



National Institute of
BUILDING SCIENCES

2018

Moving Forward: Findings and Recommendations from the Consultative Council



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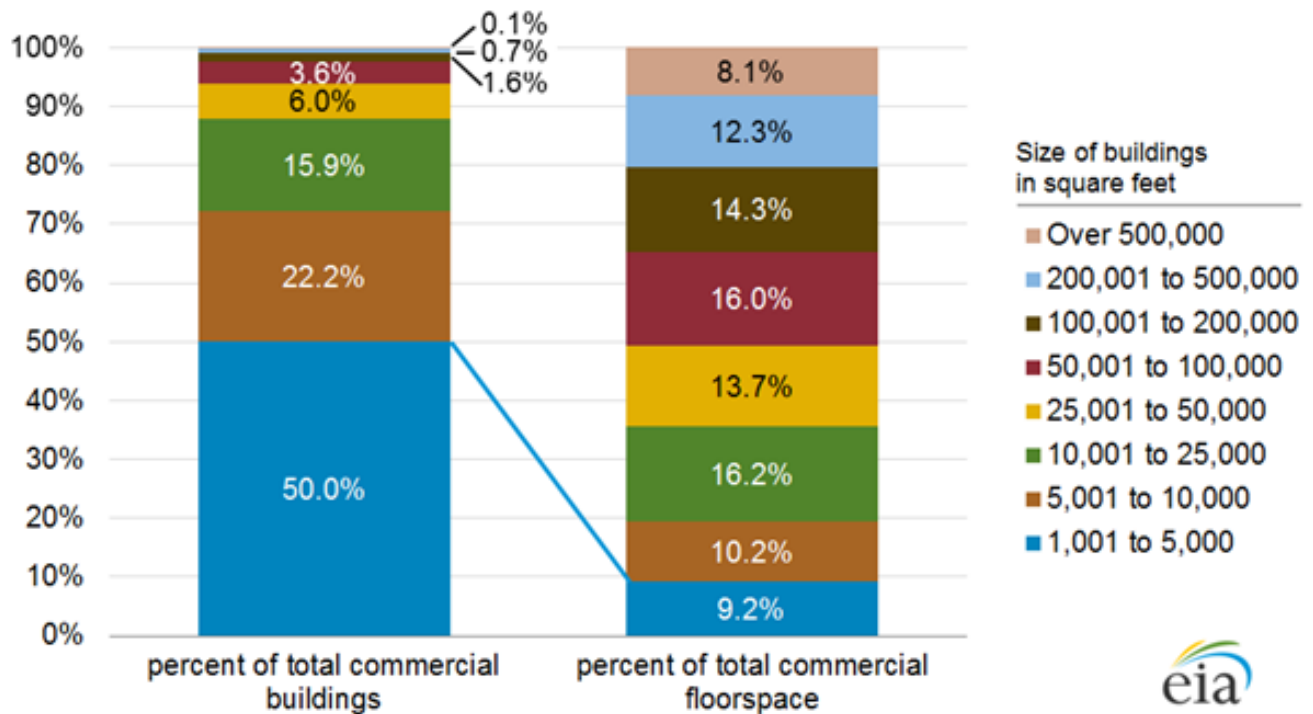
Moving Forward: 2018 Findings and Recommendations from the Consultative Council

Addressing Existing Buildings to Achieve a High-Performance Building Stock

The Current Building Stock

There are over 5.6 million commercial buildings in the United States. About half are more than 35 years old.¹ An additional 118 million housing units, of which only 3% were built in the past 10 years,² make up the nation's existing building stock.

The average age of an existing building in the United States is 41.7 years; over 80% are 15 years or older. The vast majority, both by number and square footage, are small (less than 50,000 square feet). (See Figure 1.) When it comes to achieving high-performance buildings, existing buildings present a unique set of challenges.



Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey

Figure 1: Number and Floorspace of the Commercial Building Stock

Existing buildings, both commercial and residential, represent the single largest component of a community's infrastructure. They serve as important components of the nation's economy, facilitating commerce, education, health and shelter. They also embody a significant portion of the nation's wealth and investments; North American real estate assets are valued at over \$47 trillion.³

¹ Commercial Buildings Energy Consumption Survey (CBECS) <https://www.eia.gov/consumption/commercial/reports/2012/preliminary/>

² Built between 2010 and 2015, based on CBECS data <https://www.eia.gov/consumption/residential/data/2015/hc/php/hc2.3.php>

³ Savills World Research 2016. Around the World in Dollars and Cents.

<https://pdf.euro.savills.co.uk/global-research/around-the-world-in-dollars-and-cents-2016.pdf>.

Existing buildings can serve as physical symbols of communities, either due to their historic contributions, the activities they house or their aesthetic qualities. Millions of labor-hours and massive quantities of products and materials have gone into their design, construction and operation. Millions of people walk through their doors daily and rely on the essential services they provide.

In this report, the Consultative Council addresses ways to improve the performance of the nation's existing building stock. The Council outlines efforts undertaken to date and the challenges that still remain. The content contained herein is intended to be a starting point for a much broader dialogue across the building industry and with policymakers.

Existing buildings are a key asset to the nation. However, they can become a drag on communities and the economy if they no longer meet the needs of today's society. Meanwhile, the needs of society are shifting. Policymakers, building tenants and owners are placing increased emphasis on the performance of buildings, including sustainability, health and resilience. The existing building stock must be prepared to respond.

Workplaces are changing as well. Densification of work spaces and co-working; the sharing economy and the freelance economy; and the increasing impact of technology are changing how people use buildings. These changes are not only impacting the design and use of space, but the economics of the buildings affected, with diminishing management, brokerage and parking fees. While asset values have been increasing, revenues from building operations are changing as the result of the growth of emerging technologies and the trend of more people moving into downtowns and leaving their cars behind. Management fees for operating facilities have been trending down for years as companies introduce more efficient means of delivering services. The ability to automate part of the leasing and brokerage functions has reduced this traditional revenue source. With people turning away from automobiles to mass transit, car sharing, bikes and walking to work, parking revenue is trending down in many cities as well. The business of buildings is changing and will continue to do so.

It is estimated that upwards of two thirds or more of existing buildings will be dysfunctional within the next 10 years. Tenants want to utilize space differently and integrate emerging technologies into their facilities. The growth of artificial intelligence presents an opportunity to accelerate improvements in building performance. It is truly a time for reinvention and change.

Challenges to Addressing Existing Buildings

Existing buildings in the United States offer the single best opportunity for making a significant impact on sustainability, resilience and energy efficiency. The industry's success in addressing the existing building stock will have exponential impacts on the resilience of communities dealing with disasters, and provide updated and better functionality for buildings in communities as they adapt to economic, social, industry and natural changes in their regions. Enhanced focus on upgrading existing buildings also can contribute to creating and keeping jobs across all building-related disciplines, including architects and engineers, contractors, financiers and tradespeople.

Efforts to improve the existing building stock are underway on numerous fronts. However, unlike in new construction, improving existing buildings at scale offers a unique challenge. The existing building stock encompasses techniques, technologies and practices implemented over two centuries, with various renovations conducted along the way. Addressing the sustainability and resilience potential of the existing building stock requires a significant investment in time, education and resources.

An article in the *Harvard Business Review*⁴ summarized the challenge of working with existing buildings as follows:

“A traditional energy overhaul of a building (retrofits that include replacing mechanical systems, windows, insulation and other features during a remodel) requires significant investment, and is therefore typically timed with major renovations or capital-intensive building system replacement. While the customized approach can drive deep energy savings for an individual building and has its place in the market, it is not a model that can be deployed rapidly or at scale.

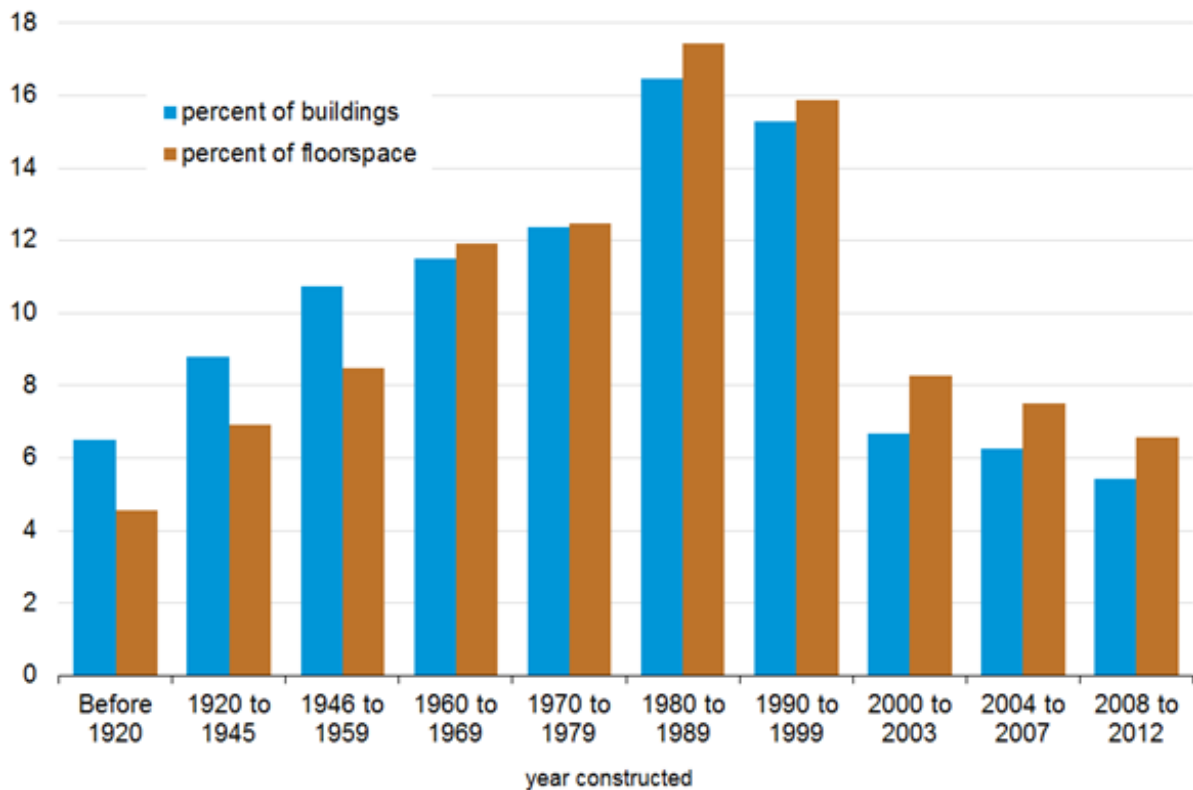
⁴<https://hbr.org/2016/01/old-buildings-are-u-s-cities-biggest-sustainability-challenge>

A more industrialized approach is needed, one that will reduce cost and simplify the decision-making process for buyers. *However, just as each city skyline is unique, every building represents a one-of-a kind combination of uses, systems and opportunities for efficiency — so the challenge is how to undertake an industrialized retrofit process that will address the uniqueness of each building [Emphasis added].* To gain market traction, retrofits need to be:

- Relevant (appropriate to their building)
- Fast (a project lasting less than a year),
- Capital-light (or better yet, funded by low-cost capital provided by a third party)
- Affordable (with a simple payback of less than 4 years, and ideally closer to 2)."

Highly Variable

No two buildings are alike. Even if constructed from the same plans, variations exist in installation and operations practices, occupant behavior and site conditions. Changes in both technology and practice over time create further variations from building to building. The commercial building stock includes buildings from before 1920 through today. (See Figure 2.) When constructed, each of these buildings was designed to use different technologies and serve different purposes. Renovations since then have added additional variations.



Source: U.S. Energy Information Administration, 2012 Commercial Buildings Energy Consumption Survey

Figure 2: Commercial Building Stock Year of Construction

Limited Opportunities for Intervention

Today, building codes provide the greatest opportunity to influence how a building performs over its lifetime. However, building codes are largely applicable when buildings are initially constructed and for major renovations. In most cases, buildings can go at least a decade without triggering a code requirement. Effectively transforming the existing building stock will require the implementation of additional mechanisms to encourage action. Incentive programs administered by government or utilities can provide some inducement. Market-based efforts ranging from competitions to benchmarking and transparency laws drive some improvements. A few jurisdictions have implemented statutory mechanisms to begin improving the local building stock. With the level of retrofits needed to meet national or local goals, the existing triggers are not sufficient. Additional intervention points will be necessary.

Building codes provide an important mechanism for the incorporation of new research and practices into new construction and major renovations. However, without an event triggering compliance with such requirements, a code-based approach to upgrades represents a slow path towards improving the building stock.

Varying Ownership Models

The ownership structure and philosophy for buildings vary significantly. Some buildings may be designed, constructed and operated as owner-occupied structures where the entire life cycle of the building is managed by a single entity. Other owners may purchase a building for a short period of time with the intent to sell. Each set of owners has very different motivations for performance improvements. Tenant lease structures also influence the ability and interest in improvements.

Where owners have been involved in the design process, and occupy and operate the building, incentives for upgrading commercial structures may only require education and cost-to-benefit studies. For leased space, green lease provisions designed to overcome the split incentives challenge have contributed to progress in aligning tenant interests with building improvements.

Preserving Our Nation's History

Nearly 100,000 properties in the United States are listed on the National Register of Historic Places.⁵ Several thousand more properties possess some degree of historic relevance. Maintaining their historic character while upgrading these buildings to meet 21st century performance requirements presents a challenge. In many cases, upgrades require specialists with the creativity, experience and knowledge to devise effective solutions that do not significantly alter the historical elements.

Evolving with the Electric Grid

The United States and many other countries are in the process of transforming and modernizing the electric grid. Today the electric grid primarily is a one-way service that provides reliable electricity to end users. The vision for a future “smart grid” is much more complex. It will incorporate new sensing technology to monitor the state of the grid, make greater use of distributed sources of generation, increase the use of variable renewable energy sources and utilize information technology for collaborative interactions between energy providers and energy consumers. Achieving this vision for a smart grid cannot happen without the cooperation and integration of building systems of all types because homes and buildings consume nearly 74% of the electricity the nation produces.

Changes occurring in the electric grid infrastructure will require new design and operation considerations for buildings, both new and existing. Facilities can be operated in ways that support grid operations while potentially lowering their own costs by managing loads and storage to contribute to balancing grid-wide demand and changes to the generation mix. As the modern grid develops, building management systems are being provided signals about the condition of the grid and current prices or values for electricity or grid services. Building operators will have increasing economic or reliability incentives for responding appropriately to grid conditions. Buildings and their operations staff must be prepared to function within this new grid infrastructure and take advantage of the opportunities it provides. New tools, such as *ASHRAE's Smart Grid Applications Guide*, are being developed to enable this communication, which will improve building performance as well as help optimize grid operations.

Defining Goals

Policymakers and citizens have identified multiple goals for their communities, including energy efficiency, resilience, affordability and attractiveness to business. Aligning the existing building stock to meet these needs requires a careful definition of goals; the development of programs and policies to communicate the goals; and mechanisms to encourage building owners to implement them. Sustainability and occupant health represent additional priorities to address in existing buildings. As cities pick up the mantle to reduce energy use and greenhouse gas emissions, existing buildings will be squarely in their sights.

⁵ See <https://www.nps.gov/nr/research/index.htm>.

Structural improvements to the existing building stock are an important component in advancing resilience to natural hazards. Recent disaster events have shown the importance of structural retrofits to withstand these risks. The National Institute of Building Sciences is examining the benefits of such retrofits as part of its ongoing Mitigation Saves study, with results available in 2019.

Addressing the Challenges

The Consultative Council and others have identified potential strategies that would benefit public and private entities for moving the existing building stock to increasingly higher levels of performance. No single approach will be successful on its own—a holistic strategy designed to address the identified challenges is needed. Though not examined in-depth, the Consultative Council looks at a number of factors below:

Financing and Incentives

While most building and home owners recognize the benefits that can happen when a building or home is upgraded, in almost every case, those changes require financing. Some financing models have proven effective for certain segments of the industry and for certain desired outcomes. Identifying additional financial mechanisms and incentives for implementation will be essential for widespread activity.

Performance Contracts

Energy savings performance contracts (ESPCs) and utility savings performance contracts (USPCs) have become effective models for improving energy and water performance in the municipal, university, school and hospital (MUSH) markets where buildings are typically owner-occupied. However, such tools have not found their way into other markets and for use in addressing other high-performance attributes. Entities that rely on a combination of owned and leased properties (such as federal or state governments) could potentially benefit from a space utilization performance contract where a third party would finance improvements in an owned property to allow improved utilization, thus reducing the need for leased space. Other performance financing models could be developed around resilience based on accompanying reductions in insurance costs.

Property-Assessed Financing

Property assessed capital expenditures (PACE) and on-bill financing have presented opportunities for energy, water and some resilience measures to be financed. While residential programs have struggled to overcome policy decisions made by federal mortgage agencies, commercial programs have been expanding. These programs have addressed one key challenge—assuring that the value and the cost of the implemented measures remain with the property.

Incentives

Incentives for building and home owners will vary depending on an owner's motivation, but generally all are incentivized at some level by the cost savings in operating the building post-renovation, and the potential for greater building safety and resilience. Finding ways to incentivize owners will advance the overall impacts of sustainability and resilience at a fast rate, providing improved building performance, cost savings and even additional jobs in communities.

Through certain tax credits and deductions, the federal government has encouraged investing in energy efficiency improvements in existing residential and commercial buildings. This includes the 179D tax deduction, which was first enacted in 2005. This deduction was retroactively reinstated for 2017 and provides a deduction of up to \$1.80 per square foot for “energy efficiency improvements to lighting, heating, cooling, ventilation and hot water systems of commercial buildings.”

The effectiveness of incentives (particularly tax-related incentives) is dependent on their recognition in the marketplace and the opportunity for implementers and other related parties to establish an economy of scale. The short-term or retroactive application of incentives does not provide such an opportunity and limits the pick-up of such incentives.

For energy-related retrofits, utility programs have been generally effective in encouraging improvements. However, these programs tend to offer component-based solutions. As communities set more stringent goals,

it is becoming increasingly obvious that component-based solutions will not provide the savings necessary to meet these goals. Holistic, systems-based approaches with measured savings will be required. Such approaches add additional complexity, but can deliver more significant savings.

Coordinating Efforts

Many of the incentives highlighted in this report have a financial element. Creating a holistic and coordinated approach across all these elements will be necessary to drive action. The National Institute of Building Sciences, through its Multihazard Mitigation Council (MMC) and Council on Finance, Insurance and Real Estate (CFIRE), with the engagement of industry stakeholders, has developed a concept termed incentivization.⁶ Incentivization focuses on developing a package of coordinated incentives offered by both the public and private sectors to cost effectively capture the benefits and costs across all stakeholders. One particular Incentivization program under development is a resilient mortgage that aligns incentives to support property improvements at or near the time of sale, resulting in increased property value and decreased risk. These benefits improve the resilience of the property, while translating into the same or lower mortgage costs.

Codes and Standards

In the United States, a number of codes and standards developing organizations publish documents that specifically relate to existing buildings and the challenges discussed here.

Existing Buildings

Throughout the nation, cities and communities are confronted with abandoned and decaying buildings. Existing building codes provide a path to renovate these structures and bring them into use without the burden of having to raze them or the cost of erecting a new building, making it more cost effective for developers and building owners. Currently, 23 states have adopted the International Existing Building Code (IEBC) developed by the International Code Council for statewide use, leaving a lot of communities with the costlier alternative of requiring owners who renovate to comply with the same requirements as new construction.⁷

Energy Use

The IEBC does not include requirements related to the energy-related upgrade of existing buildings; this requirement falls to energy codes. The *International Energy Conservation Code* (IECC), adopted by most states, includes *ANSI/ASHRAE/IES Standard 90.1 – Energy Standard for Buildings Except Low-Rise Residential Buildings* as an alternative compliance path, which generally requires building alterations and additions to comply with the same efficiency requirements as new construction. A change in occupancy that would result in increased energy use triggers increased efficiencies. However, in many renovations, and in buildings that do not undergo permit-inducing work, unaltered portions of the building remain in their existing state.

ANSI/ASHRAE/IES Standard 100-2015 – Energy Efficiency in Existing Buildings provides a comprehensive approach to retrofits of existing buildings for increased energy efficiency. This resource offers over 100 typical energy efficiency measures (EEMs) that can be applied to enable buildings to meet set energy targets and identifies commonly applied elements that can improve building performance.

Building Commissioning

Systems commissioning provides an avenue for assuring the design intent is being continued throughout a building's life cycle. Commissioning is the verification of some or all of the building systems and confirming they are installed and operating in accordance with the design documents. This is done through design reviews, observations and testing during all phases of the construction. Commissioning is proving to be a critical piece in confirming and ensuring that building systems perform and maintain the performance intended in the design. Ideally, commissioning should be conducted on an ongoing basis to assure design intent continues to be met over the building's lifetime. Standards for whole building commissioning and the commissioning of individual systems provide additional resources to support the ongoing realization of original design intent.⁸

⁶ Details on incentivization are available at https://www.nibs.org/page/mmc_projects.

⁷ See *The Role of Existing Building Codes in Safely, Cost-Effectively Transforming the Nation's Building Stock*, https://www.nibs.org/resource/resmgr/ncgbc/NCGBCS_IEBC_WhitePaper_2016.pdf.

⁸ See Building Commissioning on the WBDG Whole Building Design Guide, <http://www.wbdg.org/building-commissioning>.

Property Maintenance

Other codes centered on property maintenance provide requirements for all residential and non-residential structures and the premises. Adoption of a property maintenance code aids in maintaining minimum standards for habitability, and requires that repairs or alterations be made to meet the code. Adoption of codes like the *International Property Maintenance Code* (IPMC) help to prevent rundown, blighted areas and requires owners, rather than municipalities, to maintain their properties.

Compliance Paths

The model codes typically provide two paths to code compliance — a prescriptive path and a performance path. The prescriptive path specifies detailed requirements for building design and construction. The performance path provides more flexibility in meeting the intent of the code. A third option is emerging—an outcome path—where compliance is based on the measured and verified achievement of overall code objectives. Given the variations in existing buildings, code requirements based on a prescriptive path may not be easily implemented. Existing systems may make such requirements technically infeasible or cost prohibitive. Performance path requirements provide increased flexibility, but they still may require approaches that may not be ideal for the identified building. For community priorities that are highly measurable and can be achieved independently of the specific designs deployed (e.g., energy and water use), an outcome-based path would allow for the greatest flexibility and support the most cost- and technically effective approach to building upgrades.

Materials and Waste

Existing buildings, both in their initial design and construction and in operations, have a significant influence on resource use.

Recycle and Use

The materials used in a building's initial construction represent a significant investment in energy and other resources to transition them from raw materials to building products. When an existing building no longer fulfills its purpose, some of these materials may still be suitable for use in other projects. Capturing these materials, evaluating them for future use and keeping them out of landfills all provide significant benefits. However, standards are needed to assure that deconstruction is done in a manner that protects future uses, and that the resulting materials are fit for a purpose and the acceptable uses are defined.

Worker Safety

In some cases, the renovation or deconstruction of existing buildings may pose potential harm to the workers undertaking such activities. This is particularly true in the case of projects where materials like lead or asbestos may be present. Assuring that workers have the proper training and protective devices is essential.

Reducing Waste

Building operators are looking at ways to manage waste and utilize better recycling techniques to reduce solid waste going to landfills. Real estate practitioners are focusing more attention on benchmarking their water and waste consumption and associated costs, and implementing best practices to improve performance. Resource management is a growing issue nationwide. Much of the benchmarking is being done within the ENERGY STAR program, utilizing Portfolio Manager. There is much that can be accomplished by comparing waste management best practices and successful case studies. One example is the Building Owners and Managers Association's Water and Waste Challenge. The results benefit the environment and are good business.

Workforce

To effectively execute retrofit measures and the ongoing operations and maintenance of buildings, the nation requires a workforce with the necessary skills and abilities. Unfortunately, as identified in recent Consultative Council reports and elsewhere, the building industry continues to struggle with a severe labor shortage and skills gap that is impacting every trade, across every component of the building sector. U.S. Census and American Community Survey data show that the share of workers in the construction sector who are age 24 or younger—the prime age for the often-challenging physical jobs in the industry—has dropped in 48 states since 2005, declining almost 30% nationwide. The result of these labor shortages translates into a direct impact on the

ability of the industry to complete projects and further contribute to the economy's health, as well as the loss of important trades skill sets that are vital to an industry that cannot outsource most of its work to other nations since it relies almost entirely on a U.S.-based workforce.

Training Programs

Even before the economic downturn of 2008, high schools and community colleges were eliminating trades training programs, choosing instead to focus on training in the “high-tech” jobs of the future. After the downturn, the loss of trades training programs accelerated, with fewer young workers willing to risk jobs in an industry that was so deeply cyclical. Even fewer parents were willing to urge their children to pursue careers in an industry with such high rates of physical labor, that didn't require a college degree, with a pay scale reported to be lower than the high-tech sector.

If there is one area that seems to unite lawmakers on both sides of the aisle and all portions of the construction industry, it is an acknowledgement that it is vitally important to develop new ways to incentivize students, U.S. military veterans and non-traditional construction workforce segments (such as women) to pursue construction trades training and subsequent careers in the building industry.

The Trump Administration has taken up the workforce issue through the issuance of Executive Orders. However, the construction industry has largely been left out of taking advantage of the innovative approaches identified. The first Executive Order on apprenticeships acknowledged that the federal government can play a role in promoting the development of strong, reliable and high-quality industry-recognized credentials and training that targets skills development. Unfortunately, the final implementation of this Executive Order declared that the programs in the construction industry would not be eligible for this new, innovative Department of Labor (DOL) effort. The second Executive Order on Workforce Development would create the President's National Council for the American Worker, charged with developing recommendations on how the federal government can work with the private sector, educational organizations and state and local governments to create and promote workforce development strategies that provide evidence-based, affordable education and skills-based training to prepare workers for the jobs of today and of the future. As this new body comes together, members of the Consultative Council implore the National Council to consider the important needs of the construction sector and its important role in facilitating all other sectors of the economy, including the technology sector.

While an array of quality training programs already exist to support careers in construction, the scale of the labor shortage problem illuminates the need for expanded efforts. As the federal government turns its attention to preparing the workforce of the future, the construction industry must be part of that initiative.

Personnel Credentialing

In addition to assuring there are workers available, those workers must have the skills necessary to manage increasingly complex buildings. Personnel credentials are one means to assess a worker's capabilities and whether they can deliver on the performance measures implemented by building owners and policymakers. However, credentials vary widely in quality, and building owners and policymakers have challenges identifying the credentials that meet their needs. To help address this need in building-related energy careers, the U.S. Department of Energy (DOE) and the National Institute of Building Sciences developed the *Better Buildings Workforce Guidelines*, a set of national guidelines that can be used to develop high quality and nationally recognized training and certification programs to address challenges found in the energy efficiency workforce with quality, consistency and scalability across certification and certificate programs. These voluntary national guidelines aim to improve the quality and consistency of commercial building workforce credentials for four key energy-related jobs: Building Energy Auditor, Building Commissioning Professional, Building Operations Professional and Energy Manager. The development of these guidelines is an important first step in creating the programs the industry needs to address key workforce challenges.

Information Resources and Market Drivers

Information is power. Improving the building stock and individual buildings requires information on their current status and a potential future state to strive for. Fortunately, several tools exist to help provide such information. Building rating tools focused on existing buildings provide building owners with useful criteria. Such tools include ENERGY STAR, LEED, GreenGlobes, BREEAM, BOMA 360 and IBHS FORTIFIED.

A partnership between the U.S. Environmental Protection Agency (EPA) and DOE, the ENERGY STAR program has helped businesses and homeowners save over \$146 billion in energy costs. More than 30,000 commercial buildings are ENERGY STAR certified, using 35% less energy than standard commercial buildings and commanding higher prices and rental rates because of their lower operating costs. ENERGY STAR labeled products provide consumers with information on products that can improve energy performance.

The *Advanced Energy Design Guides*, developed through the support and engagement of both public and private sector organizations, provide guidance for achieving energy savings beyond minimum levels contained in energy codes. Two guides have been completed as part of the *Energy Efficiency Guides for Existing Commercial Buildings*:

- *The Business Case for Building Owners and Managers* – Provides the rationale for making economic decisions related to improving and sustaining energy efficiency in existing buildings.
- *Technical Implementation* – Provides technical guidance for implementing energy efficiency measures in existing buildings.

Existing Government Buildings

As the largest operator of existing buildings in the United States (with over 400,000 buildings), the federal government would benefit greatly by increasing its high-performance building stock. In fact, the U.S. General Services Administration (GSA) found buildings that meet or exceed the Guiding Principles for Sustainable Federal Buildings⁹ save energy, save water, cost less to operate, produce less waste and have more satisfied occupants compared with typical buildings.¹⁰

Compared to legacy stock buildings, GSA's high-performance buildings have:

- 23% lower energy use,
- 28% lower water use,
- 23% lower building operating expenses,
- 9% less waste landfilled and
- Higher overall tenant satisfaction.

If 100 of GSA's legacy stock buildings met the average performance rates of high-performance buildings, they could save taxpayers over \$44 million per year.

The High-Performance Building Adoption Task Group of GSA's independent Green Building Advisory Committee issued recommendations to accelerate the adoption of high-performance federal buildings. Those recommendations include doubling the annual rate of retrofits to achieve high-performance, particularly through the use of enhanced financing options. In order to accelerate the implementation of cost-effective improvements, GSA should work with the Office of Management and Budget (OMB) to identify opportunities for agencies to retain savings from the measures they implement.

The Federal Buildings Personnel Training Act (FBPTA) was passed by Congress in 2010 in recognition of the role trained building operators and managers play in achieving and maintaining high-performance buildings. While GSA has made significant progress in the development of tools to facilitate implementation of the Act, implementation across agencies has been uneven. Further, while required by the Act, the requirements for federal contractors working on federal buildings have yet to be fully incorporated into procurement requirements. Updates to the legislation may be necessary to reiterate Congress's prioritization of this approach to protecting investments made in new and existing federal buildings and establish an enforcement method.

⁹ Additional information on the Guiding Principles is available at <https://www.energy.gov/eere/femp/guiding-principles-sustainable-federal-buildings>.

¹⁰ See <https://www.gsa.gov/about-us/organization/office-of-governmentwide-policy/office-of-federal-highperformance-buildings/resource-library/integrative-strategies/the-impact-of-highperformance-buildings>.

Recommendations

To address the findings outlined in this report, the Consultative Council offers the following recommendations:

- Congress should maintain strong support for federally-developed, voluntary programs such as ENERGY STAR and WaterSense, which collectively have saved Americans billions of dollars and serve as widely recognized mechanisms to achieve energy and water efficiency.
- Congress should pass long-term tax incentives that encourage investments in the retrofit of existing buildings and the establishment of an infrastructure to support such incentives.
- All building owners, including federal, state and local governments, should identify opportunities to recognize personnel credentials to support achievement of their missions through both hiring practices and the process of procuring services.
- Federal entities, including the Small Business Administration, the U.S. Department of Housing and Urban Development (HUD), the U.S. Department of Agriculture, the U.S. Department of Veterans Affairs and Fannie Mae and Freddie Mac, along with private sector stakeholders, should encourage the development of products and services that facilitate holistic consideration of resilience strategies and effectively distribute costs and benefits to all stakeholders.
- GSA should review and implement the recommendations of the High-Performance Building Adoption Task Group of its Green Building Advisory Committee to accelerate the rate of improvement and the realization of cost and resource savings.
- Congress and federal agencies, including DOE, the Federal Emergency Management Agency (FEMA) and the National Institute of Standards and Technology (NIST), should support research to identify modular, plug-and-play retrofit strategies that work with common building types or vintages.
- Congress, with input from the private sector, should identify and enact policies, including incentive programs, that encourage increased investment in natural and man-made hazard mitigation for existing buildings and other infrastructure. This includes ensuring FEMA mitigation grants and tools receive the funding necessary to effectively capture the significant benefits pre-disaster mitigation provides.
- The Administration, DOL and the U.S. Department of Education should extend their efforts to advance apprenticeships and workforce development to include careers within the buildings and construction workforce.
- Congress and applicable federal programs should require the adoption and enforcement of building codes for all federally supported communities. If a state or locality receives federal funding or technical assistance associated with community development, infrastructure, public safety or community governance, the federal agencies providing oversight should require it to adopt and effectively enforce building codes that meet or exceed the latest model building codes.
- Federal agencies including DOE, NIST, EPA and HUD should support research aimed at identifying improvements to building codes and other criteria that can provide cost-effective approaches to enhanced building performance.
- Standards developers, with the support and expertise from federal agencies, including EPA and NIST, should undertake standards development focused on the effective reuse of building products in recognition of their embodied energy.

About the Consultative Council

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

Council Members

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For more details on the Council, visit: <http://www.nibs.org/CC>.

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