Goods and supply chain challenges. IIJA is expected to improve the way Americans travel, as well as how goods and materials are transported. It has earmarked $25 billion for airports, $66 billion for railways, and $100 billion in competitive grants for projects focused on moving freight. These grants will help unblock delivery channels and clear bottlenecked supply chains. Electric vehicle charging infrastructure will also be addressed with $7.5 billion in funding. Additionally, $5 billion is allocated for electric school buses and cleaner alternatives.

- Lifelines and access to high-speed networks. According to the U.S. Environmental Protection Agency, there are an estimated six to 10 million lead service lines across the country. Cities have been taking measures to finance projects that identify and remove the bad lines. Knowing that access to clean drinking water is a basic human right, IIJA allocated $55 billion to further reach this goal. Also, in January 2022, the U.S. Department of Energy launched the Building a Better Grid Initiative to make the nation's power grid more resilient to the impacts of climate change and increase access to reliable and affordable clean energy. IIJA earmarked $28 billion for resiliency of powerlines and over $60 billion total for clean energy.
- Preparedness and mitigating the climate crisis. IIJA is the largest-ever federal investment in climate change. It has earmarked $8 billion for wildfire management, $6 billion for drought management, $8.3 billion for water storage and sanitation, and $12.5 billion for flood mitigation. Funds will be filtered through the U.S. Environmental Protection Agency, Federal Emergency Management Agency, U.S. Army Corps of Engineers, and U.S. Department of the Interior to state and local governments.

Visit Infrastructure 2022 to view the webinar recordings and session notes.

NIBS COUNCILS

Building Enclosure Technology and Environment Council

The **Building Enclosure Technology and Environment Council (BETEC)** fosters a better understanding of how building components interact with each other and with the environment in order to optimize energy use.

In 2022, BETEC members rallied for the cause to bring more building science education into school curricula and initiated efforts toward that goal, including presenting an introductory session on the topic at Building Innovation 2022. BETEC also initiated a push to increase its visibility within the building industry by sponsoring a booth at the International Institute of Building Enclosure Consultants (IIBEC) fall conference. Additionally, BETEC members once again networked virtually to rebuild sections of the Whole Buildings Envelope Guide (part of the Whole Building Design Guide), including the exterior wall, fenestration, and masonry pages.

Chair: Stephen Shanks, CxA, BECxP, NDT Level III, Senior Consultant, Building Science Solutions, Building & Construction, Intertek
Vice Chair: Dudley McFarquhar, PhD, PE, Owner, McFarquhar Group Inc.
Secretary: Keith A. Simon, FAIA, Principal, Terracon Consultants, Inc.
Members-at-Large: Justin Boone, Associate Principal & Unit Manager, WJE Associates; Brian Stroik, Director of Building Enclosures, Tremco Commercial Sealants & Waterproofing
AIA/BETEC Liaisons: Will Babbington, Principal, Facade Design Director, Studio NYL; Lane Beougher, FAIA, FCSI, LEED AP BD+C, Program Manager, Ohio Facilities Construction Commission

The **Building Enclosure Councils (BECs**), a joint venture between The American Institute of Architects and NIBS under the aegis of BETEC, consists of 4,000 members in 34 local chapters.

BEC chapters brought back a number of in-person events and employed a variety of virtual means to connect members and continue building enclosure education through webinars and virtual meetings throughout 2022. BETEC and the BECs also began initial discussions to revive the Building Enclosure Science and Technology (BEST) Conference series, with an in-person conference imagined for early spring 2023.

BEC National Chair: William Babbington, AIA, Principal, Studio NYL
BEC National Vice Chair: John Burningham, Principal, UNVC
NIBS Board Liaison: Paul R. Bertram, Jr., FCSI, PRB Connect
NIBS Staff: Stephanie Stubbs, Vice President, Technical Solutions

Building Information Management Council

The **Building Information Management (BIM) Council** is a unique organization helping the North American real property industry become more efficient. The BIM Council leads in the creation of tools and standards that allow projects to be built digitally before they are built physically through the use of building information modeling.

BIM Council membership is comprised of individuals and organizations representing government agencies, academia, and the private architect, engineer, and construction firms. It includes 160 participating organizations.

The BIM Council continued to support the national computer-aided design (CAD) and building information modeling (BIM) standards – the United States National CAD Standard® (NCS) and National BIM Standard–United States® (NBIMS-US™). The BIM Council's NCS Steering Committee (SC) continued its review and reorganization of the upcoming version 7 of the standard and developed SC ballots, documenting the changes and global updates planned to be submitted for approval of the NCS Project Committee in early 2023.

The council's NBIMS Planning Committee (PLC) continued work on the update of the next edition of the NBIMS-US with workgroups addressing Project Delivery Requirements, Construction to Operations Handover (COBie), BIM Uses, BIM Execution Plans, and Information Exchange Requirements for the updated standard to be released in parts in 2023. The BIM Council also conducted a workshop series on Cybersecurity and Project Delivery and supported the development and launch of the U.S. National BIM Program (NBP).

2023 will focus on release of NBIMS v4 modules and the NBP. The council is generously supported by sponsors from government and industry identified on the NIBS website.

Chair: Rachel Riopel, AIA, Digital Practice Leader, HDR Inc.
Vice Chair: Nancy Novak, Chief Innovation Officer, Compass Datacenters; Mariangélica Carrasquillo Mangual, Chief, CAD-BIM Technology Center, U.S. Army Engineer Research and Development Center (ERDC)
Secretary: Alex Belkofer, CM-BIM, VDC Director, McCarthy Building Companies, Inc.
Member-at-Large: Shawn Foster, Director, Business Development & Customer Success, Allegion
Past Chair: Van Woods, BIM Program Manager, Seattle District, U.S. Army Corps of Engineers
NIBS Board Liaison: Russell Manning, PhD, LEED AP, CEFP, CRL, International Code Council, Denver, CO
NIBS Staff: Roger J. Grant, FbSI, Vice President, Building Technology; Dominique Fernandez, Project Director

BIM Council – National BIM Program Steering Committee – The U.S. National BIM Program (NBP) expands on needed standards, supporting their implementation and use by building and infrastructure asset owners and bringing together the many related initiatives and stakeholder groups working on digital transformation in the U.S.

The NBP Steering Committee is comprised of representatives of the public and private asset owners, design and construction organizations, and academia. The steering committee completed the development of the U.S. National BIM Program implementation plan and began to work with the BIM Council Board and NIBS staff on

obtaining support and implementing the program across its six workstreams (Owner Leadership, Project Delivery, Standards and Guidelines, Stakeholder Engagement, Education and Training, and Legal and Insurance.) Efforts will continue in 2023 with a focus on Owners, Standards and Stakeholders.

Salla Eckhardt, Chair, OAC Services, Inc.
Paul Audsley, NBBJ
Luciana Burdi, Massachusetts Port Authority
Andrew Blackmore, U.S. Department of State Bureau of Overseas Building Operations
Jason Fairchild, U.S. Army Corps of Engineers
Charles G. Hardy, U.S. General Services Administration, Public Building Service
Michael Kennerly, Iowa Department of Transportation
Hannu Lindberg, DPR Construction
Jagannath Mallela, WSP
Russ Manning, International Code Council
Katherine Petros, Office of Infrastructure Research and Development, Federal Highway Administration
Ivan Panushev, Amazon Web Services
Will Sharp, HDR
Grace Wang, Google
NIBS Staff: Roger J. Grant, FbSI, Vice President, Building Technology; Johnny Fortune, BIM Program Executive Director

Building Seismic Safety Council

The **Building Seismic Safety Council (BSSC)** deals with the complex technical, regulatory, social and economic issues involved in developing and promulgating building earthquake risk mitigation provisions that are national in scope.

It brings together the needed expertise and relevant public and private interests to resolve issues related to the seismic safety of the built environment through authoritative guidance and assistance backed by a broad consensus. It enhances public safety by providing a national forum that fosters improved seismic planning, design, construction and regulation in the building community.

BSSC was established in 1979, as one of the important initiatives under the National Earthquake Hazards Reduction Program (NEHRP).

Chair: Kent Yu, PhD, SE, Principal, SEFT Consulting Group
Vice Chair: Joann Browning, PhD, P.E., Dean, College of Engineering, University of Texas, San Antonio
Secretary: Iris Tien, Williams Family Associate Professor, Georgia Tech
Members-at-Large: Roberto Leon, P.E., PhD, Professor, Via Department of Civil and Environmental Engineering, Virginia Tech; Bill Earl, Engineering Branch Chief, GSA

Past Chair: Charles J. Carter, SE, PE, PhD, President, American Institute of Steel Construction
NIBS Board Liaison: Sez Ratamturktur Russcher, Head of the Department of Architectural Engineering, Penn State
NIBS Staff: Jiqiu (JQ) Yuan, PhD, P.E., PMP, Vice President, Engineering, Executive Director, Multi-Hazard Mitigation and Building Seismic Safety Councils

Consultative Council

The **Consultative Council** assembles high-level building community representatives to make recommendations directly to the executive and legislative branches of government to improve our nation's buildings and infrastructure.

Each year, the Consultative Council publishes the Moving Forward Report to investigate key issues, offering solutions to overcoming these challenges. The 2022 Moving Forward Report is focused on decarbonizing the built environment.

Chair: Kathie Morgan, President, ASTM International
Vice Chair: Brian Pallasch, CEO & Executive Vice President, IIBEC
NIBS Staff: Kyle Barry, Director, Technical Solutions

Facility Management and Operations Council

The **Facility Management & Operations Council (FMOC)** is focused on the use of technology for existing buildings.

In 2022, council workshops were executed to determine and document facility management and operations focus areas that may be underrepresented or underdeveloped in national standards, federal or state funding, or industry strategy. The focus areas selected for fortification include TCO (Design for Maintainability), Lean Data Standards & Product Data Requirements, AI in Buildings & Cybersecurity, Facility Commissioning & Transition Planning, Asset Sustainment & Risk Mitigation, and Sustainability. Several focus areas have been elevated for multi-council collaboration and development.

The FMOC will be hosting several webinars in 2023 on these focus areas. Multiple focus area white papers have been completed and are being edited and approved for publication in 2023 on the NIBS Whole Building Design Guide.

Chair: Rolf Alexis, Senior Global Capital Asset Analyst, Global Facilities, General Motors Vice Vice Chair: Emily Herndon, LEED AP, Senior Consultant, Woolpert, Inc.

NIBS COUNCILS

NIBS Board Liaisons: Daniel E. Nichols, PE, IAAI-FIT, State of New York's Metropolitan Transportation Authority, Hyde Park, NY; Darrell X. Rounds, FMA, CEM, Senior Manager, Global Workplace Risk Mitigation, General Motors Company
NIBS Staff: Jay Kline, Director, Project Management

Multi-Hazard Mitigation Council

The **Multi-Hazard Mitigation Council (MMC)** brings together a body of experts in a multitude of related fields that can address the challenges associated with the identification and implementation of effective mitigation practices. NIBS is an independent entity that aims to inform decision-making, leading to effective public policy on many levels. Its goals are simple — promoting disaster resilience, while becoming a focal point of credible information and promoting whole building strategies.

Chair: Anne Cope, PhD, P.E., Chief Engineer, Insurance Institute for Business and Home Safety
Vice Chair: Russ Strickland, Secretary, Maryland Department of Emergency Management (MDEM)
Secretary: Lauren Alexander Augustine, Executive Director, Gulf Research Program, National Academies of Sciences, Engineering, and Medicine
Member-at-Large: Alice Yates, Director of Government Affairs, ASHRAE
Past Chair: Sara Yerkes, Senior Vice President of Government Relations, International Code Council (retired)
NIBS Staff: Jiqiu (JQ) Yuan, PhD, P.E., PMP, Vice President, Engineering, Executive Director, Multi-Hazard Mitigation and Building Seismic Safety Councils; Mira Papinova, Project Manager

Multi-Hazard Mitigation Council - Committee on Finance, Insurance, and Real Estate (CFIRE) examines the intersection of finance, insurance, investment and design, construction, and ownership to encourage the development and assist in the affordability of high-performance buildings.

Banks, insurance companies, appraisers and real estate firms all play a significant role in how buildings are procured, designed, and constructed. How these segments evaluate the risk associated with particular projects, technologies and practices can have an enormous impact on whether an idea gets the funding and insurance needed to move forward to fruition. However, banks, insurance companies, appraisers and real estate firms often lack the necessary data to support building industry efforts to go beyond "business as usual." CFIRE works to address these challenges by promoting a cooperative process and open dialogue among the different parties to support the achievement of cost-effective high-performance buildings.

Chair: Daniel Kaniewski, PhD, Managing Director, Public Sector, Marsh McLennan
CFIRE Steering Committee:
Timothy Judge, SVP, Chief Climate Officer, Fannie Mae
Michael Newman, Senior Director, Law and Public Policy, IBHS
Bill Garber, Director, Government and External Relations, Appraisal Institute
Cassandra Skidanov, Affordable Lending Manager, Housing Insights and Solutions, Freddie Mac

Natalie Enclade, Executive Director, BuildStrong Coalition
Jamie Woodwell, Vice President, Research & Economics, Mortgage Bankers Association
NIBS Board Liaison: Lori Peek, PhD, Director, Natural Hazards Center and Professor, Department of Sociology, University of Colorado Boulder
NIBS Staff: Jiqiu (JQ) Yuan, PhD, P.E., PMP, Vice President, Engineering, Executive Director, Multi-Hazard Mitigation and Building Seismic Safety Councils

Off-Site Construction Council

In 2013, the National Institute of Building Sciences established the **Off-Site Construction Council (OSCC)** to serve as a research, education and outreach center for relevant and current information on off-site design and construction for commercial, institutional, and multifamily facilities.

Chair: Aundre Oldacre, Managing Partner, AoRa Development
Vice Chair: Ryan Colker, J.D., CAE, Vice President of Innovation, ICC
Secretary: Marc Bielas, Founder and CEO, Quilt Group
Members-at-Large: Laurie Robert, Horizon North (retired); Ryan Smith, Founding Member, MOD X
NIBS Staff: Kyle Barry, Director, Technical Solutions

Whole Building Design Guide Workgroup

Whole Building Design Guide Workgroup

For almost 40 years, NIBS has been entrusted to provide advanced technology services in accessing criteria from the U.S. Department of Defense, U.S. Department of Veterans Affairs, General Services Administration and other principal federal agencies responsible for design and construction of this nation's government facilities. The WBDG – Whole Building Design Guide (www.wbdg.org) has been that robust online resource for over two decades fulfilling that charge while also providing pertinent building technology resources to advance their facility programs.

The goal of the WBDG not only is to provide a platform to convene federal agencies and industry organizations working to advance building innovation, but also focus on the concept of 'whole building design,' applying an integrated design approach and team process to create high-performance buildings. This is the mission and vision of the WBDG–Whole Building Design Guide Workgroup to foster that communication and knowledge-sharing among federal, industry and academic partners leveraging the WBDG website and other outreach channels.

The WBDG Workgroup's membership consists of representatives from more than 15 agencies, including the U.S. Department of Defense, U.S. Department of Veterans Affairs, U.S. Department of Energy, General Services Administration, U.S. Department of State, U.S. Department of the Interior, and the National Aeronautical and Space Administration. These members along with non-profit organizations, educational institutions and key private sector supporters provide subject matter expertise, expanding the wide range of building environment knowledge represented in WBDG online resources.

FY22 Highlights

- The WBDG Commissioning Committee convened professionals from NIBS, the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE), Building Commissioning Association, AABC Commissioning Group, and NEBB to advance and revise the Building Commissioning resources online. The WBDG's Building Commissioning section went through a major revision to present information about current approaches and processes as well as overcoming challenges and emerging issues. It was also expanded to address Existing Buildings and Ongoing Commissioning.
- The WBDG serves as the DOE Federal Energy Management Program's platform for continuing education and collaborated with its expert team to develop new features in WBDG's Learning Management System, improving user experience. FEMP produces training events and online courses, providing the most up-to-date technology and contracting opportunities to assist in developing and sustaining a high-performance federal workforce supporting our government's facilities and fleets. NIBS has been proud to provide WBDG's online services to FEMP for over a decade as the program's mission is key to assisting agencies with meeting Federal Sustainability Plan goals calling for additional energy and water efficiencies while also reducing greenhouse gas emissions.
- WBDG staff added and updated more than 1,000 Federal Facility Criteria documents providing up-to-date information on federal and industry standards in designing, constructing, and maintaining government facilities. Also this year, the WBDG Accessible Design Objective committee convened to update its pages with new emerging developments, subject matter experts provided updates to key Building Type/Resources pages, and the WBDG developed new partnerships with industry organizations to collaborate and share information among stakeholders.

Member Spotlight

Andy Smith
Retired, Solutions Executive, Bentley Systems Inc.
Past Chair, former buildingSMART alliance, NIBS

I practiced architecture with Atlanta design firms actively working on projects, providing firm-wide information technology leadership, and became a user of Bentley MicroStation. My professional practice experience and use of MicroStation led me to work at Bentley. My work focused on consulting with executives to understand project delivery business requirements, helping to optimize investments in information technology, and providing input back into Bentley's building design applications functionality and business strategy.

My interest in technology motivated me to become a member of NIBS in 2009, joining the buildingSMART alliance (bSa) Board of Direction (today, it's the Building Information Management (BIM) Council). The council is responsible for commercial delivery of the United States National CAD Standard (NCS) and National BIM Standard-United States® (NBIMS-US™).

In 2014, I was privileged to be the chair of the bSa Board of Direction. During my time on the board, we focused on member value, communications, and strategic planning. We desired to organize in a way to provide forward-looking technology insight, industry education, and the commercial delivery of open standards.

For me, a favorite part of being a NIBS member is getting to know other professionals interested in professional practice technologies, learning of organizational dynamics through a voluntary organization, and making some lifelong friends. Bentley Systems received value from NIBS sponsorship with market visibility as an active contributor to industry improvement and an opportunity to provide input into the development of IFC (Industry Foundation Classes), an open standard for the exchange of data about a facility, its construction, and maintenance.

I contribute my participation on industry boards and technical working groups with helping me be more understanding of the complexities of the architectural, engineering, construction and operations industry. It helped me be more respectful on the different roles and business needs of the many companies that come together to deliver an infrastructure project. And, it helped me be thoughtful when participating in global diverse organizations.

Member Organization Spotlight

International Code Council

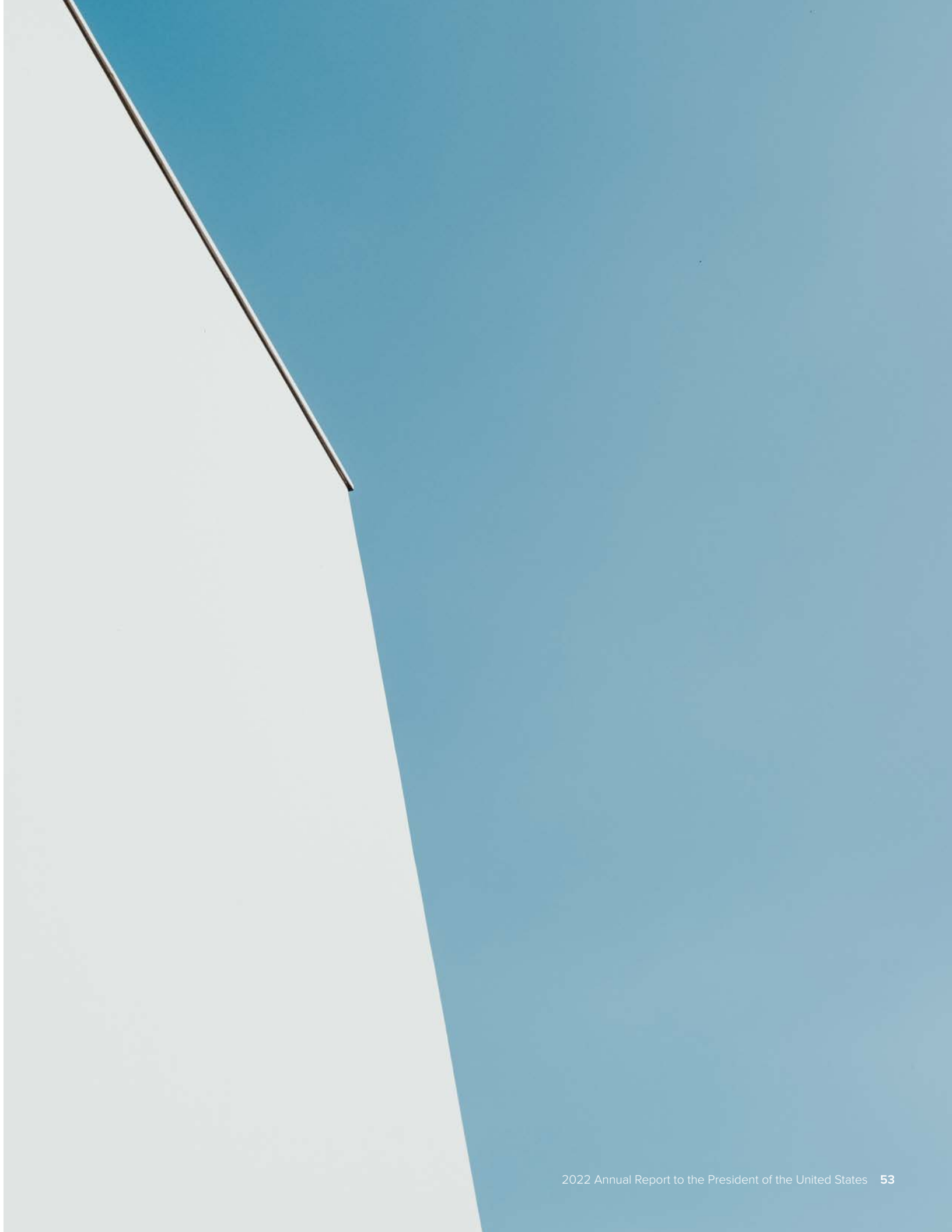
The International Code Council is the leading global source of model codes and standards and building safety solutions. Code Council codes, standards and solutions are used to ensure safe, affordable and sustainable communities and buildings worldwide. Nearly two billion people are impacted by the International Codes.

The long-standing partnership between NIBS and the Code Council has been central to fulfilling the missions of both organizations, which can be simplified to keeping people and buildings safe. Together, we've led industry-wide conversations with recognized leaders about key topics, including multi-hazard mitigation and resilience and the rise and regulation of offsite construction. We've conducted ground-breaking research and educated the industry and public on the importance of building safety. Finally, we've developed valuable resources they have helped hundreds of jurisdictions navigate regulatory challenges and advance building safety in their communities.

Some partnership highlights:

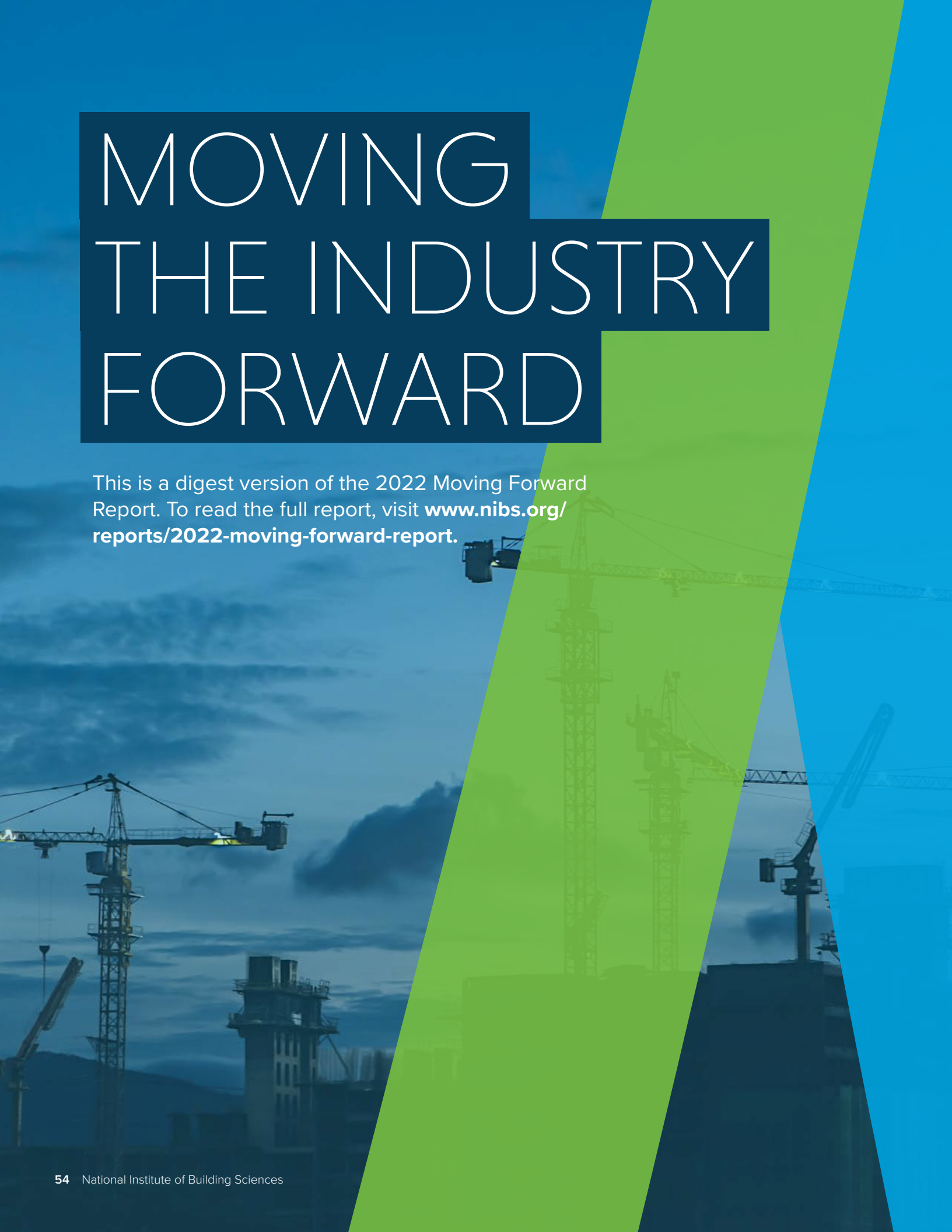
- 2017-present NIBS is a Preferred Provider of International Code Council education courses
- 2019 Natural Hazard Mitigation Saves report update
- 2021 co-convened Surfside Panel Discussion
- 2020–2024 HUD Off-Site Construction Research Roadmap and strategic plan
- Ongoing: NIBS supports the Code Council's annual Building Safety Month
- Ongoing: ICC is a contributor to the NIBS Consultative Council's annual Moving Forward report
- Ongoing: Code Council representatives serve on the NIBS Board of Directors, Consultative Council, Multi-Hazard Mitigation Council, and Off-Site Construction Council

The future of our partnership will include the continued advancement of building safety through building science and building codes as well as a commitment to encouraging and supporting diversity within the construction workforce. We look forward to many more years of collaboration.



MOVING THE INDUSTRY FORWARD

This is a digest version of the 2022 Moving Forward Report. To read the full report, visit **www.nibs.org/reports/2022-moving-forward-report.**



Decarbonizing the Built Environment

The NIBS Consultative Council assembles high-level building community leaders to make collective recommendations directly to policymakers to improve our nation's buildings and infrastructure. Members of the council include organizations representing consumers, architects, engineers, government officials, contractors, researchers, and housing officials. The goals of the council are three-fold:

- Convene Thought Leaders: bringing together industry leaders and experts from across the built environment to improve our nation's infrastructure and buildings.
- Identify Challenges: assembling experts who identify key issues they believe will be facing the industry in the years ahead.
- Find Solutions: developing and publishing a yearly report that offers solutions to key challenges the built environment faces.

Each year, the Consultative Council publishes the Moving Forward Report to investigate critical challenges facing the building industry and to make recommendations to the industry and policymakers to help overcome those challenges. These reports provide a reference point on the state of the industry at a specific point in time. NIBS and the Consultative Council intend to revisit each report topic periodically, to track progress and discuss potential new challenges and solutions.

The Challenge: Carbon Emissions and the Building Sector

The building sector is a significant contributor to global greenhouse gas (GHG) emissions. At the macro level, these emissions contribute to and accelerate the harmful effects of climate change. Locally, these emissions have a direct, negative impact on buildings' occupants and surrounding communities, by reducing indoor air quality and contributing to outdoor air pollution. Mitigating these adverse effects will require achieving both near- and long-term emissions reductions throughout the built environment. Further, the potential near-term consequences of climate change mean that there is a critical need to accelerate reductions in GHG emissions sooner rather than later. This calls for a sector- and economy-wide effort, involving stakeholders throughout the building lifecycle.

To support this effort, NIBS and the Consultative Council have issued this report to examine key concepts, challenges, and considerations related to building sector decarbonization, and also to provide recommendations to policymakers and industry stakeholders on priority actions and next steps.

Several terms used in this report—including decarbonization, operational carbon, and embodied carbon—are colloquial terms of art within the building sector, where the word "carbon" is used as shorthand for the full range of GHG emissions that are produced during a building's lifecycle. The word "carbon" derives from carbon dioxide (CO_2), which represents the vast majority of GHG emissions each year. However, there are several other GHGs of major concern that are also a focus of decarbonization efforts, including methane, nitrous oxide, and fluorinated gases.[1]

Building Sector Emissions – U.S. Summary

Buildings are one of the leading sources of carbon emissions in the U.S. Per the U.S. Environmental Protection Agency (EPA), the residential and commercial building sector directly contributes 12.5% of total GHG emissions in the U.S., primarily through the direct combustion of fossil fuels for building operations such as heating, cooling, and cooking.[2] When also accounting for indirect emissions associated with the generation and transmission of electricity used in buildings, the residential and commercial building sectors' share of total U.S. GHG emissions increases to over 30%.

These totals also do not account for the full lifecycle of a building's GHG emissions, including those resulting from resource extraction; product manufacturing, transportation, and installation; building construction; equipment replacement and maintenance; and demolition/end of life. Accounting for each of these lifecycle elements produces total building sector emissions that are much higher than traditionally estimated.[i]

Decarbonization

What is Decarbonization?

Decarbonization broadly refers to the process of reducing the amount of CO2 and other GHG emissions that are released into the atmosphere, by moderating or replacing carbon-intensive activities and energy sources with low- or no-carbon alternatives. As applied to the building sector, decarbonization entails reducing or eliminating lifecycle GHG emissions associated with the construction, operation, and decommissioning of buildings, defining success for sustainability efforts as a reduction in the building sector's lifecycle carbon footprint.

How to Decarbonize the Building Sector

Efforts to reduce the carbon footprint of the building sector are differentiated between activities targeting operational carbon and those targeting embodied carbon. Due to advancements in building energy codes, appliance standards, the efficiency of building technologies, and other regulatory and market innovations, the

[i] According to the World Green Building Council, as much as 11% of global GHG emissions can be attributed to building sector materials and construction activity. See: https://worldgbc.org/article/bringing-embodied-carbon-upfront/.

building sector has observed a significant decrease in energy use and operational carbon emissions in new-construction buildings over the last three-plus decades. In contrast, tools, guidance, and other informational resources have only recently emerged to help architects, engineers, builders, and others reduce embodied carbon, and embodied carbon has only recently been established as a priority target of public policy and regulatory requirements.

Operational Carbon

Operational carbon refers to those GHG emissions associated with energy used to heat, cool, ventilate, illuminate, and otherwise operate a building. Traditionally, reducing operational carbon emissions has been the focus of policymakers and industry stakeholders, and this focus has not been without warrant—over two-thirds of total building emissions currently stem from building operations.[3]

Decarbonizing Building Operations

To continue achieving significant and meaningful reductions in buildings' operational carbon emissions, the same basic formula can be applied to most structures:

> (1) Minimize a building's energy needs through energy efficient design and construction, energy efficiency retrofits, installation of high-efficiency appliances and equipment, implementation of building commissioning practices, and/or the application of efficient operational strategies.
>
> (2) Meet a building's resulting balance of energy needs with energy sources that have the lowest possible GHG intensity, such as by investing in onsite renewable generation capacity and energy storage, or by operating buildings in harmony with the power grid, implementing demand response and other forms of building-to-grid integration to reduce peak demand and time-of-use-related emissions.

Though this formula for decarbonizing building operations is simple, there is no one-size-fits-all approach to its implementation. The most realistic and effective emissions reduction pathway for any given building will vary significantly based on a myriad of factors, including geographic location, building type, the cost and availability of compatible equipment and materials, the availability of financing, the availability of a trained and experienced workforce, and applicable state and local requirements. In addition, relevant considerations will vary based on whether the building in question is an existing building or a planned new-construction project. Finally, efforts to decarbonize building operations can inadvertently impact a building's ability to withstand expected severe weather, so decarbonization activities need to carefully consider and integrate resilience planning and practices.

Embodied Carbon

Per the New Buildings Institute, embodied carbon is the sum total of all GHGs emitted from nonrenewable sources resulting from raw material extraction, manufacturing, transporting, construction and installation activities, ongoing material/product use, maintenance, repair, and disposal.[4] Generally, with some material exceptions, the embodied carbon in a structure cannot be reduced—once expended or embodied in the walls, windows, and surfaces of a building, this emitted carbon from non-operational activities cannot be recovered.[5]

Traditionally, embodied carbon has been a secondary concern for industry and policymakers, with primary attention paid to GHG emissions associated with building operations. However, as recognition grows that—absent intervention—embodied carbon will begin to represent a larger and larger share of total building sector emissions as operational carbon emissions decline, this balance of attention has begun to shift. Presently, both the building industry and governments at the federal, state, and local levels are expanding their focus to also include policies aimed at reducing buildings' embodied carbon. This must continue if there is to be a meaningful reduction in total

lifecycle emissions from the buildings sector.

Reducing Embodied Carbon in Buildings

Given that a majority of a building's embodied GHG emissions are locked in once it has been constructed and occupied, strategies and approaches for reducing a building's embodied carbon footprint are most impactful when applied to new construction or major rehabilitation projects. The American Institute of Architects (AIA) identifies the following 10 steps that can be taken to reduce embodied carbon as part of the design and construction of such projects:[6]

1. Reuse buildings instead of constructing new ones.
2. Use low carbon concrete mixes.
3. Limit carbon intensive materials.
4. Choose lower carbon alternatives.
5. Choose carbon sequestering materials.
6. Reuse materials.
7. Use high-recycled content materials.
8. Maximize structural efficiency.
9. Use fewer finish materials.
10. Minimize waste.

Any renovations, maintenance activities, or repairs that add to or replace materials during a building's lifetime contribute to its embodied carbon calculation, and the same strategies used during design and initial construction can also be applied during renovation or repairs to minimize lifetime embodied emissions. Emissions associated with the decommissioning of a building also count against its ultimate embodied carbon tally, so prior to rehabilitation or demolition it is important to consider what building materials can be recycled or reclaimed for use elsewhere.

Why Decarbonization Matters

Given the U.S. building sector's significant contributions to both national and global GHG emissions totals, there is a clear case for expanding efforts to target reductions in building sector GHG emissions. The scale of the industry's emissions present an opportunity to achieve significant reductions through decarbonization, thus contributing to mitigation efforts that can slow or even reverse the harmful effects of anthropogenic climate change. Successful building sector decarbonization can also yield more immediate environmental benefits, notably a decrease in local air pollution resulting from reductions in regional GHG emissions.

Many potential benefits can also accrue directly to those building owners who invest in decarbonization. For one, energy efficiency

improvements and onsite renewable generation capacity can reduce owners' utility bills and other related energy costs, while also increasing a building's resilience to extreme weather events. In addition to reducing operating costs, buildings that are energy efficient and have low GHG emissions may be more attractive to buyers or renters, which can increase overall property values. Decarbonization investments can also improve a building's indoor air quality, which can be beneficial for the health and well-being of building occupants.[7]

Challenges to Decarbonization

As one of largest carbon-emitting sectors of the U.S. economy, decarbonizing the building sector will take a massive, strategic, all-hands-on-deck effort. Both the private sector and federal, state, and local governments have begun taking important steps to reduce operational GHG emissions and embodied carbon in the nation's building stock, but numerous challenges remain that require broad buy-in and coordination across sectors.

New vs. Existing Buildings

With much of the current building stock expected to continue to operate well into the second half of the 21st century, improving the energy efficiency of existing buildings represents a huge opportunity to reduce GHG emissions. However, improving existing buildings represents a unique set of challenges that need to be addressed by policymakers[8], and will require a coordinated effort on the part of governments, owners, developers, designers, operators, and the building industry at large.

Code Adoption and Enforcement

Updated building code requirements for new and existing buildings, if adopted and enforced, have the potential to significantly reduce GHG emissions through energy efficiency. However, the adoption of energy codes at the state and local level is highly variable—some jurisdictions have no or only an outdated energy code in place, while others have energy codes that exceed the latest model codes. Even where codes are adopted, enforcement lags significantly, and states and local jurisdictions frequently pick and choose only portions of the newest model codes to implement. To realize savings from codes, authorities having jurisdiction need to significantly step up code enforcement and compliance rates.

System-Level Considerations

Buildings do not operate in a vacuum, and efforts to decarbonize the building sector cannot succeed without considering the broader systems in which buildings operate. For example, the GHG intensity and other characteristics of power grids that serve buildings can heavily impact the efficacy of building decarbonization investments. Additionally, federal-, state-, and utility-level power sector regulations and policies all influence the ultimate cost borne by building owners who seek to interconnect onsite renewable generation capacity with the grid. Ultimately, the success of efforts to advance building decarbonization will in part depend on parallel efforts to establish favorable system-level conditions.

Workforce Considerations

Recent federal legislation has directed significant new funding toward workforce development to help grow the pipeline of skilled professionals that can manufacture, install, operate, and maintain emerging low-emission technologies and advanced building controls. However, as the NIBS Consultative Council has discussed in previous Moving Forward Reports, the U.S. building industry is already facing a dire workforce shortage. Consequently, while decarbonization of the building sector can serve as a jobs creator in fields such as energy efficiency, renewable energy, and green building design, maintaining a narrow focus on new and emerging technologies and services risks crowding out existing workforce development efforts that seek to meet

longstanding needs among established trades and professions.

Equity Concerns

A drive towards building decarbonization must prioritize the fair and equitable distribution of benefits and costs. Existing housing and energy systems disadvantage low-income and minority populations, whose communities face larger exposure to pollution, especially from energy infrastructure, and are less likely to be the focus of policy improvements to the built environment.[9] The building industry and policymakers should focus on improvements for all communities, and not simply focus on "champion" projects that, while important, do not represent a broad sharing of the benefits of decarbonization.

Recommendations from the Consultative Council

The task of decarbonizing the building sector will be difficult, but there are multiple achievable, scientifically-proven pathways to doing so. Drawing on the latest research and industry best practices, the recommendations below are designed to promote collaboration and information exchange, as well as the sharing of costs and benefits, to continue the important process of decarbonizing the built environment. These recommendations supplement, and should not replace, other necessary actions to adapt the built environment to a changing climate and make our buildings and communities healthier and more resilient to natural hazards.

Coordination Across the Building Sector

- The Federal Government should leverage the significant experience of the design and construction industries, prioritizing private sector input in ongoing Council on Environmental Quality coordination of federal actions around decarbonization. This public-private sector exchange is particularly important for relevant agencies with regulatory missions and substantial private sector impact, such as the EPA, DOE, and the U.S. Department of Housing and Urban Development.
- Building Industry Trade Associations should continue to collaborate, align, and harmonize activities in the realm of building decarbonization. Together, they should use their collective market power and professional membership to align under common definitions, metrics, and practices for their respective members, as well as develop messaging and communications that promote building decarbonization to targeted and relevant stakeholders and constituents.
- The Administration and Federal Agencies should continue to engage with building owners and portfolio managers to discuss and identify the most effective incentives that can drive action to reduce operational emissions and embodied carbon in buildings leased by the federal government. This is essential to complement federal decarbonization portfolio planning for government-owned buildings.

Embodied Carbon Accounting and Data Transparency and Disclosure

- The Administration and Federal Agencies should ensure that all proposed action and mandates are working from a common definition of decarbonization, with commonly shared, publicly available performance data, to ensure shared progress and tracking.
- Building Component and Materials Manufacturers should continue to develop EPDs verified by an accredited EPD Program Operator to support informed decision making across a building's lifecycle.
- Federal Agencies should directly provide, or provide funding for, tools and resources to support manufacturers and trade groups—particularly small businesses—to expand the availability of EPDs to more

products and manufacturers.

- Federal Agencies should provide technical assistance and funding to support development of a generally-accepted and widely available lifecycle approach to evaluating whole-building environmental impacts, one that balances operational GHG emissions and embodied carbon considerations.
- Once developed, Building Designers, Owners, and Developers should use this whole-building, lifecycle approach to evaluate projects, determine their embodied carbon and operational GHG emissions, and support development of baselines for common building types.

Market Transformation

- Federal, State, and Local Governments should provide a continuum of policy support to facilitate decarbonization efforts at every stage of the building lifecycle, including design and construction (e.g. building energy codes), operation (e.g. benchmarking, disclosure, and performance standards), renovation (e.g. incentivize or subsidize energy efficiency and/or decarbonization retrofits), and end-of-use (e.g. facilitate building rezoning and/or re-use or incentivize recycling of building materials).
- The Federal Government should continue to coordinate with industry trade associations and other private sector actors to leverage funding from the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA) to further stimulate and grow a private sector marketplace for low-embodied carbon building products, which Agencies can then specify for construction and renovation projects as part of “Buy Clean” programs.

Codes & Standards

- Federal, State, and Local Governments should increase investment in understanding the current landscape of energy code compliance; developing tools, resources, and best practice compliance methods for all building types; and continuing education and training for both current code officials as well as the next generation of code officials.
- Codes and Standards Developers should review existing codes and standards for their potential contributions to building decarbonization and whether they are aligned with the urgency of the challenge.

Existing Buildings

- Federal, State, and Local Governments and the Building Industry should increase investment in understanding and overcoming the challenges to decarbonization posed by the existing building stock. A significant portion of the existing buildings will continue to operate for decades, but extreme variability in the age, design, and construction of these buildings constrains the implementation and widespread applicability of many technologies and approaches that can drive decarbonization.

Workforce

- The Federal Government should increase investment in continuing education and training for the current workforce on low-emission building technologies and low-embodied-carbon products, as well as continued investment in developing a next-generation building sector workforce that can help to address the shortage of skilled and unskilled laborers in the building trades.

Consultative Council Members

American Institute of Architects

American Institute of Steel Construction

American Society of Civil Engineers

ASHRAE

Associated Builders and Contractors

Associated General Contractors of America

ASTM International

Building Owners and Managers Association International

ConnexFM

Construction Management Association of America

Construction Specifications Institute

Design-Build Institute of America

EPDM Roofing Association

Green Building Initiative

Insurance Institute for Building and Home Safety

International Association of Plumbing and Mechanical Officials

International Code Council

International Institute of Building Enclosure Consultants

Modular Building Institute

National Building Museum

National Ready Mixed Concrete Association

New Buildings Institute

Royal Institution of Chartered Surveyors

U.S. Green Building Council

NIBS and Consultative Council members continue to make tangible commitments to demonstrably reduce the carbon footprint of the built environment, and are matching this intent by developing and disseminating educational materials and technical resources; driving industry engagement; reporting on progress to drive accountability and inform future strategies, and advocating for appropriate regulations and policies at the local, state, federal, and international levels.

Equitable Decarbonization

- Federal, State, and Local Governments should allocate dedicated funding for disadvantaged or low-income communities to support decarbonization efforts. This includes funding for technical assistance, energy-efficiency renovations, or the purchase of high-efficiency and/or low-emissions equipment or appliances in residential and commercial buildings, as well as increased utility bill support for disadvantaged residents or communities who remain on legacy energy distribution systems.
- In implementing Federal decarbonization goals, including the Federal Building Performance Standard, Federal Agencies should critically examine whether closures of buildings or facilities not in compliance with the Federal Building Performance Standard would harm disadvantaged or low-income communities in areas where those facilities provide a substantial number of jobs.

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[3] Cortese, Amy. "The Embodied Carbon Conundrum: Solving for All Emissions Sources from the Built Environment." New Buildings Institute. https://newbuildings.org/embodied-carbon-conundrum-solving-for-all-emission-sources-from-the-built-environment/

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[8] National Institute of Building Sciences. "Moving Forward: 2018 Findings and Recommendations from the Consultative Council." 2018. https://www.nibs.org/files/pdfs/NIBS_CC_MovingForward_2018.pdf

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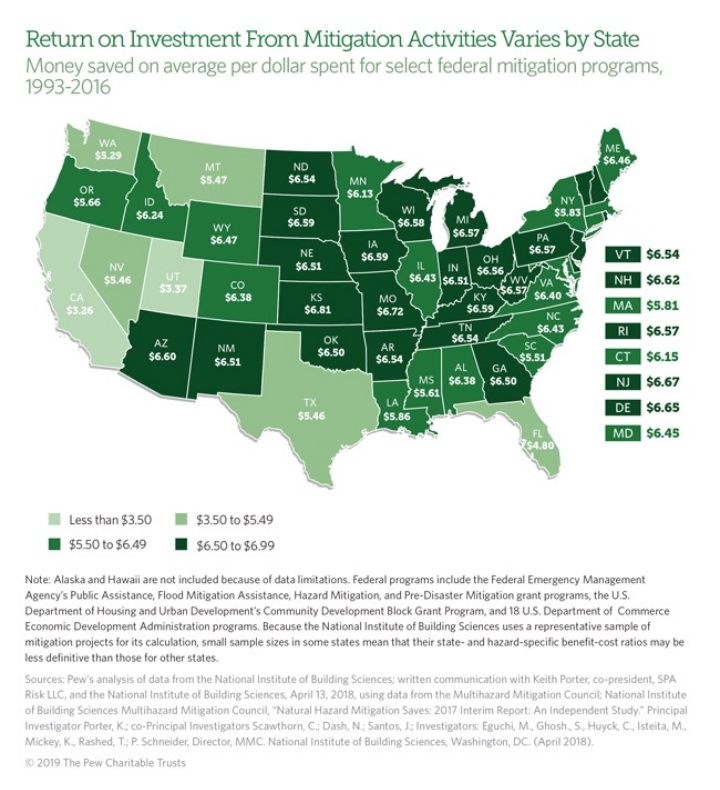
Member Organization Spotlight

The Pew Charitable Trusts

The Pew Charitable Trusts is a non-partisan, non-profit organization that aims to use data-driven approaches to tackle significant challenges both in the U.S. and abroad. Pew has a long-standing partnership with NIBS working on issues involving disaster resilience policy and spending. Pew's work aims to reduce the impacts of flood-related disasters through reforms to federal and state policies and highlight ways to address public budgeting challenges stemming from growing disaster costs, including prioritizing cost-saving mitigation.

Pew has partnered with NIBS on a variety of initiatives since first co-hosting a 2018 webinar featuring the release of the interim report of the Natural Hazard Mitigation Saves study. In 2019, NIBS shared underlying Mitigation Saves data with Pew to inform a state-by-state analysis of the benefits of mitigation. Since then, collaborative efforts have involved additional webinars, conference panels, Hill briefings, and web analyses focused on helping amplify NIBS research on building science and disaster resilience.



NIBS' research continues to help make data more tangible for lawmakers and assists in their ability to make well-informed decisions about disaster preparedness, mitigation, and recovery.

https://www.pewtrusts.org/en/research-and-analysis/articles/2019/06/17/data-highlight-state-by-state-benefits-of-federal-natural-disaster-mitigation-grants

Pew values the opportunity to engage with the NIBS Multi-Hazard Mitigation Council via its organizational membership. Participation in the MMC provides Pew the opportunity to share its work with key stakeholders, contribute to MMC-driven initiatives, and learn about ongoing activities led by fellow MMC members.

Assets	2022	2021
Current Assets		
Cash and cash equivalents	$ 11,369,179	$ 10,997,219
Certificates of deposit	50,003	49,909
Accounts receivable	2,895,833	2,497,816
Contract assets	2,278,031	1,307,615
Prepaid expenses and deposits	154,830	219,152
Total current assets	16,747,876	15,071,711
Investments	1,093,498	1,338,948
Property and Equipment		
Furniture and equipment	548,274	521,330
Leasehold improvements	751,864	751,864
Software	192,150	192,150
Total	1,492,288	1,465,344
Less accumulated depreciation and amortization	(1,026,768)	(880,396)
Total property and equipment, net	465,520	584,948
Total assets	$ 18,306,894	$ 16,995,607
Liabilities and Net Assets		
Current Liabilities		
Accounts payable and accrued expenses	$ 2,290,102	$ 2,727,679
Deferred rent, current portion	91,165	77,440
Contract liabilities	1,519,953	1,238,952
Total current liabilities	3,901,220	4,044,071
Deferred Rent, net of current portion	577,706	668,871
Total liabilities	4,478,926	4,712,942
Net Assets, without donor restrictions		
Undesignated	12,684,467	10,893,808
Designated, reserves	1,143,501	1,388,857
Total net assets	13,827,968	12,282,665
Total liabilities and net assets	$ 18,306,894	$ 16,995,607

	2022	2021
Revenue		
Contracts and awards	$ 17,800,880	$ 17,839,373
Other publication sales	32,588	32,306
Member and other contributions	165,245	146,821
Investment (loss)	(236,592)	(12,206)
Meeting and other	260,469	674,112
Total revenue	18,022,590	18,680,406
Expenses		
Program Services:		
Contracts and awards	15,270,398	15,370,990
Publications	530,644	279,477
Other	135,512	65,967
Total program services	15,936,554	15,716,434
Supporting Services:		
General and administrative expenses	94,135	254,025
Membership	446,598	421,850
Total supporting services	540,733	675,875
Total expenses	16,477,287	16,392,309
Change in net assets	1,545,303	2,288,097
Net assets, beginning of year	12,282,665	9,994,568
Net assets, end of year	$ 13,827,968	$ 12,282,665

See Notes to Financial Statements.

Member Organization Spotlight

84 Lumber Company

Founded in 1956 and headquartered in Eighty Four, Pennsylvania, 84 Lumber Company is the nation's largest privately held supplier of building materials, manufactured components, and industry-leading services for single and multi-family residences and commercial buildings.

The company operates 310 facilities, including stores, component manufacturing plants, custom door shops, and engineered wood product centers in 35 states. 84 Lumber also offers turnkey installation services for a variety of products, including framing, insulation, siding, windows, roofing, decking, and drywall.

84 Lumber is a certified national women's business enterprise owned by Maggie Hardy, and the company was named one of America's Largest Private Companies by Forbes. 84 Lumber has just under 7,000 associates across the country with plans to continue growth in 2023.

84 Lumber became a NIBS organizational member in September 2021.

84 Lumber sponsored NIBS' former Women Executives in the Building series, which was an important event that reached women in the C-suite in the built environment. In this industry, women in the C-suite face unique challenges, and we believe it is our responsibility to have brought this group together to find solutions.

"84 Lumber is honored to be a part of NIBS and represent ourselves in the building science sector," says Judy Dinelle, CGP, CAPS, AMA, Building Ambassador with 84 Lumber and NIBS Board Member. "We are proud to work with other industry experts and government entities so we can ensure a safe building process for communities everywhere."

Member Thank You

The National Institute of Building Sciences serves the built environment to ensure the safety of buildings in the U.S. We do this by performing research, publishing timely reports, and sponsoring expert-led events to discuss challenges in the built environment.

We work to help improve and reimagine a future built environment that continues to innovate and thrive.

We could not do this work without you – our subject matter experts, volunteers, members, and dedicated partners.

Thank you.

You make our important work possible. Your partnership affects and improves the building profession and our communities.

NIBS was established by Congress to serve the built environment, but we receive no congressional funding. Please consider donating to NIBS.

Your generous donation will help to continue to elevate the built environment through educational webinars and workshops, and vital research that impacts the buildings industry and our communities.

Your donation may be tax-deductible; please check with your tax advisor.

On behalf of our President & CEO, Board of Directors and staff, thank you for your support!

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