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Dear Mr. President,

While not always evident, buildings and related infrastructure serve as the economic backbone of our communities. Citizens rely on housing and schools; businesses rely on commercial and industrial buildings; and governments provide necessary services like police and fire stations, libraries and recreation sites. Buildings represent the major assets and investments within a community, and their construction, renovation, repair and operations employ a significant workforce. Through high-performance buildings, owners strive to integrate and optimize those values and attributes that are important to a community, including safety and security, sustainability, resilience, accessibility, functionality and historic preservation.

We are pleased to present this Annual Report outlining the current status of work conducted by the National Institute of Building Sciences (Institute) to assist the nation in achieving such high-performance buildings. The work of the Institute is occurring at a time in the United States when there is great energy and awareness of the need to become more resilient in our built environment, to achieve greater efficiencies in the operation of buildings and structures, and to realize a more sustainable environment. This Annual Report also includes findings and recommendations from the Institute’s Consultative Council to policy makers and the building community to advance the nation’s built environment.

The National Infrastructure Advisory Council found, “Resiliency is significantly related not just to the ability to reduce the magnitude and duration of disruptive events, but the ability to maintain critical operations and functions in the face of crisis, to respond and manage a crisis or disruption as it unfolds, and to return to and reconstitute normal operations as quickly and efficiently as possible after a disruptive event.” This resilience serves to protect the economic, social and environmental viability of communities.

Over the past several years, the Institute has focused on improving the resilience in our communities, with a particular focus on high performance. High-performance structures address the full range of attributes that result in a more sustainable and resilient community. These include addressing human, environmental, economic and total societal impact through a comprehensive strategy that places emphasis on the entire life cycle of a building, from design through construction, to operation and maintenance.

The Federal Buildings Personnel Training Act of 2010, which you signed into law on December 14, 2010, serves as an important step in the achievement of high-performance buildings. This legislation, which the Institute actively supports, highlights the need to identify core competencies, designate relevant courses needed to improve competency, and promote licensing of operation personnel. The Act promotes engaging personnel in continuing education and focuses on development of a curriculum to address facility operation and management. The U.S. General Services Administration (GSA) is diligently working with representatives from across the building community to implement its requirements.

Through the engagement of knowledgeable design and construction professionals, along with researchers, educators, product manufacturers, building owners and managers who work in the buildings industry, the Institute works to provide guidance and to seek advances in building science and technology to improve the built environment.

The Institute focuses on building sciences as the underlying theme for this work. We define building sciences as “the analysis and evaluation of issues critical to the development of criteria, standards and practices that yield buildings and structures that respond to the environmental, societal, business and sustainable needs of our nation.”

Resilience must include identifying the need and preparing for building safety in the face of natural disasters. We experienced a seismic event here in Washington, D.C., in August 2011, but many in the Washington metropolitan area and throughout the East Coast were unaware of the safety practices needed to respond to such an event. Many people evacuated offices in the downtown Washington area unaware of the potential dangers of falling debris from buildings. Fortunately, the buildings and structures were subjected to only minimal damage, although some iconic structures, such as the Washington Monument and the National Cathedral, experienced more damage. The work of the Institute’s Building Seismic Safety Council (BSSC) continues to provide the research and science behind the codes and standards that are in place today to guide the design

1 Henry L. Green, December 2010
and construction of buildings to resist adverse conditions created in a seismic event. It is the work of the BSSC that established the necessary safeguards for current building practices that allowed our buildings to withstand these events with minimal damage.

Since terror struck on September 11, 2001, building sciences have changed. As the nation commemorated the tenth anniversary of 9/11, the Institute reflected on how building sciences have changed over the past decade and how the events of that day brought about several revisions to building codes to improve safety, security and resilience of the nation's buildings. In 2011, these efforts included the convening of a stakeholder's summit on high-performance resilient buildings and related infrastructure. Working with the U.S. Department of Homeland Security (DHS) Science and Technology Directorate's (S&T) Infrastructure Protection and Disaster Management Division (IDD), the Institute helped DHS create a unique set of Integrated Rapid Visual Screening (IRVS) tools for buildings, tunnels and mass transit stations to quickly and reliably assess the vulnerability of our nation's critical infrastructure.

The Institute's work also resulted in the creation of an Integrated Resilient Design Program, which focuses on innovative approaches to the design, construction and operation of buildings and infrastructures that are resilient to natural and man-made disasters. Sponsored by the DHS S&T, whose High Performance Integrated Design Resilience Program develops tools and resources so users (designers and others) can integrate resilience to reduce the impact of a disruptive event and the duration of its effects. The Institute also developed the Security Information Technologies Exchange (SITE) for DHS S&T IDD to provide quick access to critical security information needed by building designers, owners and security specialists.

In tangent, the DHS High-Performance Based Design for the Building Envelope (HPBDE) project helps building owners evaluate total building performance, including security when planning a new project. The goal of the DHS HPBDE project is to develop a modeling tool for planning high-performance building envelopes. The envelope, often the first line of defense against attack, is also increasingly called on to address energy conservation and sustainability. The tool will use high-performance requirements, metrics, benchmarks and verification/validation methods to help establish the owner's performance requirements to ensure that blast resistance; chemical, biological and radiological (CBR) protection; and other more commonly considered building envelope issues such as thermal resistance, air tightness, day-lighting, durability and moisture mitigation, are incorporated into high-performance building design.

One especially important element in the effective creation of sustainable communities is the ability of a community to effectively administer codes and standards. As part of the Institute's enabling legislation, we are charged with working with states and local governments. State and local government representatives serve on the Institute Board of Directors, on Institute councils and committees, and are involved in numerous Institute projects, publications and reports. However, up until now, these public sector representatives have not had their own program at the Institute. With the establishment of the National Council of Governments on Building Codes and Standards (NCGBCS), that void is filled.

State, local and regional governments are primary participants in the building process. These authorities have jurisdiction to oversee building permits, inspections, energy codes, accessibility requirements and other codes and standards in their communities. NCGBCS provides a new opportunity for state, local and regional code agencies to work together on these important issues that cross state lines.

To increase the reach and scope of collaboration at the Institute, another new council was established to include other important sectors engaged in the building process. Banks, insurance companies and real estate firms all play a significant role in how buildings are procured, designed and constructed. The new Council on Finance, Insurance and Real Estate will promote a cooperative process and open dialogue that will be especially important as demands on buildings increase.

During the year, the Institute empanelled the Scientific Resolution Panel under the auspices of the Federal Emergency Management Agency to provide an efficient, independent way of resolving conflicting technical data while ensuring that the best science is being utilized for its Flood Insurance Rate Maps.

The Institute also formed a multidisciplinary, open committee to explore how design of the built environment impacts the needs of the tens of millions of people with low vision in the United States. The Low Vision Design Committee is a direct outcome of the Workshop on Improving Building Design for Persons with Low Vision sponsored by the GSA and the Institute.

As the nation strives to meet its resilience and high-performance goals, data is key to measuring progress and evaluating future opportunities. In July, following the announcement that the Energy Information Administration (EIA) would be suspending its release of the Commercial Building Energy Consumption Survey, more than 30 witnesses from across the building industry provided testimony at an Institute hearing to assess building data needs. A report was issued in December 2011 incorporating this input and identifying current data needs, relevant data users, existing data and its use, additional collection opportunities and tools to support data use. The report also provides recommendations focused on short- and long-term needs for the development and maintenance of a comprehensive dataset of high-performance building attributes. The New Buildings Institute (NBI) and the National Environmental Balancing Bureau (NEBB) both supported the hearing and the report to respond to an increasingly expressed need for additional building benchmark data on other high-performance building attributes, including safety and security, accessibility, cost effectiveness, water use and indoor environmental quality. The report also addresses these considerations.

Today, in addition to decreasing the nation's losses from natural and man-caused disaster events, there is an increased focus on promoting community preparedness, sustainability and resilience, as well as working to achieve other national goals, such as creating high-performance buildings and improving energy efficiency. It is in this context that the Institute's Board of Directors approved the reconstitution of the Multihazard Mitigation Council (MMC). The new MMC will promote increased all-hazard (man-caused and natural) disaster resilience in homes and commercial buildings as part of a whole building strategy that incorporates sustainability, security and the use of geographic information systems (GIS) and other technological tools. This expansive approach will be directed to homeowners, businesses, schools, communities, public and private sector building portfolio managers and many others.

In March, the Institute issued the inaugural issue of the Journal of Hazard Mitigation and Risk Assessment (JHARZ). This semi-annual publication addresses subjects relevant to buildings. 
the mitigation of risk to natural hazards. Under the sponsorship of the MMC, JHAZ focuses on decreasing the nation’s losses from disaster events while also promoting community preparedness, sustainability and resilience.

The Institute’s WBDG Whole Building Design Guide®, the largest online portal for building sciences information in the world, set several new records in 2011. For the first time ever, file downloads from the site exceeded five million, with a total of 5,286,003 in one month. Visitor sessions also topped the charts, with 697,342 visitors coming to the site in October.

The Institute’s Building Enclosure Technology and Environment Council (BETEC) held a symposium focused on, “High Performance Light Framed Walls: Code Requirements, Durability, Constructability Concerns and Field Experiences.” The all-day event, sponsored in conjunction with the National Association of Home Builders Research Center, put the focus on upcoming code changes for light-framed walls.

Each year, the Institute recognizes individuals and organizations that have provided outstanding service to the Institute, the building community and the nation. In December, the Institute Honor Award was presented to Michelle Fox, PhD, Chief Strategist for Education and Workforce Development for the Office of Energy Efficiency and Renewable Energy (EERE) within the U.S. Department of Energy (DOE). In late 2009, Dr. Fox personally championed the establishment of a 40-person multidisciplinary team to develop a weatherization online training (WxOT) program for DOE that incorporates state-of-the-art educational practices and media techniques, including three-dimensional animation and video games. The WxOT program integrates the skills of architecture, engineering and weatherization subject matter experts; instructional designers; and media producers to give DOE improved means to educate energy auditors, installers, crew chiefs and inspectors and to provide 65,000 new jobs within the building community over the next decade.

The Institute Member Award went to Get W. Moy, DSc, PE, Vice President at AECOM. Dr. Moy, Chair of the High Performance Building Council, participated in the development of the Report to Congress on High Performance Buildings. Dr. Moy has further exemplified his commitment to the cause of high-performance buildings with his involvement in the HPBDE project sponsored by the DHS.

The Institute President’s Award, given in recognition of extraordinary efforts to assist in advancing the mission of the Institute, was presented to Mila Kennett, Senior Program Manager in the IDD of the DHS S&T. Ms. Kennett is responsible for the DHS S&T High Performance Resilience Program. The program serves to improve the way buildings and infrastructure are built in the United States in order to protect the physical inventory from all hazards and to increase their performance to address energy efficiency and environmental sustainability.

In 2011, the Institute established a new Lifetime Achievement Award named in honor of a founding member of the Institute, Mortimer M. Marshall, Jr., FAIA, FCSI, NOMAC. In the future, this merit-based award, will recognize a member that has demonstrated exceptional service to the Institute, the Board of Directors and/or the organization.

During 2011, the Institute has sharpened its focus to improve collaboration and synergy in the creation of more resilient construction practices and achieving high-performing buildings and structures. With the work accomplished in 2011, the future is clearer to achieve the goals of more resilient communities and a more resilient nation. In 2012, we will strive to continue this work, bringing together public and private resources to address the pressing needs for vibrant sustainable communities that can recover quickly from setbacks that threaten our built environment.

It is our honor and privilege to provide this Annual Report for your consideration and to work with you to assist the nation in achieving high-performance buildings.

Respectfully,

Jim. W. Sealy, FAIA
Chairman, Board of Directors

Henry L. Green, Hon. AIA
The Institute Board of Directors

The National Institute of Building Sciences Board of Directors is comprised of 21 members. Six members are appointed by the President of the United States, with the advice and consent of the Senate, to represent the public interest. The remaining 15 members are elected from the nation’s building community to represent either public interest or industry voices. The Board representation includes architects, builders, building owners, building standards developers, consumers, contractors, fire safety professionals, local agency officials, product manufacturers, professional engineers, state agency officials and others. However, the majority of board members are required to come from the public interest category.

In 2011, President Obama nominated four public interest members, pending approval from the Senate. James “Tim” Ryan, CBO, secretary of the National Institute of Building Sciences Board of Directors, is a certified building official. Elected to the Board in 2006 as a local agency official, he is a non-presidential appointee in the public interest category. He serves on both the Executive Committee and Strategic Plan Implementation Committee, chairs the Awards Committee and is a member of the Building Seismic Safety Council Board of Direction. Mary B. Verner is the current mayor of Spokane, Washington. As the city’s chief executive officer, she is responsible for directing the activities of the city’s two thousand employees and managing a $600 million annual budget. Susan A. Maxman, FAIA, is a nationally recognized advocate and expert on the principles of sustainable design and historic preservation. She founded SMP Architects in 1980 and became the first female president of the American Institute of Architects (AIA) in 1993. James Timberlake, FAIA, co-founded the internationally published architecture firm, KieranTimberlake, in 1984. He is co-author of five books, has taught at a number of universities and is an award-winning architect.

The 2011 Executive Committee consisted of four members. Jim W. Sealy, FAIA, an architect and consultant to the design, codes, construction and legal profession, served as chairman of the Institute Board of Directors. RK Stewart, FAIA, Hon. FRAIC, Hon. JIA, Hon. AIA, LEED AP BD+C, an associate principal at Perkins + Will in San Francisco, California, held the position of vice chair. Ryan, code administrator for the city of Overland Park, Kansas, was secretary. Edward L. Soenke, FCSI, AIA, CCS, NCARB, of the Design Partnership, Architects, West Des Moines, Iowa, served as treasurer.

Elected to serve three-year terms, Dr. Charles W. Steger, FAIA, president of the Virginia Polytechnic Institute and State University, and Gordon V.R. Holness, PE, FASHRAE, past president of the ASHRAE, joined the Board in 2011. Three Board seats remained vacant.

The Institute honored Ronald L. Skaggs, FAIA, FACHA, FHFI, and Mortimer M. Marshall, Jr., FAIA, FCSI, NOMAC, who retired from the Board in 2010. Skaggs, Chairman Emeritus of HKS Architects, served eight years on the Board, completing a term as vice chair and two terms as Board chair. Marshall, president of The Marshall Group, Ltd., Architects, served two six-year terms on the Board, serving as treasurer in both terms. Marshall, who was involved in the Institute’s founding 35 years ago, provided an enormous amount of historical knowledge to the Board.

2011 Board of Directors

Chair: Jim W. Sealy, FAIA, Architect, Jim W. Sealy/Architect/Consultant
Vice Chair: RK Stewart, FAIA, Hon. FRAIC, Hon. JIA, Hon. AIA, LEED AP BD+C, Associate Principal, Perkins+Will
Secretary: James “Tim” Ryan, CBO, Building Official, City of Overland Park, Kansas
Treasurer: Edward Soenke, FCSI, AIA, CCS, NCARB, President, Design Partnership, Architects

Carl E. Baldassarra, PE, FSFPE, Executive Vice President, The RJA Group, Inc.
John F. Bender, PE, FSFPE, Staff Engineer, Regulatory Services Department, Underwriters Laboratories, Inc.
Heidi Brock, President, Aluminum Association
C. Morgan Edwards, Charlotte, NC
Bill Hardiman, Former State Senator, 29th District of Michigan
Steve M. Hays, PE, CIH, FACEC, Chairman of the Board, Gobbell Hays Partners, Inc.
Gordon V.R. Holness, PE, FASHRAE, Consulting Engineer, West Palm Beach, Fla.
John P. Kelly, Executive Vice President, Ryan Companies, U.S., Inc. (retired)
Susan Klawans, Director of Operational Excellence and Planning, Gilbane Building Company
Dwight “Sonny” M. Richardson, Jr., Richardson Home Builders
Emory R. Rodgers, Deputy Director, Virginia Department of Housing & Community Development
Charles W. Steger, PhD, FAIA, President, Virginia Polytechnic Institute and State University
Steven R. Winkel, FAIA, PE, Manager - West Coast Office, The Preview Group
Brent H. Woodworth, President/CEO, Los Angeles Emergency Preparedness Foundation
Each year, the National Institute of Building Sciences recognizes individuals and organizations that have provided outstanding service to the Institute, the building community and the nation. In 2011, at its Annual Awards Reception and Dinner, the Institute honored Michelle Fox, PhD; Get W. Moy, DSc, PE; and Mila Kennett. More than a hundred Institute members and supporters attended the event, which was held December 7, 2011, during the Institute’s Annual Meeting in Washington, D.C.

The Institute Honor Award goes to someone who has made an exceptional contribution to the nation and the building community. Institute Chairman Jim W. Sealy, FAIA, presented the 2011 Honor Award to Michelle Fox, PhD, Chief Strategist for Education and Workforce Development for the Office of Energy Efficiency and Renewable Energy (EERE) within the U.S. Department of Energy (DOE).

Dr. Fox’s work with DOE encompasses creating the strategic direction for education and workforce development programs, especially through the integration of advanced learning technologies. In late 2009, she personally championed the establishment of a 40-person multidisciplinary team to develop a weatherization online training (WxOT) program for DOE that incorporates state-of-the-art educational practices and media techniques, including three-dimensional animation and video games. The WxOT program, now in its second year, integrates the skills of architecture, engineering and weatherization subject matter experts; instructional designers; and media producers to give DOE improved means to educate energy auditors, installers, crew chiefs and inspectors and to provide 65,000 new jobs within the building community over the next decade.

The Institute Member Award goes to a member of the Institute or affiliate council who has made a substantial contribution in support of the mission, goals and objectives of the Institute. Institute Chairman Jim W. Sealy, FAIA, presented the 2011 Member Award to Get W. Moy, DSc, PE, Vice President at AECOM.

Dr. Moy attended the High Performance Building Council’s (HPBC) inaugural meeting and workshop, participated in the development of the Report to Congress on High Performance Buildings and, since 2008, has chaired the Council. At that time, he was the Director of Installation Requirements and Management for the U.S. Department of Homeland Security (DHS). Dr. Moy embraced the opportunity to become a member of the project team, participating in almost-monthly, day-long meetings. He contributed his perspective on the needs of the building owner during the development of the technical information for the report and for the Owner Performance Requirements (OPR) Tool. He also worked to ensure that the HPBDE Workshop, hosted by the HPBC Executive Committee, included the necessary organizations to get input from industry about the HPBDE Draft Report and OPR Tool. Dr. Moy is committed to identifying the standards that represent increasing levels of building performance and his dedication is apparent in his work as a volunteer leader.

The Institute President’s Award is given in recognition of extraordinary efforts to assist in advancing the mission of the Institute. Institute President Henry L. Green, Hon. AIA, presented the 2011 President’s Award to Sealy (left) and Green (right).
Award to Mila Kennett, Senior Program Manager in the Infrastructure Protection and Disaster Management Division (IDD) of the U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T).

Ms. Kennett is responsible for the DHS S&T High Performance Resilience Program. The Program serves to improve the way buildings and infrastructure are built in the United States in order to protect the physical inventory from all hazards, including chemical, biological, radiological and explosives (CBRE); earthquakes; floods; winds; and fire, and to increase their performance to address energy efficiency and environmental sustainability.

The High Performance Resilience Program has produced a wide range of publications, tools, metrics and benchmarks to promote this concept within the building industry and to provide information and tools to assist researchers, engineers, architects, industry and first responders. Such projects and tools include: the Urban Blast Tool (UBT); the Integrated Rapid Visual Screening (IRVS) for buildings, subways and tunnels; the Owners Performance Requirement Tool (OPR); the Advanced Materials Database; the Security Information Technical Exchange Database (SITE); and the Building and Infrastructure Protection Series (BIPS), a series of ten publications directed at the protection of buildings and infrastructure.

The Institute also recognized Mortimer M. Marshall, Jr., FAIA, FCSI, NOMAC, President, The Marshall Group, Ltd., Architects first from 1981 to 1987, and the second from 2005 to 2011. He served as treasurer in both terms, the second time for his entire tenure. The new merit-based award, named in Marshall’s honor, will recognize members that demonstrate exceptional service to the Institute, the Board of Directors and/or the organization. Marshall was unable to attend the Awards Dinner. His children, Mortimer M. Marshall, III, and Joy Marshall Ortiz, AIA, NCARB, accepted the award on his behalf.

Earlier in the year, the Institute issued a call to industry for nominations to identify potential award recipients. An Awards Committee reviewed the submissions and selected winners from the nominees based on how their work meets the mission, objectives and goals of the Institute.

The Awards Committee will solicit nominations for 2012 awards in late spring of 2011, with nominations due next July.
The Institute at a Glance: Councils and Programs

About the Institute

On August 22, 1974, upon signing the Housing and Community Development Act (Public Law 93-383) into law, the U.S. Congress authorized establishment of the National Institute of Building Sciences.

“The Congress finds that the lack of an authoritative national source to make findings and to advise both the public and private sectors of the economy with respect to the use of building science and technology in achieving nationally acceptable standards and other technical provisions for use in Federal, State and local housing and building regulations is an obstacle to its efforts by and imposes severe burdens upon all those who procure, design, construct, use, operate, maintain, and retire physical facilities, and frequently results in the failure to take full advantage of new and useful developments in technology which could improve our living environment.”

The law set guidelines for an authoritative nongovernmental organization to be created to address those concerns. Since its founding more than three and a half decades ago, the nonprofit Institute has established dozens of councils, developed numerous projects and brought together thousands of representatives from government, the professions, industry, labor and consumer interests to focus on the identification and resolution of problems and potential problems that hamper the construction of safe, affordable structures for housing, commerce and industry throughout the United States. Serving as an authoritative source of advice with respect to the use of building science and technology, the Institute continues to provide the opportunity for free and open discussion of issues and problems where there was once conflict and misunderstanding. It brings together regulatory agencies, legislators and representatives of the private sector to open working sessions that seek a consensus solution to problems of mutual concern.

The Institute’s Board of Directors consists of 21 members, six of whom are appointed by the President of the United States subject to the approval of the U.S. Senate. Headquartered in Washington, D.C., the Institute’s professional staff provides technical, managerial and administrative support for the Institute’s programs.

Coordinating Council: The Coordinating Council is the place where the National Institute of Building Sciences’ councils and committees can share information about projects that may be of interest across program areas and coordinate activities that are of mutual concern for different committees. In 2011, a number of programs worked on joint projects. For example, the Facility Maintenance and Operations Committee and buildingSMART alliance worked on development of the Information Exchange standards; the High Performance Building Council and the Multihazard Mitigation Council coordinated with the Integrated Resilient Design Program; and the Whole Building Design Guide received information from the Building Enclosure Technology and Environment Council, National Mechanical Insulation Committee, the buildingSMART alliance and other program areas.

Consultative Council: The Consultative Council engages the leadership of key organizations, representing the diversity of the building community. The Council makes recommendations on behalf of the building community directly to the executive and legislative branches of government to improve our nation’s buildings and infrastructure. In 2010, the Council developed its first comprehensive report, examining five topics the members identified as essential for the advancement of the built environment. In 2011, the Council examined several issues in-depth. These issues form the basis of the 2011 report contained within this Annual Report.

Council on Finance, Insurance and Real Estate: Banks, insurance companies, appraisers and real estate firms all play a significant role in how buildings are procured, designed and constructed. In May 2011, the Institute Board of Directors approved formation of a new body—the Council on Finance, Insurance and Real Estate (CFIRE)—to promote a cooperative process and open dialogue among the different parties, with the goal of supporting the achievement of cost-effective high-performance buildings.

Since its initial formation, the Council has discussed initial tasks, including identifying the data needs related to the financial implications of high-performance attributes and educating building occupants, policymakers and the building community on their roles in achieving high-performance buildings.

National Council of Governments on Building Codes and Standards: States and localities across the United States play a very important role—they serve as the front line, protecting the health, safety and welfare of citizens by adopting and enforcing building codes. In May 2011, the Institute established the National Council of Governments on Building Codes and Standards (NCGBCS) to help state and local jurisdictions enhance the public’s social and economic well-being by coordinating efforts across geographic boundaries to make technical findings, improve performance criteria and promote standards to ensure safe, durable, accessible and efficient buildings.
Haiti Center for Sustainable Reconstruction and Development: Following the 2010 earthquake in Haiti, the National Institute of Building Sciences brought together the U.S. building community to provide technical assistance and resources to inform the rebuilding efforts. The volunteer group established a “Haiti Toolkit” as the repository to house resources for the construction of a safe and sustainable Haiti. Upon compilation of the Toolkit, leading organizations from the international building community, with active engagement of Haitian professionals, proposed the development of a Haiti Center for Sustainable Reconstruction and Development. In 2011, the transition in Haitian government resulted in changes within the relevant ministries and in the approach to rebuilding. The Institute and other Center partners continue to engage potential funders and international relief and development organizations to secure funding.

Building Seismic Safety Council: The Building Seismic Safety Council (BSSC) provides a national forum to advance earthquake-resistant design and construction. Funded by the National Earthquake Hazards Reduction Program (NEHRP), BSSC develops the NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, the primary resource document used by codes and standards development organizations to provide for sound seismic-resistant design and construction practices. Charged with updating the 2009 Provisions for publication as the 2014 edition, the Council continued its work in 2011. In addition, BSSC completed several related seismic publications.

Multihazard Mitigation Council: In 2011, the Institute’s Board of Directors announced the reconstitution of the Multihazard Mitigation Council (MMC), expanding the Council’s mission and broadening its membership base. The goals of the reconstituted MMC are simple: promoting disaster resilience, becoming a focal point of credible information and promoting whole building strategies. However, these goals, while worthy, present a unique set of challenges that will require collaboration with homeowners, commercial and industrial property owners, researchers, the public sector and many others in order to be achieved. In the second half of 2011, the MMC established its leadership team and worked to expand its membership. In addition, the Council began establishing a range of program activities.

Multihazard Risk Assessment Program/Hazus: When emergency planners across the United States want to see the potential impact of a natural disaster on their communities before it actually happens, they use Hazus, a software program available through the Federal Emergency Management Agency (FEMA). Hazus is a geographic information system (GIS)-based software program that utilizes state-of-the-art technology to estimate damage and loss from potential earthquake, flood, hurricane, and coastal surge events. The Institute initiated the Hazus Program in 1992 and developed software versions until 2009. Since then, the Institute provided Independent Verification and Validation (IV&V) for the Hazus software. In 2011, the Institute tested two new versions of Hazus, assembled a Tsunami Model Oversight Committee and an Open Source Committee, and reconvened the Flood Committee. In addition, the Coastal Surge Committee finalized its work.

Multihazard Risk Assessment/IRVS: In 2011, the U.S. Department of Homeland Security (DHS), Science and Technology (S&T) Directorate’s Infrastructure Protection and Disaster Management Division (IDD) developed a unique set of Integrated Rapid Visual Screening (IRVS) tools to quickly and reliably assess the vulnerability of our nation’s buildings, tunnels and mass transit stations. The Institute provided DHS technical support in the development of these tools. This is the first set of tools that uniquely computes and quantifies scores for resiliency and risk, and combines them with a multi-hazard assessment for a given building.

Scientific Resolution Panels: FEMA engaged the Institute in 2010 to establish and administer a Scientific Resolution Panel (SRP) process to perform independent reviews of the scientific and technical data FEMA uses to develop its Flood Insurance Rate Maps (FIRMs). In 2011, the Institute convened three SRPs. Two of the Panels were established to resolve conflicting scientific and technical data submitted by communities challenging FEMA’s proposed flood elevations. The third Panel was requested by FEMA to obtain comments and feedback on new proposed methodologies and approaches for creating FIRMs in areas with levees that are “not accredited.”

Integrated Resilient Design Program: In 2010, DHS S&T IDD contracted with the Institute to assist the DHS High Performance Integrated Design Resilience (HP&IDR) Program in addressing the security and resiliency of buildings and infrastructure. In 2011, the Institute’s Integrated Resilient Design Program continued work with the HP&IDR Program on tools and publications for resiliency, business continuity, mitigation and stabilization analysis, including the Advanced and High Performance Materials Database (AMD), Security Information and Technologies Exchange Database (SITE) and Owner Performance Requirements (OPR) Tool.

Advanced and High Performance Materials Council: The Advanced and High Performance Materials Council (AMC) aims to encourage the understanding and use of high-performance and advanced materials in construction by coordinating the research efforts of public and private institutions. Formed by DHS with the Institute, the AMC works to unite research institutions, laboratories, industry and universities to investigate and develop a variety of materials that address construction attributes such as resilience, durability and security. In January 2010, it was decided that the AMC would develop the AMD. The Institute completed the database structure in December 2010. The database became available for population and use in 2011.
Security Information and Technology Exchange: SITE is a database designed as the tool of choice for obtaining information about and comparing available security products. DHS, in partnership with the Institute, designed this easy-to-use web resource for security operations managers, architects, engineers and other critical infrastructure professionals responsible for the security and safety of federal facilities. In 2011, the SITE working group continued to meet to refine product data fields and enhance content, including standards, policies and publications.

Building Enclosure Technology and Environment Council: For nearly 30 years, the Building Enclosure Technology and Environment Council (BETEC) has fostered cooperation among the public and private industries that work together to make buildings more energy efficient and environmentally responsible. In 2011, BETEC members formed a Vision Committee to examine redefinition of the Council’s goals, rewriting of its bylaws and a potential restructuring to meet those goals. The Council hosted a symposium entitled, “High Performance Light-Framed Walls.”

High Performance Building Council: The High Performance Building Council (HPBC) works to identify high-performance building standards, guidelines, rating and certification programs; stimulate innovation within the buildings industry; reduce barriers to the deployment of high-performance building technology; and promote understanding of whole building performance. In 2011, a major focus of the HPBC was in providing review and support to the Institute on a project it is conducting for DHS. The High Performance Based Design for the Building Enclosure project serves to ensure that building owners have a mechanism to incorporate high-performance building goals that also address security.

DHS High Performance Based Design for the Building Enclosure: In 2010, DHS S&T IDD asked the Institute to help with a new project—the High Performance Based Design for the Building Enclosure (HPBDE) project. The goal of the HPBDE is to ensure that blast and ballistic resistance and chemical, biological and radiological (CBR) protection, along with operational building enclosure objectives such as energy performance, sustainability and durability, are included into the planning, design and construction of new buildings and the retrofit of existing buildings. In 2011, the Institute completed the HPBDE project, which focused on enclosure systems for new and renovated office building construction. The ultimate goal is to cover the key systems of the whole building.

DOE Weatherization Online Training (WxOT) Project: The U.S. Department of Energy (DOE) Weatherization Online Training (WxOT) program provides learning materials to bring new life to DOE's existing, instructor-led weatherization training program and expand widely its current reach to people interested in starting a career in weatherization as well as those who wish to “move up” to other jobs in the field. The WxOT project began in June 2010, with a team of professionals working to develop a set of lessons to train Weatherization Assistance Program workers. Meeting over the course of 2010 and 2011, the team created online materials, including videos and computer games, to make learning more engaging and hands-on. Even while still in development, the WxOT program has heightened interest on the part of other federal agencies to the possibilities of taking part and contributing to this kind of learning system.

National Mechanical Insulation Committee: The National Mechanical Insulation Committee (NMIC) for Building and Industrial Applications brings together major governmental agencies, private industry and organizations that are concerned with the design, installation and maintenance of mechanical insulation in the commercial and industrial market segments. A primary focus of the NMIC is the internet-based Mechanical Insulation Design Guide (MIDG), which NMIC develops and makes available through the WBDG Whole Building Design Guide®. MIDG, is an evolving web-based resource that enables users to access increasingly specific information on mechanical insulation. A number of new online calculators were added in 2011 to educate industry about and promote the benefits of mechanical insulation.

VA Facility Management Transformation Initiative: In 2009, the U.S. Department of Veterans Affairs (VA) began an enterprise-wide initiative to promote advances in life-cycle facility management, including planning, design, acquisition, construction, sustainment and decommissioning. The Institute serves as the primary consultant and liaison between VA staff, consultant subject matter experts (SMEs), and public and private sector contributors to the VA Facility Management (VAFM) transformation initiative. The VAFM SME team began piloting the new VAFM operating constructs for Project Management Plans (PMP), Post-Occupancy Evaluation (POE) and Facility Master Planning (FMP) in 2011. Once established, VAFM will integrate functions associated with facilities management services and activities across the Staff Offices and Administrations.

GSA Performance Based Design Program: The U. S. General Services Administration (GSA) Facilities Standards for the Public Buildings Service (P-100) establishes design standards and criteria for new buildings, major and minor alterations, and work in historic structures. In 2011, the GSA Public Buildings Service engaged the Institute to update its P-100 standard and incorporate a performance-based approach. The Institute assembled and directed a multidisciplinary project team to create a tool that
would allow assessment of different levels of performance for the major attributes of a building, including enclosure; lighting; heating, ventilation and air conditioning (HVAC); interior and electrical systems.

**DoD TRICARE Management Activity:** The Department of Defense (DoD) Military Health System (MHS) provides healthcare to DoD service members, retirees and their families. In 2011, the Institute began providing support to TMA programs with the goal of making Facility Life Cycle Management (FLCM) program operations more efficient and effective. The Institute provided SMEs to advise and instruct TMA on processes, ranging from facility operations, maintenance, space-planning, benchmarking, communications and overall best practices associated with military health facilities. Through the Institute’s and TMA’s relationship, the program has been able to execute several initiatives with the VA involving the proposed integration of joint facilities.

**Access Board Acoustics in Classrooms Project:** A standard developed by the Acoustical Society of America, ANSI/ASA S12.60-2010: Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, establishes requirements for educational facilities to ensure a quality learning environment. In 2011, the U.S. Access Board approached the Institute to evaluate the cost of requiring compliance with the ANSI/ASA acoustics standard for kindergarten through grade 12 (K-12) schools, in both permanent construction and relocatable classrooms. The Institute began tabulating data late in 2011. Through their research, staff found that there are many factors affecting the cost of K-12 school construction, beyond the classroom acoustics issue, that are all factors that must be considered in the evaluation.

**Low Vision Design Committee:** In September 2010, the Institute held the “Workshop on Improving Building Design for Persons with Low Vision” sponsored by the GSA. The Low Vision Design Committee (LVDC) is a direct offshoot of that event. Members of the LVDC organizing group incorporated major findings from the workshop and distilled them into suggested changes to the GSA design guide, P-100: Facilities Standards for Public Buildings. The organizing group also created a set of stand-alone guidelines to accompany the P-100. With funding from the Rothschild Foundation, a formal kick-off meeting of the LVDC took place at the Institute’s headquarters in November 2011.

**NAV FAC Architectural Acoustics Project:** Within the branches of the DoD, there are a number of different acoustical requirements addressing military unique facilities and space types within those facilities. The Institute is assisting the Naval Facilities Engineering Command (NAVFAC) in compiling and consolidating the various requirements into one location. Once compiled, NAVFAC will add them into its new Architecture Unified Facilities Criteria (UFC 3-101-01) to help architects design for acoustics and noise control in military facilities. This project began in 2011. During the year, Institute consultants conducted sound measurements at Norfolk Naval Base on military-specific facilities. Institute staff and consultants have compiled this information, along with the other requirements, into a first draft document, which was submitted for review by NAVFAC.

**NAVFAC Design Build Document Update:** The Naval Facilities Engineering Command (NAVFAC) is in the process of updating its Design-Build (DB) Documents for Sustainability and Energy for both the DB Model Request for Proposal (RFP) - Standard Template and - Small Project Template (SPT). The primary purpose of the project, which kicked off in December 2011, is to keep the DB documents living and ready to use. Energy and sustainability updates are required by the President of the United States, the U.S. Congress and the leadership of NAVFAC. The documents also need to reflect the latest developments in the DB process and be cast in terms of performance. The Institute, which is overseeing the project, is responsible for interpreting the work and recommendations of everyone on the contractor team and supervising the editing of all documents.

**ProjNetSM:** The Institute is helping federal agencies streamline the design-bid-review process and accelerate review of projects through the use of the ProjNetSM secure, on-demand design review tool. This accredited, cloud-based platform has been the de-facto standard in government-to-business service for over a decade. Using the ProjNetSM tool, more than 25,000 private designers, engineers and contractors have been able to work with their public agency counterparts to transparently manage the creation of our built environment. In 2011, ProjNetSM technical experts began developing a new user interface page to streamline the process and minimize the number of clicks to get to information on the site. The interface was beta tested late in the year and posted on the site for use and comment.

**WBDG Whole Building Design Guide®:** One of the largest, most comprehensive online resources in the building construction industry, WBDG is a web-based portal that contains design, construction and facility management information and criteria required by the U.S. military and other federal agencies. In March 2011, WBDG set a new record of 4,264,604 downloads—the first time downloads on the site exceeded 4 million. Just months later in November, WBDG set two new records. The first for downloads (5,699,454, a 33% increase) and the second for visitors to the site (763,656). In each of the last three months of 2011, downloads exceeded 5.2 million and visitors exceeded 670,000. During the year, WBDG added 26 new pages (15 of which are renewable energy Resource Pages), updated a number of sections, and added a Twitter account and Wikipedia page.

**buildingSMART alliance™:** The buildingSMART alliance™ (bSa) has a simple purpose—to root out non-value added effort in the facilities industry by reducing waste, streamlining the construction process and integrating industry practices. One way bSa streamlines the process is by developing standards for computer-
aided design (CAD) and building information modeling (BIM). The Alliance, through its committees, develops both the United States National CAD Standard® (NCS) and the National BIM Standard–United States™ (NBIMS-US™). In 2011, the buildingSMART alliance focused much of its efforts on the creation of the first open-standard, consensus-based NBIMS-US™. In addition, the bSa released NCS Version 5.

United States National CAD Standard®: The United States National CAD Standard® (NCS) offers greater efficiency in the design and construction process because it streamlines and simplifies the exchange of graphical two-dimensional building design and construction data. First published in 1999, the NCS consists of AIA’s CAD Layer Guidelines, the Construction Specification Institute’s (CSI) Uniform Drawing System (Modules 1-8), and the Plotting Guidelines module developed by the Institute. The NCS coordinates these CAD-related publications to allow consistent and streamlined communication among owners and design/construction teams. In May 2011, the Institute released NCS Version 5.

National BIM Standard–United States™: A BIM is a three-dimensional digital representation of the physical and functional characteristics of a building. It is a shared resource of knowledge about a facility that can be used to make decisions about the building throughout its life cycle, from the initial idea, to design and construction, through daily operations and eventual demolition. The purpose of the National BIM Standard–United States™ (NBIMS-US™) is to standardize the way practitioners use BIMs so that they can easily pass information from one phase of the building process to another. In 2011, the NBIMS-US™ Project Committee successfully approved 18 ballots. In late autumn, the Alliance began the production stage of the standards development process. The final product, NBIMS-US™ Version 2, is anticipated in spring 2012.

Facility Maintenance and Operations Committee: The Facility Maintenance and Operations Committee (FMOC) works within the industry to improve the performance and longevity of buildings and building systems through consistent, effective and proper facility maintenance and operation. In March 2011, FMOC held a meeting during the National Facility Management and Technology (NFMT) Conference and arranged several presentations. The Committee met again in December during the Institute’s Annual Meeting. The Operations and Maintenance Subcommittee for the WBDG, many of whom are members of FMOC, met to review existing pages and new pages. In addition, FMOC worked with the bSa and CSI to provide OmniClass support on the OmniClass numbering system.

Information Exchanges: The Construction Operations Building Information exchange (COBie), which delivers building asset information, has grown from an idea to an internationally recognized standard implemented in commercial software that is used across the globe. COBie provides a vendor-neutral interchange format that allows building asset information to flow without the multiple stages of rediscovery and rekeying of data required today. As of 2010, COBie is now mandated for public building projects in the United Kingdom. In the summer of 2011, COBie was submitted as a ballot to become a part of the NBIMS-US™ Version 2. In addition, the Specifiers Properties information exchange (SPie) project works to establish product templates that could be used by manufacturers to export product data into an open-standard format consumed by designers, specifiers, builders, owners and operators.

National Clearinghouse for Educational Facilities: The National Clearinghouse for Educational Facilities (NCEF) website is the premiere source for research and resources on the planning, design, funding, building and maintenance of schools for all levels of learning. NCEF has over 25,000 resources and gets 1.2 million visitors a year. In 2011, NCEF enhanced the look and feel of its website by expanding the site layout and improving the display of information. As a way of increasing the visibility of the Clearinghouse, NCEF integrated social media into the website and, in July, began posting on Twitter.

Annual Meeting: The National Institute of Building Sciences 2011 Annual Meeting, held December 5-9, 2011, in conjunction with Ecobuild America in Washington, D.C., served to highlight the projects and programs of the Institute. It was a great opportunity for Institute members, partners and other building professionals to witness the organization in action, while finding out the latest trends in technologies and developments for the building industry. The Annual Meeting included annual meetings of the Institute’s councils and committees; the BETEC Symposium; the buildingSMART alliance™ Conference; FEDCon® ‘11; and the Institute’s Annual Reception and Awards Dinner.
Coordinating Council

The National Institute of Building Sciences Coordinating Council serves an important purpose. It is the place where the Institute’s councils and committees can share information about projects that may be of interest across program areas and coordinate activities that are of mutual concern for different committees. The Council consists of representatives from each of the Institute’s standing councils.

Each quarter, the Coordinating Council reports on the status of projects and programs and provides the Board of Directors with an overview of how the programs respond to the strategic direction set by the Board.

In 2011, a number of programs worked on joint projects. The Facility Maintenance and Operations Committee continued to work with the buildingSMART alliance™ on development of the Information Exchange standards, with a particular focus on the Construction Operations Building information exchange (COBie) and the Specifiers Properties information exchange (SPie).

The High Performance Building Council and the Multihazard Mitigation Council worked on a number of activities in concert with the Integrated Resilient Design Program, including the U.S. Department of Homeland Security High Performance Based Design for the Building Envelope project and the Integrated Rapid Visual Screening Tools, with the purpose of incorporating high-performance attributes and hazard mitigation components when addressing building security issues.

The WBDG Whole Building Design Guide® continues to incorporate additional material from the Building Enclosure Technology and Environment Council, the National Mechanical Insulation Committee, the buildingSMART alliance™ and other program areas, as new materials become available. These program areas provide their expertise to update WBDG pages, allowing the online resource to keep on the cutting edge of the latest technologies.

As a result of the Coordinating Council, the work of the Institute’s various programs and councils has become more integrated.

Learn More

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Coordinating Council

Chair: RK Stewart, FAIA, Hon. FRAIC, Hon. JIA, Hon. AIA, LEED AP BD+C, Perkins+Will

Wagdy A. Y. Anis, FAIA, LEED AP, WJE


William Brodt, NASA

James R. Cagley, PE, SE, Cagley & Associates

E. William East, PhD, PE, U.S. Army Corps of Engineers

Ron King, National Insulation Association

Rob Kistler, Façade Group, LLC

Stephen F. Mawn, ASTM International

David Morris, EMCOR Group

Get W. Moy, DSc, PE, AECOM

Looking Ahead

In 2012, the representatives on the Council will continue to share, discuss and evaluate common strategies and development proposals, with the goal of coordinating and streamlining program activities.
Consultative Council

The U.S. Congress, within the National Institute of Building Sciences’ enabling legislation, called for the establishment of a Consultative Council to serve as an important link among the many disciplines and organizations in the field of building technology. The Council has evolved over the last 37 years to meet the changing needs of the Institute and the building community as a whole. In its most recent evolution, the Institute reconstituted the Consultative Council in 2010 to engage the leadership of key organizations, representing the diversity of the building community.

The Consultative Council was charged by the Institute’s Board of Directors to develop findings and recommendations to advance the building community and the nation’s buildings. The Council now 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.

In 2010, the Council developed its first comprehensive report, examining five topics the members identified as essential for the advancement of the built environment.

Upon the release of the Council’s initial report, the High-Performance Building Congressional Caucus Coalition hosted a briefing in May 2011 outlining the findings and recommendations. Throughout the year, Council members, Institute leadership and others presented the report’s findings and recommendations in numerous venues.

In 2011, the Council examined several issues in-depth from the broad findings and recommendations contained in the 2010 report. These issues form the basis of the 2011 report contained within this Annual Report.

The Council welcomed three new members in 2011. Membership will continue to expand to include a wider range of representative sectors on both the Council and within its topical committees.

Looking Ahead

The Council has identified a number of outreach opportunities to be implemented in 2012. The Council will continue to examine important issues before the building community and offer recommendations to improve the nation’s building stock. In addition, the Council will develop a number of educational tools in 2012.

Learn More

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Council Members

Chair: Doug Read, ASHRAE
Vice-Chair: Ron King, National Insulation Association
Secretary: Tom Meyer, ESCO Group

Council Member Organizations
ASTM International
American Institute of Architects
American Society of Civil Engineers
ASHRAE
Associated General Contractors of America
Building Owners and Managers Association, International
Construction Specifications Institute
ESCO Group
Extruded Polystyrene Foam Association
Glass Association of North America
Green Mechanical Council
HOK
Illuminating Engineering Society
International Association of Lighting Designers
International Association of Plumbing and Mechanical Officials
International Code Council
Laborers’ International Union of North America
National Insulation Association
National Opinion Research Center at the University of Chicago
United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry

Topical Committee Facilitators
Defining High-Performance & Common Metrics: Paul Mendelsohn and Jessyca Henderson, American Institute of Architects
Energy and Water Efficiency: Peter DeMarco, International Association of Plumbing and Mechanical Officials
Education and Training: Larry Bulman, United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry
Codes and Standards Adoption and Enforcement: Nancy McNabb, National Institute of Standards and Technology
Sustainability: Richard Wright and Michael Sanio, American Society of Civil Engineers
Existing Buildings: Ron Burton, Building Owners and Managers Association, International
Council on Finance, Insurance and Real Estate

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 a specific idea gets the funding and insurance it needs to move forward to fruition. The challenge, however, is that banks, insurance companies, appraisers and real estate firms often lack the necessary data to support building industry efforts to go beyond “business-as-usual.”

In December 2010, the National Institute of Building Sciences hosted a Dialogue on Finance, Insurance and Real Estate to open discussion on this important issue. Participants in the Dialogue identified considerable opportunities for communication between the design, construction and ownership sectors and the finance, insurance and real estate sectors. Such communication could lead to a greater understanding of each sector’s needs and opportunities for cooperation in achieving national goals.

In May 2011, following that successful meeting, the Institute Board of Directors approved formation of a new body, the Council on Finance, Insurance and Real Estate (CFIRE), to promote a cooperative process and open dialogue among the different parties, with the goal of supporting the achievement of cost-effective high-performance buildings.

CFIRE expects to work on a number of activities. It may develop and recommend standards, guidelines and conformity assessment programs; stimulate innovation in government and within the sectors of the economy; and promote increased understanding and communications among architects, engineers, contractors, owners, insurers, bankers, investors, appraisers, voluntary standards organizations, government agencies and other sectors of the economy. The Council also will serve as a focal point for bringing the perspectives of the finance, insurance and real estate community into the Institute's other councils and programs.

Since its initial formation, the Council has begun discussing a number of initial tasks. Two especially important ones include, first, identifying the data needs related to the financial implications of high-performance attributes and, second, educating building occupants, policymakers and the building community on their roles in achieving high-performance buildings.

Learn More

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Looking Ahead

CFIRE will work to expand membership and select a leadership team while working to achieve a number of tasks to improve building performance. The Council will be identifying potential resources to conduct, coordinate, promote and sponsor research and development activities related to information exchange, education and training, as well as funding to conduct forums and workshops, manage research-related projects and disseminate information related to improving building performance.

Council Members

Debra Ballen, Insurance Institute for Business & Home Safety
David Bonowitz
Michael Chipley, PMC Group LLC
Andrew Dorchester, The Dorchester Group
Rob Duke, Surety & Fidelity Association of America
Dave Dybdahl, American Risk Management Resources Network
James Finlay, Wells Fargo Bank
Peter Fusaro, Global Change Associates
George Goeisieski, Business EcoSystems
Paul Grahovac, PROSOCO
Brian Green, Building Owners and Managers Association, Intl.
Erin Rae Hoffer, Autodesk
Kent Jeffrey, International Council of Shopping Centers
Odell Jones, Jones Program Management
Jim LaRoe, LAROE Consulting Services
Steve Linville, National Association of Home Builders
Janie Maffei, California Earthquake Authority
Mark McCallum, National Association of Surety Bond Producers
Brian McCarter, Sustainable Real Estate Solutions
Peter Miscovich, Jones Lang LaSalle
Christopher Monek, Associated General Contractors of America
Andrea Morris, Arlington Economic Development
Scott Muldavin, The Muldavin Company
Charles Perry, EAG Consulting
Joe Phillips, IBM
Alan Redmond
Russell Riggs, National Association of Realtors
Julie Rochman, Insurance Institute for Business & Home Safety
Marc Sallette, DQI USA
Ron Sappenfield, DDA Associates
Paula Seidel, The Appraisal Foundation
Ellen Sinreich, GreenEdge LLC
Bob Smith, Tall Tree Labs
Ron Smith, HOK
Susan Stokes, Royal Institution of Chartered Surveyors
Simon Taylor, Questant
Leanne Tobias, Malachite
Ujiv asphalt, Alberti Group
David Ways, DotBim, LLP
Catherine Williams, OSCRE
Dan Winters, Evolution Partners Real Estate Advisors
Masoud Zedah, Risk & Reliability Engineering
National Council of Governments on Building Codes and Standards

States and localities across the United States play a very important role—they serve as the front line, protecting the health, safety and welfare of citizens by adopting and enforcing building codes. Unfortunately, protecting the public is not always easy, especially when government budgets are being cut, employees are being laid off and education and training funds are non-existent. The National Institute of Building Sciences recently established the National Council of Governments on Building Codes and Standards (NCGBCS) to help state and local jurisdictions enhance the public’s social and economic well-being by coordinating efforts across geographic boundaries to make technical findings, improve performance criteria and promote standards to ensure safe, durable, accessible and efficient buildings.

When the U.S. Congress authorized the establishment of the Institute nearly four decades ago, one of the organization’s mandates was to conduct programs that would facilitate cooperation among states. The goal was to encourage the states to accept technical findings and nationally recognized performance criteria, standards and other technical provisions for building regulations brought about by the Institute. This program would have several priorities: encouraging states to implement the findings and regulatory provisions; helping states to develop in-service training programs for building officials; and establishing fully staffed and qualified state technical agencies to advise local officials on questions of technical interpretation.

In May 2011, following dissolution of the National Conference of States on Building Codes and Standards (NCSBCS), an independent body with similar goals, the Institute Board of Directors approved formation of NCGBCS.

NCGBCS is tasked with identifying and providing resources needed to conduct, coordinate, promote and sponsor research and development activities related to information exchange, education and training. The Council will conduct forums and workshops. It will manage research and research-related projects. It will disseminate information and review work performed by other groups. The Council also may develop (or support the development of) and recommend standards, guidelines and conformity assessment programs. It will work to stimulate innovation in states and within the building industry. NCGBCS also will promote increased understanding and communications among architects and engineers, builders, manufacturers, product vendors, voluntary standards organizations, users, government agencies and other sectors of the building community.

Learn More

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Looking Ahead

In 2012, NCGBCS will work to expand membership and select a leadership team while beginning to tackle a range of program activities.
The earthquake that struck Haiti on January 12, 2010, was a tragic demonstration of how the lack of well-designed and constructed buildings could have a devastating impact on the safety of the Haitian people. The earthquake, which left an estimated 250,000 dead, 300,000 injured and 1.5 million homeless, was the latest in a line of natural disasters that continues to haunt and stunt the development of Haiti. As the country strives to rebuild, it is crucial that all new buildings are designed and built to minimize the repeat of these preventable tragedies.

Following the earthquake, the National Institute of Building Sciences brought together the U.S. building community to provide technical assistance and resources to inform the rebuilding efforts. The volunteer group established a “Haiti Toolkit” as the repository to house resources for the construction of a safe and sustainable Haiti. The group provided guidance on effective design criteria for the building sector; information on the implementation of building code enforcement and quality control schemes; as well as background for the formation of a design and construction training program.

Upon compilation of the Toolkit, leading organizations from the international building community, with active engagement of Haitian professionals, proposed the development of a Haiti Center for Sustainable Reconstruction and Development. The Center would provide a focal point for the development, dissemination and implementation of safe and sustainable physical development for Haiti. The Toolkit would serve as one of the initial resources provided by the Center.

In 2011, the transition in Haitian government resulted in changes within the relevant ministries and in the approach to rebuilding. Members of the international consortium submitted a proposal for recognition and funding of the Center to the Interim Haiti Recovery Commission (IHRC). However, the IHRC dissolved before it completed its deliberations.

The Institute and other Center partners continue to engage potential funders and international relief and development organizations to secure funding. The partners have established a website for the Center (www.HaitiBuildingCenter.org) and are soliciting private sector donations.

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Website: www.HaitiBuildingCenter.org

Participating Organizations

- Ayers Saint Gross Architects + Planners
- California Polytechnic State University
- Earthquake Engineering Research Institute
- Haitian American Engineering Association (ADIHA)
- Institute for Building Technology and Safety
- National Institute of Building Sciences
- National Organization for the Advancement of Haitians (NOAH)
- The State University of Haiti (UEH)
- Virginia Polytechnic Institute and State University
- Witt Associates
- YCF Group, S.A.

Looking Ahead

While significant funding is being sought for the design and construction of the Center and to support long-term programming, the Institute and participating organizations are developing small scale projects to advance the implementation of a strong building culture in Haiti. One such project is the development of a workshop for both local government staff and building professionals to learn about codes and standards and enforcement in a collaborative learning environment.
Building Seismic Safety Council

Two seismic events occurred in 2011 that made a serious impression on the way Americans and the world look at earthquakes. On March 11, 2011, a magnitude 9.0 earthquake occurred in Honshu, Japan. Because earthquakes occur there on a regular basis, the Japanese have constructed their buildings to resist seismic activity. Yet, the tsunami that followed this earthquake had catastrophic consequences, erasing entire coastal communities and wreaking havoc on a nearby nuclear power plant. Later in the year, on August 23, a 5.8 magnitude earthquake hit Virginia. The shocks, which were felt up and down the East Coast, emptied buildings from Washington, D.C., to New York City and made it clear to residents that the East Coast is not immune to earthquakes. For such a small event, there was a significant amount of damage to two major icons. The Washington Cathedral had more than a million dollars’ worth of damage and the Washington Monument was closed for the remainder of the year.

These two events, as well as a devastating earthquake in Christchurch, New Zealand, on February 22, brought the importance of preparing for earthquakes and tsunamis to the forefront and made Americans question how ready U.S. nuclear plants and the nation as a whole are to resist them. Such catastrophic events exemplify the importance of incorporating seismic safety into building construction and disaster planning for communities.

The Building Seismic Safety Council (BSSC) provides a national forum to advance earthquake-resistant design and construction. BSSC develops earthquake risk mitigation and regulatory provisions for use in the nation’s building codes and standards. Since the National Institute of Building Sciences established this pioneer council in 1979, BSSC has served the building community and the public by ensuring that lessons learned from building performance during earthquakes, as well as new research to improve earthquake resistance, are reflected in state-of-the-art seismic requirements. BSSC works via committees to accomplish its goals, with 66 voting organizational members and 19 affiliate members. More than 150 volunteer experts, including engineers, architects, academics, researchers, code officials, manufacturers and suppliers, participate in committee activities.

In 1977, the U.S. Congress passed the Earthquake Hazards Reduction Act to develop effective ways to mitigate earthquake risks to the national economy and protect the life safety of building occupants. The law established the National Earthquake Hazards Reduction Program (NEHRP) and provided funding to four federal agencies to address seismic issues: the Federal Emergency Management Agency (FEMA), National Institute of Standards and Technology (NIST), National Science Foundation (NSF) and United States Geological Survey (USGS). Since its inception, the NEHRP has supported many important initiatives to foster broad-scale mitigation of earthquake risks.

One such initiative is development of the NEHRP Recommended Seismic Provisions for New Buildings and Other Structures, the primary resource document used by codes and standards development organizations to provide for sound seismic-resistant design and construction practices. The BSSC develops the NEHRP Provisions under a process sponsored by FEMA.

The NEHRP Provisions provides design professionals, building officials and educators with in-depth commentary on the intent and preferred application of the seismic regulations. BSSC completed the first edition of the Provisions for publication in 1985. Since that time, FEMA has funded BSSC to regularly update the Provisions. The most recent edition came out in 2009.


In the summer of 2011, Clarett Heider, Executive Director of the BSSC, for more than twenty years, retired. Dana K. “Deke” Smith, FAIA, took over as the new Executive Director and Drew Rouland as Program Manager.

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BSSC Board of Direction

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Vice Chair: James Cagley, PE, SE, Cagley and Associates
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Joseph Messersmith, PE, Portland Cement Association
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Timothy Reinhold, PhD, PE, Institute for Building and Home Safety
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Charles Spitz, NCARB, AIA, CSI, Architect/Planner Code Consultant
S. Shyam Sunder, PhD, PE, National Institute of Standards and Technology
Robert D. Thomas, National Concrete Masonry Association

Looking Ahead

In 2012, BSSC will conduct the first member organization ballot on changes to the 2014 NEHRP Provisions. The Council will also pursue simplified seismic design investigation, complete several educational publications for FEMA, begin efforts to ensure that the next edition of the model building codes and standards reflect the Provisions requirements, and keep on encouraging adoption and widespread use of the Provisions.
The Federal Emergency Management Agency (FEMA), on its website, listed 99 major disaster declarations for 2011 alone. Each of these catastrophic events, as well as the 29 emergency declarations and 114 fire management assistance declarations also posted for the year, impacted lives, businesses and communities. Helping the nation’s communities to prepare for such potential disasters is a key focus of the Multihazard Mitigation Council (MMC).

The National Institute of Building Sciences first formed the MMC in 1997. Since then, the Council has worked on a number of projects addressing mitigation issues. In 2005, MMC released a study requested by Congress and funded by FEMA. *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities* concluded that every dollar spent on mitigation saves four in future losses. Since its publication six years ago, the study has been quoted by media, industry experts and even members of Congress. In another project, the MMC worked closely with the National Institute of Standards and Technology (NIST) to translate World Trade Center investigation recommendations into proposed changes for the nation’s building codes and standards.

In 2011, the Institute’s Board of Directors announced the reconstitution of the MMC, expanding the Council’s mission and broadening its membership base. The goals of the reconstituted MMC are simple: promoting disaster resilience, becoming a focal point of credible information and promoting whole building strategies. However, these goals, while worthy, present a unique set of challenges that will require collaboration with homeowners, commercial and industrial property owners, researchers, the public sector and many others in order to be achieved.

The reconstituted MMC will fill a vital need by establishing a body of experts from a multitude of related fields that can address the challenges associated with identifying and implementing effective mitigation practices. This independent entity within the Institute will work to inform decision making in ways that lead to effective public policy on many levels. The challenge before MMC members will be to think beyond the science and engineering into the realm of public policy and private lives. Hazard mitigation only works when implemented, yet there are a number of real-world barriers to that implementation. A large part of the MMC’s mission is to identify how to reduce or eliminate those barriers when developing the best possible mitigation strategies, measures and policies. The new and improved MMC will utilize the internet, social media and good old-fashioned on-the-ground work to reach out to the local level.
Membership in the MMC is voluntary and includes public and private sector architects, engineers, contractors and risk assessment practitioners, as well as trade and professional associations, materials interests and others from communities across the United States. The Council provides a forum for disaster professionals to exchange valuable information on emerging trends in building technology and federal policy and to address building systems and software applications that play a critical role in disaster resilience and sustainability.

In the second half of 2011, the MMC established its leadership team and worked to expand its membership. In addition, the Council began discussing a range of program activities.

**Subcommittees**

During the MMC Annual Meeting held in December, the MMC established five subcommittees to oversee MMC activities. The Symposium Subcommittee will coordinate the logistics associated with selecting topics and speakers for a symposium to be held during the 2013 Annual Conference. The Multihazard Subcommittee will address conflicts that exist between standards/guidelines for different hazards; the interrelationship between hazard impacts, mitigation, etc.; and approaches for addressing communication limitations between and within agencies who address mitigation issues. The Education and Communications Subcommittee will recommend ways of providing content on a consistent basis and a communications plan. The Legislation Subcommittee will be tasked with maintaining awareness of proposed legislation that may impact the goals of the MMC and its constituency. Lastly, the Finance Subcommittee will work to identify appropriate funding opportunities (grants, donations, etc.) that can support the mission and initiatives of the MMC.

**Publications**

As part of its activities and outreach, the MMC intends to develop a number of publications, including white papers on disaster resilience policy. One periodical, a free semi-annual magazine entitled the *Journal of Hazard Mitigation and Risk Assessment (JHAZ)*, debuted in March 2011 under the sponsorship of the MMC with Board members among the article writers.

**MMC Symposium**

In late November, the Institute met with FEMA representatives. During the meeting, they discussed defining a comprehensive strategy to address the combined potential impacts of all hazards on a region. Such a strategy must include the cascading consequences of disasters (economic, social, political, etc.) In response to this need, the Institute offered to convene an MMC Symposium to be held during its Annual Conference in January 2013. The Symposium will bring together experts in engineering, social science and other related fields.

**Learn More**

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**Looking Ahead**

Through the Symposium Subcommittee, the MMC will begin developing the schedule for the MMC Symposium, to be held in January 2013. In addition, the four other MMC subcommittees will work to advance MMC goals.
Multihazard Risk Assessment/Hazus

When emergency planners across the United States want to see the potential impact of a natural disaster on their communities before it actually happens, they use a software program available through the Federal Emergency Management Agency (FEMA) called Hazus. Used to support FEMA’s Risk Mapping, Assessment and Planning (Risk MAP) program, Hazus is a geographic information system (GIS)-based software program that utilizes state-of-the-art technology to estimate damage and loss from potential earthquake, flood, hurricane, and coastal surge events. Decision makers use the free program to forecast shelter capacity and evacuation routes, and assess zoning development and emergency mitigation plans to protect their communities from future losses, and to organize an emergency response when a disaster event occurs.

The National Institute of Building Sciences initially developed Hazus in 1992 and developed versions of the software until 2009. Since then, the Institute has been providing Independent Verification and Validation (IV&V) for the Hazus software to maintain a baseline of quality for the Hazus flood, earthquake, hurricane and coastal surge models.

In 2011, the Institute tested two updates to the Hazus program: Hazus-MH Version 2.0, released by FEMA in May, and Hazus-MH Version 2.1, to be released in February 2012. The goal of the testing was to validate the usability and accuracy of a Hazus version before its release to the public, as any errors in the programming or the interface could result in expensive mistakes for communities. The Institute’s comprehensive testing included both a review of the Hazus software and its documentation. The corrections were then passed on as recommendations to FEMA for approval for incorporation into the new Hazus releases.

Within the IV&V program the Institute also expanded its national expert oversight for the development of the Hazus methodology. The Institute assembled an 11-person Tsunami Model Oversight Committee to assist FEMA in developing the methodology for a fully functional Tsunami Module to be used with Hazus. FEMA recognized the need for planning mitigation and emergency management for a potential U.S. event, given the catastrophic level of destruction and death seen in the 2004 Indian Ocean Tsunami and this year’s Tohoku Tsunami in Japan.

The Institute established a nine-member Open Source Committee, which initiated development of concepts for Hazus open-sourcing for leveraging outside resources to further develop the Hazus methodology and source code. In addition, the Institute reconvened the 12-member Flood Committee, which reviewed the Hazus Flood Model based on results from average annualized loss (AAL) studies and oversaw a significant reduction. A Committee flood expert met with the Flood Model developer and facilitated increasing the depth calculation speed by a factor of seven. The Flood Committee also developed recommendations for future Hazus versions.

The Coastal Surge Committee, assembled the year before, finalized its work by reviewing the fully coded Coastal Surge Model following its release in Hazus-MH Version 2.0 and developing recommendations for future versions.

In August at the Hazus Conference in Seattle, the Natural Resources Canada (NRCan) and FEMA signed a memorandum of understanding (MOU) to support the creation of a Canadian version of Hazus. NRCan forged its relationship with FEMA after researching all of the major loss estimation methodologies in the world and selecting Hazus. Two Canadian representatives will serve on the Tsunami Oversight Committee. Canadian representatives also were sought for the Earthquake and Flood Committees.

Learn More:

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Looking Ahead

In 2012, the Institute will continue to finalize acceptance testing for Hazus-MH Version 2.1 and test the next update. The Tsunami Oversight Committee will meet in January to prepare for its first review of the Tsunami Model Methodology. The Earthquake Committee (with the addition of a Canadian representative) and Wind Committee will be reconvened and join the Flood and Coastal Surge Model Committees in reviewing how new methodology has been implemented in the Hazus Models, and developing recommendations for future versions. The Open Source Committee will develop pros and cons of approaches to open sourcing Hazus and a Software Committee will be reassembled to oversee upgrades to the Hazus software that keep it current with evolving technology.
Multihazard Risk Assessment/IRVS

In 2011, the U.S. Department of Homeland Security (DHS), Science and Technology (S&T) Directorate’s Infrastructure Protection and Disaster Management Division (IDD) developed a unique set of Integrated Rapid Visual Screening (IRVS) tools for buildings, tunnels and mass transit stations to quickly and reliably assess the vulnerability of our nation’s critical infrastructure. This is the first set of tools that uniquely computes and quantifies scores for resiliency and risk, and combines that with a multi-hazard assessment for a given building.

The Institute supported DHS in the development of these tools. For the building-related IRVS, staff provided expert advice on natural hazards, reviews of software and supporting documents, and beta testing support. For the mass transit and tunnel IRVS, staff prepared the final documents.

The IRVS tools are designed by and intended for use by engineers, architects and other design professionals; city, county and state officials; emergency managers; law enforcement agencies; lenders; insurers; building owners and operators; facility managers; and security consultants.

Results obtained from the rapid visual screening process can be used for various applications including: prioritization of inventories of facilities based on risk, resilience and potential resource needs; conveniently testing implemented or planned mitigation measures; supporting other more thorough assessments; and dramatically reducing facility assessment costs, time and expertise constraints. These applications are expected to save millions of dollars for the public and private sectors. The results are especially useful for identifying a specific asset for more detailed study.

One or two assessors can use the IRVS tool to conduct and complete a screening in one to five hours. The IRVS tools operate on Microsoft (MS) Access 2007 with support from MS Excel 2007, MS Word 2007 and portable document format (PDF) files. The software tools facilitate data collection and function as a data management tool. Assessors can use the software tools on a personal computer tablet or laptop to systematically collect, store and report screening data.

Scientific Resolution Panel

The Federal Emergency Management Agency (FEMA) engaged the National Institute of Building Sciences in 2010 to establish and administer a Scientific Resolution Panel (SRP) process to perform independent reviews of the scientific and technical data FEMA uses to develop its Flood Insurance Rate Maps (FIRMs). When a community challenges the proposed FEMA flood elevations for a particular area, either the community or FEMA may request, during a regulatory appeal period, that an SRP be convened. Each SRP is established for the purpose of reviewing and resolving conflicting scientific and technical data submitted by a specific community challenging FEMA’s proposed flood elevations.

SRPs are independent panels of experts organized, administered and managed by the Institute. When FEMA and a community request an SRP, the Institute compiles a shortlist from the pre-qualified cadre of scientific experts based on the technical challenges of the specific case. This list of professionals has engineering and scientific expertise in riverine, lacustrine, coastal flood hazard, surveying, topographic information, hydrologic analysis, hydraulic analysis, coastal analysis, levee design analysis or other pertinent experience applicable to the development of flood elevation studies and FIRMs. The community then selects three experts from the list and FEMA selects two experts, creating a Panel of five members.

Once selected, the Panel reviews FEMA’s flood hazard data and the flood hazard data submitted by the community to determine which studies are technically and scientifically more accurate. The SRP then renders a written decision that denies or accepts the alternative flood elevations submitted by a community. The decision of a Panel serves as the recommendation to the FEMA Administrator for resolution of the conflicting data.

The Institute establishes each SRP to achieve the following benefits to both FEMA and communities: to offer a process deemed neutral for all parties; to offer the best independent scientific and technical expertise available to review and decide on conflicting flood hazard data and flood maps; and to provide faster resolution to community challenges of proposed flood elevations.

FEMA and the Institute launched the SRP process in November 2010. In 2011, the Institute convened three SRPs. Two of the Panels were established to resolve conflicting scientific and technical data submitted by communities challenging FEMA’s proposed flood elevations. The third Panel was requested by FEMA to obtain comments and feedback on new proposed methodologies and approaches for creating FIRMs in areas with levees that are “not accredited.”

In 2012, the Institute will continue to maintain its cadre of experts and convene SRPs when requested by FEMA and challenging communities.
Integrated Resilient Design Program

2011 marked the tenth anniversary of the September 11th terrorist attacks. Since that tragic day, the United States Government has worked to improve the safety and security of the nation's communities. In 2010, the Department of Homeland Security (DHS) Science and Technology Directorate (S&T) Infrastructure Protection and Disaster Management Division (IDD) contracted with the National Institute of Building Sciences to assist the DHS High Performance Integrated Design Resilience (HP&IDR) Program in addressing the security and resiliency of buildings and infrastructure.

A primary goal of the DHS HP&IDR Program is to improve resilience—the ability of a building to anticipate, absorb, adapt to and rapidly recover from a disruptive event. The HP&IDR Program promotes an integrated approach that includes continuity of operations, extension of structure life and cost effectiveness, while also meeting high-performance attributes. To support DHS, the Institute is assisting in developing and disseminating a range of readily usable and reliable methods to assess potential risks to buildings from blast, chemical, biological, radiological (CBR) and natural hazards.

The Institute, through its Integrated Resilient Design Program, is working with DHS to develop a number of integrated high-performance-based tools and publications. Building designers and contractors can use these resources to better accommodate building and infrastructure resilience, thereby reducing the impact of a disruptive event. New materials, methods and technologies are needed to protect the nation's critical infrastructure. By establishing research and development priorities, resources and labor can be better allocated towards those tasks most likely to achieve the greatest benefit.

Advanced and High Performance Materials Database

The Advanced and High Performance Materials Database (AMD) aims to encourage the understanding and use of high-performance and advanced materials in construction by coordinating the research efforts of public and private institutions. In 2011, the Institute's Integrated Resilient Design Program continued work with the HP&IDR Program on tools and publications for resiliency, business continuity, mitigation and stabilization analysis. Researchers were able to access AMD and SITE to identify and provide information on new technologies, materials and products to improve building safety, security and resilience. The publicly available AMD and the security clearance-restricted SITE also were both available to the industry to populate with relevant entries. The Institute maintained both databases, working in partnership with industry. In addition, the Institute released a new journal, the Journal of Advanced and High Performance Materials (JMAT), in coordination with the AMD. The inaugural edition was released in winter 2011.

In 2012, the Institute will continue to update the AMD and SITE databases. Beginning in 2012, the Institute also will help DHS S&T continue to extend the coverage of the Integrated Rapid Visual Screening (IRVS) Tool following release of the Buildings version. The Institute will work to expand the OPR Tool to cover critical whole building systems to increase its usefulness to building owners and designers. In addition, staff will continue to help DHS expand awareness and use of the HP&IDR tools through direct interaction with prospective users of these tools and at meetings and workshops.

Security Information and Technologies Exchange Database

The Security Information and Technologies Exchange Database (SITE) is an online, searchable database of security products and technologies that meet DHS Interagency Security Committee (ISC), Department of Defense (DoD) and Department of Veterans Affairs (VA) security criteria and standards. It contains information on existing and emerging products, systems and technologies, as well as best practices to provide protection for federal facilities.

High Performance Based Design (HPBD)

The HPBD Program aims to help building owners evaluate total building performance including security when planning a new facility. After completing Phase 1 for Building Enclosures, the HPBD team is developing the next phase of the Owner Performance Requirements (OPR) modeling tool for planning high-performance into new and renovation construction projects for all critical whole building systems.

The overall goal of the program is to raise the general awareness and use of the family of HP&IDR tools to help improve the resiliency of our nation's infrastructure.

Learn More

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Looking Ahead

In 2012, the Institute will continue to update the AMD and SITE databases. Beginning in 2012, the Institute also will help DHS S&T continue to extend the coverage of the Integrated Rapid Visual Screening (IRVS) Tool following release of the Buildings version. The Institute will work to expand the OPR Tool to cover critical whole building systems to increase its usefulness to building owners and designers. In addition, staff will continue to help DHS expand awareness and use of the HP&IDR tools through direct interaction with prospective users of these tools and at meetings and workshops.
Advanced and High Performance Materials Council

Now more than ever, building professionals need to select the material that will, over its useful life, provide optimal performance to achieve their security, energy-efficiency and sustainability needs. The Advanced and High Performance Materials Council (AMC) aims to encourage the understanding and use of high-performance and advanced materials in construction by coordinating the research efforts of public and private institutions. Formed by the U.S. Department of Homeland Security (DHS) with the National Institute of Building Sciences, the AMC works to unite research institutions, laboratories, industry and universities to investigate and develop a variety of materials that address construction attributes such as resilience, durability and security. The AMC’s overall goal is to promote the design and adoption of new and innovative materials that meet the increasing demand for high performance, reduce energy consumption, and protect against natural and manmade disasters.

In 2009, during a Security, Energy and Environment (SEE) Summit sponsored by DHS and organized by the Institute, two concerns became clear: first, that the challenges brought on by climate change, the energy crisis and international security threats imposed great demands on infrastructure and construction; and second, that the construction materials currently available were not efficient enough to meet these demands in a cost-effective manner. Summit participants believed building efficiency could be improved by fostering the development of newer, more advanced construction materials that could perform at a higher standard. AMC was formed to address these issues.

From its initial meeting in January 2010, it was decided that the AMC would develop an Advanced Materials Database. The purpose of the Advanced Materials Database would be to publicly list high-performing materials that vendors, contractors and designers could reference to find appropriate materials to use in constructing sustainable and secure buildings. The Institute completed development of the database structure in December 2010. The database became available for population and use in 2011.

The AMC also developed a new materials science journal entitled the Journal of Advanced and High Performing Materials (JMAT), which follows a similar format to the Institute’s other journals. The inaugural edition, which contained six articles on high-performing materials for the built environment, was distributed in early 2011.

Looking Ahead

In 2012, the AMC will reach out to manufacturers to submit their products for inclusion in the Advanced Materials Database and to the materials science and built environment industry to promote awareness and use of this powerful tool to catalog materials.
Securing federal facilities is a vital component of keeping our nation’s buildings safe from potential manmade or natural threats. The Security Information & Technologies Exchange (SITE) is a database designed as the tool of choice for obtaining information about and comparing available security products. The U.S. Department of Homeland Security (DHS), in partnership with the National Institute of Building Sciences, designed this easy-to-use web resource for security operations managers, architects, engineers and other critical infrastructure professionals responsible for the security and safety of federal facilities. SITE contains security products meeting Interagency Security Committee (ISC), Department of Defense (DoD) and Department of Veterans Affairs (VA) standards. The Institute manages SITE under contract to DHS.

In 2010, DHS asked the Institute to oversee the development of an online, searchable database of security products and technologies that meet DHS ISC security standards. The Institute, with the concurrence of the DHS Science and Technology Directorate (S&T) Infrastructure Protection and Disaster Management Division (IDD), convened a working group to develop the framework for what would become SITE. Once the effort was underway, it was clear to the working group that the scope of SITE should not be limited solely to ISC standards. Therefore, the effort was expanded to include security standards from the U.S. Department of Defense (DoD) and the U.S. Department of Veterans Affairs (VA).

In 2011, the SITE working group continued to meet to refine product data fields and enhance content, including standards, policies and publications. These working group meetings led to the development of an online database containing information on existing and emerging products, systems and technologies, as well as best practices to provide protection for federal facilities.

SITE is now a one-stop resource. It provides security operations managers with the most up-to-date standards and products available, eliminating the need to search multiple sources. It helps assure architects, engineers and other facility management professionals that their projects, whether new construction or renovation, meet all applicable standards, and makes product specification and procurement easier by offering needed security products and new technologies in one place. SITE also offers manufacturers the opportunity to showcase approved products and technologies with the added benefit of a reference on the WBDG Whole Building Design Guide®, the largest online portal in the field of building science.

SITE features products and technologies, by security area category, with searchable information by building envelope, security system and functional space. It contains references and links to security standards, classified by agency; policy references and federal mandates, indexed by agency; literature, references and links to federal criteria and guidelines, indexed by agency; case studies with best practices on how security experts have addressed perimeter security, lighting, personnel screening and other security challenges; and other resources, including publications and websites containing libraries, archives and knowledge bases for facility security.

In 2011, the Institute incorporated DHS Safety Act information onto SITE; promoted SITE at security conferences and government security meetings (along with the Protective Glazing Council, which promoted SITE to its member companies), leading to significant interest in SITE from glazing and window film manufacturers. The Institute created an online product data submission request form; populated more product data fields, including physical access control systems (PACS), intrusion detection system (IDS) sensors and trash receptacles; added new federal and ASTM security standards; submitted a matrix for adding product category for modeling and blast design; looked into creating an open LinkedIn Group; and created a SITE marketing trifold brochure. In addition, the Combating Terrorism Technical Support Office (CTTOSO) International Vehicle Barrier Working Group reviewed the Vehicle Barriers section of SITE; and manufacturers, particularly from the glazing and window film industries, continued to submit product data sheets and specifications.

Looking Ahead

In 2012, Institute staff will promote SITE to the target audience of architects and engineers; continue to seek manufacturers’ security product information to populate the database; coordinate SITE with other Institute programs and councils, including WBDCG, the Multihazard Mitigation Council and the Integrated Resilient Design Program; and identify case studies to add to SITE.
For nearly 30 years, the Building Enclosure Technology and Environment Council (BETEC) has fostered cooperation among the public and private industries that work together to make buildings more energy efficient and environmentally responsible. The National Institute of Building Sciences established BETEC in 1982 in response to the U.S. Department of Energy’s (DOE) national plan to address the energy crisis as it related to buildings. The Council focuses on buildings’ "skin," known as the building enclosure system, and how improving the performance of building envelope components and systems affects the environment. BETEC is supported by DOE and is composed of 125 corporate and individual researchers, government personnel, design professionals and academics who serve on technical committees and special-topic work groups; propose and review research projects (including NIBS Guideline 3: Exterior Enclosures Technical Requirements for the Commissioning Process); and organize, write and publish information on building enclosures for the construction industry.

In 2011, BETEC members formed a Vision Committee to examine redefinition of the Council’s goals, rewriting of its bylaws and a potential restructuring to meet those goals. The Vision Committee surveyed the membership and will continue its efforts into 2012.

The BETEC Board of Directors convened twice during the year, the first time on May 17 at Institute Headquarters and the second on December 7 as part of the Institute’s Annual Meeting, held in conjunction with Ecobuild America in Washington, D.C. The Council also hosted a symposium at the Annual Meeting entitled, “High Performance Light-Framed Walls.” More than 100 people attended the all-day educational program, which was conducted in cooperation with the National Association of Home Builders Research Center. Symposium presentations delivered by industry experts are available on the Institute website at www.nibs.org.

In addition, throughout 2011, BETEC and Building Enclosure Council (BEC) members from the BEC-Atlanta chapter intensified planning and design efforts for the third annual Building Enclosure Science and Technology (BEST3) Conference, to be held on April 2-4, 2012, in Atlanta. BEST3, themed “High Performance Buildings – Combining Field Experience with Innovation,” will offer 65 technical papers in three tracks—energy efficiency, whole building and fenestration—as well as an expert panel discussion on future trends for energy efficiency. Conference information is available online at www.thebestconference.org.

Building Enclosure Councils

The BECs are a network of affiliated architects, engineers, contractors, manufacturers and others located in major cities across the United States. The BECs, founded in 2004 under a cooperative agreement with the American Institute of Architects (AIA), offer industry professionals an opportunity to exchange valuable information relating to successful building enclosure design through meetings and sharing of resources. Some 4,000 affiliated professionals with an interest in building enclosures now participate in BECs at the
Looking Ahead

BETEC will continue reddefining itself and its mission through its Visioning Committee. BETEC members will continue work on Guideline 3, Exterior Enclosure Technical Requirements for the Commissioning Process. Two editions of JBED are planned, with the summer edition focused on foam insulation testing and NFPA 285. The 2012 BETEC Symposium will center on fenestration performance.

The BECs are looking forward to expanding their relationships with the AIA local chapters and producing educational webinars to support members of both institutes. BEC members will continue updating the WBDG Whole Buildings Design Guide®, with substantive revisions to chapters on roofing and structural insulated panels (SIPs). BETEC and BEC members alike will take part in the BEST3 Conference April 2-4 in Atlanta.

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High Performance Building Council

In 2007, the U.S. Secretary of Energy asked the National Institute of Building Sciences to conduct an assessment of the current voluntary standards and rating systems that define high-performance buildings in the United States. The Institute founded the High Performance Building Council (HPBC) in response to the agreement. HPBC adopted the integrated approach used in the Institute’s Whole Building Design Guide®, which defines high-performance buildings in terms of eight attributes: cost-effectiveness, safety and security, sustainability, accessibility, functionality, productivity, historic preservation and aesthetics. Eight HPBC sub-committees—one for each attribute—performed industry-wide research and analysis to yield the seminal report, Assessment to the U.S. Congress and the U.S. Department of Energy on High Performance Buildings. After the report was released in 2008, upon further review and deliberation, the Council added resiliency as a ninth performance attribute. Since then, the HPBC has concentrated on refining its recommendations for metrics and verification methods to define high performance within the building industry.

Through industry consensus, the Council serves to establish the definition of high-performance buildings, promote the harmonization of industry standards to meet that definition and encourage the production of high-performance buildings throughout the United States. The HPBC works to identify high-performance building standards, guidelines, rating and certification programs; stimulate innovation within the buildings industry; reduce barriers to the deployment of high-performance building technology; and promote understanding of whole building performance.

In 2011, a major focus of the HPBC was in providing review and support to the Institute on a project it is conducting for the U.S. Department of Homeland Security. The High Performance Based Design for Building Enclosures (HPBDE) project serves to ensure that building owners have a mechanism to incorporate high-performance building goals that also address security.

In July, the Council organized and held the Workshop on High Performance Based Design for Building Envelopes at the American Institute of Architects (AIA) Headquarters in Washington, D.C. Attended by more than 50 public and private sector building professionals, the Workshop provided the HPBDE project team with commentary that informed its final work product. (Information and presentations from the Workshop are available at www.nibs.org/hpbc.)

Upon completion of Phase 1 of the HPBDE project, the Council was able to produce its first matrix of high-performance standards for industry review. The High Performance Standards Matrix identifies the attributes, metrics and standards for four levels of increasing performance, ranging from “baseline” to “high performance.” At the Council’s Annual Meeting in December, HPBC members reviewed and discussed the completed HPBDE project, as well as the High Performance Standard Matrix and an Owners’ Project Requirements (OPR) Tool. (Notes and presentations are posted on the HPBC website.)

Looking Ahead:

In 2012, the HPBC will complete its review of the first version of its High Performance Standards Matrix, compile the results, and establish a procedure for its ongoing expansion and maintenance. The HPBC will open a comment period for Council members and other interested parties to submit feedback on the Matrix, Phase 1 of the HPBDE Report and the beta release of the OPR Tool. The HPBDE project team will use the feedback to prepare the second phase of the project, which will address the whole building.

Learn More

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HPBC Executive Committee

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HPBC Member Organizations

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Air Conditioning Contractors of America
Air-Conditioning and Refrigeration Institute
Alliance to Save Energy
AABC Commission Group
American Architectural Manufacturers Association
American Chemistry Council
American Council of Renewable Energy
American Forest and Paper Association
American Institute of Architects
American Institute of Steel Construction
American Institute of Timber Construction
American Iron and Steel Institute
American National Standards Institute
American Society of Civil Engineers
American Society of Mechanical Engineers
American Solar Energy Society
American Welding Society
ASHRAE
Associated General Contractors of America
ASTM International
Building Enclosure Technology and Environment Council
Brick Industry Association
Building Codes Assistance Project
Building Owners and Managers Association
Construction Management Association of America
Construction Specifications Institute
EIFS Industry Members Association
Federation of American Scientists
GANA
Green Building Initiative
Greenguard Environmental Institute
Gypsum Association
IEEE
Illuminating Engineering Society of North America
International Association of Plumbing and Mechanical Officials
International Code Council
International Window Cleaning Association
Master Painters Institute
National Electrical Contractors Association
National Electrical Manufacturers Association
National Environmental Balancing Bureau
National Fenestration Rating Council
National Fire Protection Association
National Institute of Standards and Technology
National Roofing Contractors Association
National Sanitation Foundation International
National Science Foundation
North American Insulation Manufacturers Association
Plumbing Manufacturers Institute
Portland Cement Association
Reflective Insulation Manufacturers Association
Sheet Metal and Air-Conditioning Contractors National Association
Southern California Edison
Standards Engineering Society
Steel Door Institute
Structural Building Components Industry
Sustainable Buildings Industry Council
Wallcovering Association
Urban Land Institute
Water Quality Association
U.S. Department of Defense
U.S. Department of Energy
U.S. Environmental Protection Agency
U.S. General Services Administration
U.S. Green Building Council
DHS High Performance Based Design for the Building Enclosure

In 2010, the U.S. Department of Homeland Security (DHS) Science and Technology Directorate’s (S&T) Infrastructure Protection and Disaster Management Division (IDD) asked the National Institute of Building Sciences to help with a new project to ensure that building owners have a way to incorporate high-performance goals for blast, ballistic and chemical, biological and radiological (CBR) protection into their building programs. The High Performance Based Design for the Building Enclosure (HPBDE) project builds on work that the Institute and its High Performance Building Council (HPBC) have been pursuing for several years. That work, incorporated into the Energy Independence and Security Act (EISA) of 2007, defines high-performance buildings as the integration and optimization on a lifecycle basis of all major high-performance attributes, including: energy conservation, environment, safety, security, durability, accessibility, cost-benefit, productivity, sustainability, functionality and operational considerations.

The goal of the DHS HPBDE project is to ensure that blast and ballistic resistance and chemical, biological and radiological (CBR) protection, along with operational building enclosure objectives such as energy performance, sustainability and durability, are included into the planning, design and construction of new buildings and the retrofit of existing buildings. Working with technical experts to accomplish this objective, the project team set out to develop a building performance model that includes metrics, benchmarks and verification/validation methods to identify increasing levels of performance. Once complete, the model will be made available to building owners and designers in a web-based Owner Project Requirements Tool (OPR) that will allow owners to select the best combination of envelope system attributes that balance the safety, security, energy, sustainability and durability performance needs of their project.

The Institute completed the HPBDE project in 2011, which focused on enclosure systems for new and renovated office building construction. The ultimate goal is to cover the key systems of the whole building that are impacted by natural and manmade hazard events, as well as their relationship to operational performance for a variety of critical commercial building types.

In 2011, the project team identified the attributes, demands, benchmarks and outcomes for high-performance envelopes/enclosures used in new buildings. The High Performance Based Design for Building Enclosures Report documented the data developed by the project’s technical experts, along with the development procedures. The Report, completed at the end of the year, is now available for industry review and use. The performance data and interrelationships between attributes and performance levels were programmed into the OPR Tool. The beta version of the OPR Tool, at www.oprtool.org, is available for building owners and designers to use to evaluate and establish performance goals for enclosure systems for projects. (A version of the tool for existing buildings was also developed working with another DHS project that studied the impact of blast on existing building enclosures.) The project team shared the Report and Tool with industry at both a workshop held in July in conjunction with the High Performance Building Council (HPBC) and at the HPBC Annual Meeting in December. The project team will continue to work with ASTM Task Group E06.55 to get the OPR Tool adopted as an adjunct to that group’s new building envelope commissioning standard.

Learning Ahead

The High Performance Based Design (HPBD) project will continue in 2012, expanding from looking at the building enclosure to also include the structural, mechanical and electrical systems, thereby allowing a performance model of the whole building to be produced. The technical specialists will document their work in a revised version of the Report. In addition, the project team will update the OPR Tool to incorporate comments received from the beta version and expand the Tool to add whole building coverage for both new and renovated office building construction. The HPBC will invite industry review and comment and, once developed, the results of the performance levels and standards, will be turned over to the HPBC for ongoing maintenance and development.
DOE Weatherization Online Training (WxOT) Project

The U.S. Department of Energy (DOE) Weatherization Online Training (WxOT) project provides learning materials to bring new life to DOE’s existing, instructor-led weatherization training program and expand widely its current reach to people interested in starting a career in weatherization as well as those who wish to “move up” to other jobs in the field.

DOE’s Weatherization Assistance Program (WAP) has been in place since 1977 to enable low-income families to permanently reduce their energy bills by making their homes more energy efficient. While continuing to further this goal, DOE also intends to grow the weatherization program to create some 65,000 new jobs—for energy auditors, installers, crew chiefs and inspectors—in the coming decade. To do so, DOE has expanded its WAP education programs to include online courses and electronic training aids to extend the reach of instructors to a much wider audience than currently is possible.

In 2010, DOE asked the Institute to help with the effort. The WxOT project began in June, 2010, with a multidisciplinary team of 40 professionals working to develop a set of lessons—for use online and in the classroom—to train WAP workers. The Institute-led project team consists of subject matter experts, instructional designers and media producers, who “mix and match” on different teams for different lessons, depending on the skill sets needed. They also are backed with extensive input from the learning platform developers at Stanford Research Institute.

Through a highly collaborative effort, the team met over the course of 2010 and 2011. They worked to develop detailed learning objectives used to facilitate development of 40 or more discrete yet interrelated SCOs (Shareable Content Objects) or “lessons” that will supplement existing content in WAPs. As the project developed, WAP trainers showed increased interest and desire for these teaching materials to also be useable “offline” in the classroom and played an increasingly active role as project reviewers.

With an emphasis on interactive and immersive learning, the Institute-directed team created online materials, including videos and computer games, to make learning more engaging and hands-on. All materials are open source and eventually will be offered through DOE’s National Training and Education Resource (NTER) website to allow for their widespread use. The material, presented in discrete SCOs, is made universally accessible through Shareable Content Object Reference Model (SCORM) compliance.

One of the highlights of the program was development of 3D gaming assets that allow learners in some of the most immersive lessons to move avatars throughout different weatherization scenarios. Models that reflect various housing types in different regions of the country were created as backgrounds for the different lessons, while videos showing real-life conditions and interviews with weatherization personnel are incorporated as appropriate.

The WxOT project also became one of the first contributors to NTER, an open source platform that serves learners by allowing them to acquire new skills at a time, place and pace that is convenient to them and allows instructors to create a curriculum from a variety of sources on the platform.

Even while still in development, the WxOT program has heightened interest on the part of other federal agencies to the possibilities of taking part and contributing to this kind of learning system.

On December 15, 2011, Energy Secretary Steven Chu reported that the goal of weatherizing 600,000 homes, set through funding from the 2009 American Recovery and Reinvestment Act, had been achieved three months early. Alternative training methods, such as those developed in this project, will help DOE continue to meet its aggressive goals for WAPs and the skilled professionals it demands.

Learn More

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Looking Ahead

As the project winds down to a close in March 2012, the team’s attention turned to completion of all SCOs to at least an alpha state and refining already created work to a beta state. To date, 42 SCOs have been delivered to DOE for the NTER program.
National Mechanical Insulation Committee

As Americans pay increasingly more attention to saving energy and building owners work harder to improve building performance, the benefits of using mechanical insulation should be more appreciated. Yet, mechanical insulation, although important to facility operations and manufacturing processes, is often overlooked, undervalued and underappreciated technology. This deficiency in understanding often impedes policy makers, designers, building managers, engineers and other industry participants from utilizing mechanical insulation systems to their full potential. The reality is that, when used effectively, mechanical insulation can help lower dependency on foreign energy sources, reduce impact on the environment, improve global competitiveness, create jobs and provide a safer work place.

The National Institute of Building Sciences formed the National Mechanical Insulation Committee (NMIC) for Building and Industrial Applications in 2006 to bring together major governmental agencies, private industry and organizations that are concerned with the design, installation and maintenance of mechanical insulation in the commercial and industrial market segments. The National Insulation Association (NIA) chairs the NMIC and activities are generally mutually funded by NMIC and NIA's Foundation for Education, Training and Industry Advancement.

A primary focus of the NMIC is the internet-based Mechanical Insulation Design Guide (MIDG), available at www.wbdg.org/midg, which NMIC develops and makes available through the WBDG Whole Building Design Guide®. MIDG, like WBDG, is an evolving web-based resource that is continually augmented with updated and new information. Structured as a vertical portal, MIDG enables users to access increasingly specific information on mechanical insulation. Launched in 2008, MIDG is the most comprehensive mechanical insulation resource to be developed in decades and it is continually being expanded. It is a valuable educational tool for both the experienced professional and the novice alike and continues to receive praise from its users.

MIDG now includes a suite of mechanical insulation assessment and design tools to provide assistance for common calculations used in the design and analysis of mechanical insulation systems. These tools were developed in conjunction with NIA, its alliance partners and the U.S. Department of Energy’s Industrial Technologies Program to educate industry about and promote the benefits of mechanical insulation by providing practical, easy-to-use online calculators, free and available 24/7. These design tools (calculators) include: the Energy Loss, Emission Reduction, Surface Temperature and Annual Return Calculators (Piping & Equipment); Financial Returns/Considerations Calculator; Condensation Control Calculator – Horizontal Pipe; Estimate Time to Freezing for Water in an Insulated Pipe; Temperature Drop Calculators for Hydronic Piping and Air Ducts; and Personnel Protection Calculator for Horizontal Piping.

“Why Insulate” is a simple, yet complex, topic with multiple components. NMIC’s ongoing objective is to identify, develop and disseminate information related to mechanical insulation as a core competency in government and private sector building, and commercial and industrial applications by developing educational tools utilizing the best science and information available, and providing education and awareness programs as to the merits and value of proper insulation systems.

Looking Ahead

In 2012, the National Mechanical Insulation Committee will continue to update and develop new materials for the Mechanical Insulation Design Guide and raise awareness of the merits and value of proper insulation systems.
VA Facility Management Transformation Initiative

The U.S. Department of Veterans Affairs (VA) has 956 sites of care around the world where services are provided to an estimated 22.7 million Veterans. Through three major organizations: the Veterans Health Administration (VHA), Veterans Benefits Administration (VBA) and National Cemetery Administration (NCA), VA provides health care, benefits and services within a network of 152 hospitals, 802 community-based outpatient clinics, 134 community living centers, 90 domiciliary residential rehabilitation treatment programs, 293 Vet Centers, 56 VBA Regional Offices and 131 National Cemeteries.

In 2009, VA began an enterprise-wide initiative to promote advances in life-cycle facility management, including planning, design, acquisition, construction, sustainability and decommissioning. The National Institute of Building Sciences serves as the primary consultant and liaison between VA staff, consultant subject matter experts (SMEs), and public and private sector contributors to the VA Facility Management (VAFM) transformation initiative. The goals of VAFM transformation are to improve operations by introducing enterprise processes for planning, execution, operations and maintenance programs to enhance sustainability of VA infrastructure and improve asset and workforce management.

The VAFM SME team began piloting the new VAFM operating constructs for Project Management Plans (PMP), Post-Occupancy Evaluation (POE) and Facility Master Planning (FMP) in 2011. Once established, VAFM will integrate functions associated with facilities management services and activities across the Staff Offices and Administrations. The outcomes of this transformation include targeted investment in facilities based on the Strategic Capital Investment Planning (SCIP) process, improved performance rooted on an enterprise (corporate) operations system and alignment of investment to maximize facility life-cycle performance. Prior to beginning the pilots, the VAFM SME team produced the September 30, 2011, Draft Report: VAFM Pilot Initiatives: Benchmarking and Best Practices Research for Facility Master Planning, Project Management Plan, and Post-Occupancy Evaluation.

The Project Management Planning (PMP) pilot drew on resources from the Project Management Institute (PMI) guidance, which is the industry standard for project management best practices. In its initial stages of development, the PMP is intended to be scalable for projects of varying size and complexity.

The Post-Occupancy Evaluation (POE) pilot began with development of a draft POE Manual, which outlines the process and describes the components of a comprehensive POE, as well as the tasks for the VA Project Manager (PM). The purpose of the POE is to allow VA to evaluate completed and activated buildings with respect to design and program intent against building performance; reduce repetition of problems by providing lessons learned; identify future best value solutions to be incorporated into the design standards; and produce data that will aid in resource allocation for proper maintenance and operations. The POE is intended to be scalable for projects of varying facility types, size and complexity. POE for VHA, VBA and NCA will be customized for each Administration in order to capture information that services these very different programs.

The five POE pilots conducted in 2011 included two VHA Minors, one VHA Major, one NCA Major and one VBA Regional Office Building.

The Facility Master Planning (FMP) pilot is on-going. FMP is developing a new and more consistent methodology for infrastructure planning that has two main focal points: (1) Service Planning: A standard methodology to facilitate, understand and document the strategy of delivering services to Veterans at a regional level, and, (2) Facility Planning: The implications of translating an understanding of services planning to acquisition-ready facility requirements. Not since Capital Asset Realignment for Enhanced Services (CARES) was conducted in the early 2000s in the Veterans Health Administration (VHA), has an effort to standardize a process and method for enterprise planning been used by VHA, VBA or NCA. The FMP pilot got underway late in 2011 and will complete the initial phase in 2012.

Learn More

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Looking Ahead

In 2012, CFM will reactivate and lead the Action Team. The Integrated Planning, as FMP is now known, will complete the 2011 pilots and initiate up to seven new pilots to continue through 2013. Post-Occupancy Evaluation (POE) will add up to seven new pilots and Project Management Planning (PMP) continues to be evaluated in the three regions.

The future VAFM enterprise process provides the framework for implementation; the next steps are the refinement of detailed implementation plans with proof-of-concept pilots for selected priority initiatives.
GSA Performance Based Design Program

The U.S. General Services Administration (GSA) Facilities Standards for the Public Buildings Service (P-100) establishes design standards and criteria for new buildings, major and minor alterations, and work in historic structures.

In 2011, the GSA Public Buildings Service engaged the National Institute of Building Sciences to update its P-100 standard and incorporate a performance-based approach. The Institute assembled and directed a multidisciplinary project team to create a tool that would allow assessment of different levels of performance for the major attributes of a building. The major attributes for the project encompass enclosure; lighting; heating, ventilation and air conditioning (HVAC); interior and electrical systems. For the enclosure in particular, wall, fenestration and roof systems would be evaluated in terms of thermal performance, water penetration, moisture control, air leakage and service life.

The matrix format of the standard allows the Public Buildings Service to compare systems designed at baseline performance to those designed for three different levels of higher performance. The matrix also documents the standards to which each level of system performance is designed.

GSA also engaged the Institute to plan and develop its Post Occupancy (POE) Program. GSA uses Post-Occupancy Evaluations to assess how new and renovation building projects perform. Evaluations take a close look at GSA and agency mission requirements, end-user satisfaction, sustainability, operational effectiveness, maintainability, impact on building performance through non-compliance with GSA’s design standards, and the effectiveness of current GSA design standards in providing acceptable performance. The Institute developed a POE Tool to store the evaluations and allow GSA to analyze the results and identify systemic successes and problems.

Looking Ahead

The GSA will continue to update the Performance Based P100 and perform Post Occupancy Evaluations in 2012.

DoD TRICARE Management Activity

The U.S. Department of Defense (DoD) Military Health System (MHS) provides healthcare to DoD service members, retirees and their families. The system consists of more than 77 million gross square feet of facility space, including: 59 hospitals, 364 medical clinics, 282 dental clinics, 288 veterinary clinics and multiple research laboratories. In 1997, in response to the Department of Defense Appropriation Act of Fiscal Year 1994, DoD formed the TRICARE program to oversee a number of MHS activities. Under the authority of the Assistant Secretary of Defense, TRICARE Management Activity (TMA) contracts with several health insurance corporations to provide claims processing, customer service and most administrative functions. TRICARE also administers managed care programs for the MHS.

In 2011, the National Institute of Building Sciences began providing support to TMA programs with the goal of making Facility Life Cycle Management (FLCM) program operations more efficient and effective. During the year, the Institute provided subject matter experts to advise and instruct TMA on processes, ranging from facility operations, maintenance, space-planning, benchmarking, communications and overall best practices associated with military health facilities. Through the Institute’s and TMA’s relationship, the program has been able to execute several initiatives with the U.S. Department of Veterans Affairs (VA) involving the proposed integration of joint facilities.
Access Board Acoustics in Classrooms Project

Sound and acoustics have a major impact on the way children learn. A standard developed by the Acoustical Society of America, ANSI/ASA S12.60-2010: Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, establishes requirements for educational facilities to ensure a quality learning environment. In 2011, the U.S. Access Board approached the Institute to evaluate the cost of requiring compliance with the ANSI/ASA acoustics standard for kindergarten through grade 12 (K-12) schools, in both permanent construction and relocatable classrooms. In 2011, Institute staff, including experts from the National Clearinghouse for Educational Facilities, began acquiring the necessary data to conduct the evaluation, compiling data from architects, professional organizations, state and local school districts, and acoustical consultants. In addition, the Institute’s consultants provided valuable data from their expansive cost database.

The Institute began tabulating data late in 2011. Through their research, staff found that there are many factors affecting the cost of school construction beyond the classroom acoustics issue. Sustainability features, the level of Leadership in Energy and Environmental Design (LEED) for Schools certification, regional differences and flexible learning spaces versus standard classrooms are all factors that must be considered in the evaluation.

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Looking Ahead
In 2012, the Institute will complete its evaluation and draft a report compiling the results of the findings. Project completion is expected by midyear.

Low Vision Design Committee

In September 2010, the National Institute of Building Sciences held the “Workshop on Improving Building Design for Persons with Low Vision” sponsored by the U.S. General Services Administration. At the two-day workshop, a multidisciplinary team of professionals from the design and medical professions worked together to create a framework for research and education on low vision. The Low Vision Design Committee (LVDC) is a direct offshoot of that event.

During the workshop, attendees determined four major needs relating to low vision design. The LVDC was formed to organize activities that would address those concerns: designers need a better understanding of low vision persons’ needs; clinicians need a better understanding of lighting and accessibility; everyone needs a common vocabulary; and standards need to balance reduced energy consumption and adequate illumination for all building users.

Members of the LVDC organizing group incorporated major findings from the workshop and distilled them into suggested changes to the GSA’s design guide, P-100: Facilities Standards for Public Buildings. The organizing group also created a set of stand-alone guidelines to accompany the P-100.

Members of the committee joined forces to formulate a grant proposal to the Natural and artificial light on horizontal and vertical surfaces can create navigational challenges for people with low vision.

National Institutes of Health to develop four interrelated models that measure and further define the relationships between low vision physiology and the physical environment. Led by the prestigious Johns Hopkins School of Medicine Wilmer Ophthalmological Institute and supported by seven universities, the two-year study will enable medical researchers and designers to share their expertise and ultimately create environments to better support people with low vision.

With funding from the Rothschild Foundation, a formal kick-off meeting of the LVDC took place at the Institute’s headquarters in November 2011. The group elected officers and individuals volunteered their services within four major purviews: administration and fundraising; outreach and education; codes, standards and guidelines; and research and development.

Learn More
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LVDC Officers
Chair: James E. Woods, PhD, PE
Vice Chair: Stuart R. Knoop, FAIA

Looking Ahead
With the goal of creating more supportive environments for people with low vision, the LVDC hopes to pursue research framed by the grant submitted to the National Institutes of Health and to develop and propose changes to national and federal standards.
NAVFAC Architectural Acoustics Project

Military facilities have different requirements than other buildings. Among them are specific acoustical requirements addressing sound, such as ways to minimize external aircraft noise within facilities and to properly insulate rooms in buildings. Within the branches of the U.S. Department of Defense, there are a number of different acoustical requirements addressing military unique facilities and space types within those facilities. The National Institute of Building Sciences is assisting the Naval Facilities Engineering Command (NAVFAC) in compiling and consolidating the various requirements into one location. Once compiled, NAVFAC will add them into its new Architecture Unified Facilities Criteria (UFC 3-101-01) to help architects design for acoustics and noise control in military facilities.

This project began in 2011. During the year, in conjunction with the project, Institute consultants conducted sound measurements at Norfolk Naval Base on military-specific facilities. Institute staff and consultants have compiled this information, along with the other requirements, into a first draft document, which was submitted for review by NAVFAC.

Learn More

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Looking Ahead

Upon NAVFAC’s approval of the first draft, the Institute will finalize the document for submission into the Architecture UFC. Completion date of the project is expected in mid-2012.

NAVFAC Design Build Document Update for Sustainability, Energy and Small Project Template Coordination

The Naval Facilities Engineering Command (NAVFAC) is in the process of updating its Design-Build (DB) Documents for Sustainability and Energy for both the DB Model Request for Proposal (RFP) - Standard Template and - Small Project Template (SPT). The primary purpose of the project, which kicked off in December 2011, is to keep the DB documents living and ready to use. Energy and sustainability updates are required by the President of the United States, the U.S. Congress and the leadership of NAVFAC. The documents also need to reflect the latest developments in the DB process and be cast in terms of performance.

The National Institute of Building Sciences, which is overseeing the project, is responsible for interpreting the work and recommendations of everyone on the contractor team and supervising the editing of all documents. Once complete, the documents will then be reviewed by the NAVFAC criteria team.

The project consists of five tasks. The contractor team will coordinate the DB documents with the energy/sustainability requirement of the Unified Facilities Criteria (UFC)/ Unified Facilities Guide Specifications (UFGS) for roof-related mechanical and electrical systems; coordinate the DB documents with the energy/sustainability requirements of the Architectural UFC, which address materials and systems; coordinate with the energy/sustainability requirements of the Interim Technical Guidance (ITG)/UFGS for electric lighting systems; and facilitate review of the NAVFAC DB and Design-Bid-Build (DBB) Sustainable Submittal Process.

Lastly, the contractor team will update the SPT Energy Requirement, including standards-based energy requirements for small projects up to $750 thousand and larger but simple projects up to $4 million.

Learn More

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Looking Ahead

In early 2012, the Institute will coordinate modification of the documents and submit them for review by the NAVFAC Criteria Team. Finalized documents will be uploaded to the WBDG Whole Building Design Guide® at the conclusion of the project, which is scheduled for August 2012.
In recent years, accelerating "shovel-ready" infrastructure projects to put Americans back to work has been a key national policy goal. The National Institute of Building Sciences is helping federal agencies streamline the design-bid-review process and accelerate review of such projects through the use of the ProjNetSM secure, on-demand design review tool. This accredited, cloud-based platform has been the de-facto standard in government-to-business service for over a decade. Using the ProjNetSM tool, more than 25,000 private designers, engineers and contractors have been able to work with their public agency counterparts to transparently manage the creation of our built environment.

Developed before there was any consideration of eGovernment and integrated federal information technology (IT) initiatives, the ProjNetSM application suite has led the way for internet-based services by providing the largest federal facility management agencies with a secure, web-based tool to use. The ProjNetSM tool has demonstrated a successful and cost-effective method to deliver construction projects through efficiencies in planning and project management. The platform can be used to improve the construction of federal buildings and to reach greater potential value for the nation.

The ProjNetSM hardware and software program is operated as a unique collaboration between the U.S. Army Corps of Engineers (USACE) Construction Engineering Research Laboratory (CERL) and the Institute. Over the years, the ProjNetSM program has received awards and accolades from the Federal Laboratory Consortium, U.S. Department of Defense Office of Quality Management, Government Executive Magazine and others.

Prior to the CERL’s development of the ProjNetSM tool, which began in 1998, federal agencies reported unresolved contractor questions in 95% of all construction contract awards. The majority of these issues resulted in construction cost overruns. Since federal agencies began using the tool, agencies have seen a 90% reduction of unresolved contractor questions at the time of construction contract awarding. As a result of the platform, contracts with outstanding bidder issues have lowered to 5%. The ProjNetSM electronic construction submittal module has been shown to have the potential to reduce the duration of capital construction projects by months as an immediate result of the transparent and streamlined review of shop drawings.

In 2011, ProjNetSM technical experts began developing a new user interface page to streamline the process and minimize the number of clicks to get to information on the site. The interface was beta tested late in the year and posted on the site for use and comment.

In 2012, the new ProjNetSM user interface page will officially launch on the platform. In addition, the ProjNetSM application will integrate two new major capabilities. The first will tie the open-standard building information model (BIM) information exchanges being developed by the buildingSMART alliance to the ProjNetSM award-winning business process tools, resulting in a transformation in the ability to track issues through the life of the project. The second capability will deliver an integrated commissioning application to help ensure federal facilities are more efficiently operated. A side effect of this new capability will be the production of an electronic project as-built book in lieu of error-prone and wasteful paper operations and maintenance (O&M) manuals.
WBDG Whole Building Design Guide®

Record breaking and cutting edge might not be the adjectives people use to describe the WBDG Whole Building Design Guide® at www.wbdg.org. But that is exactly what the website is. People are more likely to describe WBDG as a great resource, with a huge amount of information and pretty much everything there is to know about construction issues. The site is also breaking records and keeping up with the latest technologies.

One of the largest, most comprehensive online resources in the building construction industry, WBDG is a web-based portal that contains design, construction and facility management information and criteria required by the U.S. military and other federal agencies. Every year, more people are becoming aware of the site as the place to find answers to their questions about programming, design, project management, construction, commissioning, and operations and maintenance.

In March 2011, WBDG set a new record of 4,264,604 downloads—the first time downloads on the site exceeded 4 million. Just months later in November, WBDG set two new records. The first for downloads (5,699,454, a 33% increase) and the second for visitors to the site (763,656). In each of the last three months of 2011, downloads exceeded 5.2 million and visitors exceeded 670,000.

During the year, Institute staff also added a number of user-friendly tools to improve access to WBDG, including a Twitter account, Twitter WBDG@wholebldgdesign, which now has 190 followers, and a Wikipedia page. In addition, the WBDG Board of Direction & Advisory Committee established a LinkedIn Group.

History

WBDG was initially designed to serve U.S. Department of Defense (DoD) construction programs. The Naval Facilities Engineering Command (NAVFAC) Criteria Office first introduced WBDG in 1997, in collaboration with the Sustainable Buildings Industry Council (SBIC) to assist the design community with integrating government criteria, non-government standards, vendor data and expert knowledge into a ‘whole building’ perspective. The Institute took over management of WBDG in 2000. In 2003, a DoD memorandum named WBDG the “sole portal to design and construction criteria produced by the U.S. Army Corps of Engineers, Naval Facilities Engineering Command and U.S. Air Force.” Since then, WBDG has expanded to give all building industry professionals free, wide access to federal and other design, construction and performance criteria. Anyone can access WBDG online, with the majority of users coming from the private sector.

The Databases

The WBDG accesses information from the National Institute of Building Sciences Construction Criteria Base® (CCB®) at www.ccb.org, a single, integrated database of all federal facility design and construction criteria; and two private-sector databases overseen by the independent companies, Information Handling Services (IHS) and MADCAD.

CCB®, the building industry’s oldest continuously operating electronic information system, began in 1987. This online library of standards and resources published by 20 federal construction agencies contains more than 10,000 documents, including federal guide specifications, manuals, regulations and other design and construction criteria. CCB® also offers computer-aided-design (CAD) libraries and 60 executable programs produced by federal agencies, including cost estimating, design analysis, life-cycle cost evaluation, environmental performance and specialized engineering programs. CCB® is a great resource for architects and engineers working on military and other federal contracts. Two private sector databases by IHS and MADCAD provide WBDG with online access to 350,000 standards developed by more than 450 other organizations.

Continuing Education

WBDG began offering a Continuing Education (CE) program for design and maintenance facilities professionals in 2007. Courses target architects, engineers and other building professionals seeking continuing education credits as part of professional licensing requirements. All course material is based on WBDG integrated content. WBDG is currently offering 16 courses online, all of which are approved by the American Institute of Architects (AIA) for Health, Safety and Welfare (HSW) Credits. Seven courses are approved for AIA Sustainable Design (SD) credit and eight courses are approved by the U.S. Green Building Council (USGBC) Green Building Certification Institute (GBCI) for Leadership in Energy and Environmental Design (LEED) Professionals. More than 3,700 individuals from 40 countries took WBDG CE courses in 2011.

Updated Content

WBDG uses the integrated, whole building approach to building construction. The portal covers a wide range of topics, from performance and sustainability to security and resilience. Linking information across industries and disciplines, the site is organized into three main categories: Guidance, Project Management, and Operations and Maintenance.

More than 14,000 sites reference the WBDG. WBDG contains millions of links within its vast resources.

To promote information sharing between stakeholders, WBDG includes a section on building information modeling (BIM) that provides links and describes efforts underway. (Many of the organizations involved with WBDG are involved in the development of the National BIM Standard—United States™.) WBDG also contains two resources developed with the support of public- and private-sector volunteers. The Building Envelope Design Guide is a comprehensive guide for exterior envelope design and construction for institutional/office buildings. The Mechanical Insulation Design Guide provides a comprehensive source of information on the performance, use, testing and standardization of mechanical insulation in buildings and industrial facilities. In 2011, two noteworthy additions to WBDG included the Federal High Performance and Sustainable Buildings section and the

During the year, the WBDG added 26 new pages, 15 of which are renewable energy Resource Pages. Among the new pages were five developed by the U.S. General Service Administration (GSA) Office of Federal High-Performance Green Buildings (OFHGPB), including: Greenhouse Gas Emissions in Federal Buildings; Living, Regenerative & Adaptive Buildings; Net Zero Energy Buildings; Biomimicry: Designing to Model Nature; Green Building Standards and Certification Systems; and Alternative Energy. Other pages include: OmniClass; Construction Operations Building information exchange (COBie); Construction Waste Management; the Case Study: Third Street Center; and new Federal Energy Management Program (FEMP) / National Renewable Energy Laboratory (NREL) Resource Pages that are part of FEMP’s Guide to Integrating Renewable Energy in Federal Construction. The Resource Pages include: Biogas; Biomass for Electricity Generation; Biomass for Heat; Geothermal Electric; Technology; Geothermal Energy – Direct Use; Geothermal Heat Pumps; Hydropower; Daylighting; Fuel Cells and Renewable Hydrogen; Ocean Energy; Passive Solar Heating; Photovoltaics; Solar Ventilation Air Preheating; Solar Water Heating; and Wind Technology.

In addition, WBDG updated a number of sections, including: Sustainable Design Objective; Secure/Safe Design Objective; Cost-Effective Design Objective; Productive Design Objective; Facilities Operations & Maintenance; Functional/Operational Design Objective; Mechanical Insulation Design Guide Calculators; Mechanical Insulation Design Guide Resources; Educational Facilities Building Type Pages (for Elementary Schools, Secondary Schools and Child Development Centers); productguide™; and Extensive Vegetative ‘Green’ Roofs.

Spreading the Word

In addition to the WBDG Board of Direction and Advisory Committee convening several times during 2011, staff participated in a number of activities to promote WBDG throughout the year. They began a monthly contribution to the Institute’s Building Sciences e-newsletter featuring WBDG updates and highlighting interesting aspects of WBDG and presentations. They gave interviews to reporters, provided input to articles, spoke to international delegations and presented at conferences.
The buildingSMART alliance™ (bSa) has a simple purpose—to root out non-value added effort in the facilities industry by reducing waste, streamlining the construction process and integrating industry practices. One way bSa streamlines the process is by developing standards for computer-aided design (CAD) and building information modeling (BIM). The Alliance, through its committees, develops both the United States National CAD Standard® (NCS) and the National BIM Standard—United States™ (NBIMS-US™). These standards establish clear implementation guidelines, which cut down confusion, reduce potential errors, minimize change orders, lower overall life-cycle costs and provide better data to the facility manager. They are essential to attaining many of the U.S. Government’s goals related to sustainability and carbon neutrality.

The Alliance grew from two preceding Institute programs. The Facilities Information Council (FIC), originally called the Computer Aided Design and Drafting (CADD) Council, worked to improve the life-cycle performance of facilities. The North American Chapter of the International Alliance for Interoperability (IAI-NA) addressed process improvement and information sharing in the construction and facilities management industries. In 2006, IAI changed its name to buildingSMART International. In 2007, IAI-NA and FIC merged into the buildingSMART alliance, which represents North America.

In 2011, the buildingSMART alliance focused much of its efforts on the creation of the first open-standard, consensus-based NBIMS-US™. The Alliance sought and received ballots from the industry, called for comments and put the ballots out for a vote by the NBIMS-US™ Project Committee, which is made up of practitioners from across the industry. Once finalized with the new content, NBIMS-US™ Version 2 will be published in 2012.

In addition, the bSa released NCS Version 5. The NCS helps architects, constructors and operators coordinate efforts by classifying electronic design data consistently and making information retrieval easier. Version 5 is the first update to the standard in three years. Unlike previous versions, Version 5 is web-based, making it available at any time for purchase and use. The NCS website received an update as well, making it easy to log in to the new NCS online product.

During the year, the Alliance inked new Memorandums of Agreement (MOAs) with the American Concrete Institute (ACI) and the American Institute of Steel Construction (AISC) to provide content for the NBIMS-US™. In addition, some of the existing MOA holders began delivering products relating to their agreements.

The Alliance also initiated a major project with the International Facility Management Association (IFMA) and International Institute for Sustainable Laboratories (FISL) to examine impediments in passing information from architecture, engineering and construction (AEC) professionals to facility management (FM) professionals.

The extremely successful Construction Operations Building Information exchange (COBie) initiative went overseas in 2011 when the government of the United Kingdom began requiring COBie on all new projects. In addition, several new vendors participated in the COBie Challenge in December and are now supporting this open standard.

Looking Ahead

The bSa will continue to expand its base by adding sponsors, signing additional MOAs with associations and seeking opportunities to collaborate on information sharing through the use of open BIM standards. The Alliance will also begin the standards development process for NBIMS-US™ Version 3 and NCS Version 6.
United States National CAD Standard®

In this era of computers, most architects and engineers use computer-aided design (CAD) to design buildings instead of pencil and drafting paper. The challenge is that unless every person working on a building project uses the same set of rules to define the different two-dimensional (2D) components (such as layers for structural, electrical, plumbing, etc.), the final plans may not be properly managed from one computer program to another or among architect, engineer and builder. That is where the United States National CAD Standard® (NCS) comes in.

The NCS offers greater efficiency in the design and construction process because it streamlines and simplifies the exchange of graphical 2D building design and construction data. Until the existence of the NCS, building owners, designers and construction professionals faced the difficulty of trying to understand and organize electronic building design data produced in a multitude of formats. The NCS coordinates the efforts of everyone involved by classifying electronic building design data consistently. NCS reduces costs because private companies and federal agencies that use the NCS do not have to develop or maintain individual office standards, or transfer building data from design applications to facility management tools.

First published in 1999, the NCS consists of The American Institute of Architects’ CAD Layer Guidelines, the Construction Specification Institute’s Uniform Drawing System (Modules 1-8), and the Plotting Guidelines module developed by the National Institute of Building Sciences. The NCS coordinates these CAD-related publications to allow consistent and streamlined communication among owners and design/construction teams.

Adoption of the NCS by the building design and construction industry is voluntary. Major government agencies, such as the U.S Army, Navy, Air Force, Coast Guard, General Services Administration, Department of Veterans Affairs and state agencies have adopted the standard, while thousands of public and private organizations have implemented the standard for the design, construction and operation of building facilities. A list of NCS adopters is available at www.buildingsmartalliance.org/ncs/adopters.


In addition, Version 5 revises the flow of the CAD Layer Guidelines Module to clarify that Layer Lists by Disciplines are simply examples of some of the commonly used layers and not an all-inclusive list of layers. In the new version, the Major and Minor Groups definitions from “Civil, Electrical, Mechanical, Plumbing, Resource, Structural, Survey/Mapping, and Telecommunications Layer Lists” were made more generic to allow broader usage. The allowable file extension characters were expanded to four characters to respond to changes in software application file extensions. The line thickness for the “note leaders” reference symbol was revised. Lastly, Version 5 eliminates obsolete Appendices C, G and H.

Learn More:

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Looking Ahead

In 2012, the buildingSMART alliance®, which oversees development of the NCS, will begin the revision cycle for the next version of the standard. NCS Version 6 is expected to be ready for release in early 2014.

NCS Steering Committee
Chair: Mark Butler, HDR
Vice Chair: Rick Green, Wilson and Company
Secretary: Greg Jordan, Dewberry
Kevin Busacker, Leo A. Daly Company
Ed Lowe, Burgess & Niple, Inc.
Stephen Spangler, U. S. Army Corps of Engineers

NCS Project Committee
Ronald A. Agnew, HDR Engineering
Ronald Baker, HDR Architecture
Melinda Beham, SSOE Inc.
David M. Benjamin, Sr., AIA OGS Design & Construction Group
Dave P. Benscoter, HDR Architecture
Richard Binning, Wakefield Beasley & Associates
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Jonathan Bolich, Devine Brothers Inc.
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R. Mark Butler, HDR Architecture
Kris Carlsen, Woodard & Curran
Jennifer DiBona, That CAD Girl, Inc.
David Esiman, International Training Institute for the Sheet Metal and Air Conditioning Industry
Mike Eriksen, HDR Engineering
Joseph M. Fabregas, VI, Fabregas Design Services
Jason Fairchild, U.S. Army Engineer Division, Vicksburg
Michael Fate, Tetra Tech
Matthew Fochs, Construction Specifications Institute
James Gerth, Wilson Miller
Charles A. Graham, Jr., AIA, DTI Architects and Engineers
Charles Rick Green, Wilson and Company
Greg Hale, SWBR Architects
Frank Heitzman, Heitzman Architects
Edward Huell, U.S. Army Corps of Engineers
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David Humiston, Stanley Consultants, Inc.
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Justin Jameson, U.S. Army Corps of Engineers
Joshua G. Jones, Blue Oak Energy
Gregory L. Jordan, Dewberry
Steven Kemp, EEF Consulting Engineers
Edward Lick, STV Incorporated

In 2012, the buildingSMART alliance®, which oversees development of the NCS, will begin the revision cycle for the next version of the standard. NCS Version 6 is expected to be ready for release in early 2014.
National BIM Standard-United States™

A building information model (BIM) is a three-dimensional digital representation of the physical and functional characteristics of a building. It is a shared resource of knowledge about a facility that can be used to make decisions about the building throughout its life cycle, from the initial idea, to design and construction, through daily operations and eventual demolition.

Using a BIM effectively can resolve problems and reduce expense and frustration because it allows people to virtually “walk through” the building, offering designers the opportunity to fix potential errors and building owners and managers to see how the space will function before it is actually built. For example, when designing a building, there are floor plans; plumbing plans; and heating, ventilation and air condition (HVAC) plans; often prepared by different people. Without effective communication, the designers risk having pipes, vents and beams colliding in the same space. A BIM allows all of the plans to be stored in a digital format together, so problems can be caught before construction begins. Federal agencies, such as the U.S. General Services Administration, U.S. Coast Guard, U.S. Army Corps of Engineers, U.S. Department of Veterans Affairs and the Smithsonian Institution have begun to require BIMs for construction projects to help integrate service delivery, reduce errors and omissions, and improve facility operations and maintenance.

The purpose of the National BIM Standard-United States™ (NBIMS-US™) is to standardize the way practitioners use BIMs so that they can easily pass information from one phase of the building process to another. Standards build trust; without a standard, practitioners risk recreating the model at each phase of a project because it does not contain all of the information each practitioner needs.

The National Institute of Building Sciences buildingSMART alliance first developed the NBIMS in 2005 to improve the interoperability of BIMs. NBIMS Version 1-Part 1: Overview, Principles and Methodologies for Public Use came out in 2008. This first version of the standard serves as an instruction manual, detailing how to produce content for future versions. In 2009, the Institute's Board of Directors approved the Rules of Governance (revised in January 2011) for the NBIMS-US™ consensus process. The same year, a new project portal launched to facilitate committee work. Since then, the NBIMS-US™ Project, Planning, Implementation and Technical Committees have been hard at work developing NBIMS-US™ Version 2. This first consensus version of the standard is made up of reference standards, Information Exchange standards and business Best Practice guidelines.

In 2011, the NBIMS-US™ Project Committee successfully approved 18 ballots through their consensus process. The committee received 45 ballots originally, which were separated into ballots ready for voting and “blue sky” submissions that required additional work before they could be considered for inclusion in the standard. In late autumn, once voting was complete, the Alliance began the production stage of the standards development process. The final product, a completed edition of the NBIMS-US™ Version 2, is anticipated in spring 2012.

Looking Ahead

In 2012, once editing and formatting is complete, the Alliance will release NBIMS-US™ Version 2 for use by the public. After the Rules of Governance have been reviewed and updated as needed, the Alliance will then kick off the standards development process for NBIMS-US™ Version 3. A significant amount of content that was not ready for Version 2, such as the blue sky submissions, may be ready for inclusion in the new edition.

The NBIMS-US™ in general is intended to be distributed at no cost based on the support of the industry during development. While this approach has been largely successful, it has meant a barebones budget, which slowed development of companion tools, such as education programs. To subsidize production, the Alliance will be developing some new distribution tools, such as an e-book version of the NBIMS-US™ Version 2, which will be available for a small charge.
Facility Maintenance and Operations Committee

Far too often, building operations and maintenance professionals are not consulted during the design of new facilities. As a result, operations and maintenance issues tend to plague facilities after they are commissioned. With operational expenses representing 95 to 97% of total life-cycle costs for facilities, the potential financial impact is massive.

Well-maintained buildings perform better and last longer. The Facility Maintenance and Operations Committee (FMOC) works within the industry to improve the performance and longevity of buildings and building systems through consistent, effective and proper facility maintenance and operations. The Committee provides industry-wide, public and private support for the creation of high-quality facilities. It promotes the sharing and integration of procedures and disseminates best practices. FMOC also actively provides feedback on a number of other National Institute of Building Sciences programs and interacts with outside agencies to improve facility maintenance.

The FMOC’s objectives are to increase consideration of operations and maintenance issues during the facility acquisition process; promote the sharing and integration of facility operations and maintenance procedures and information; and identify and disseminate “best practices” for facility operations and maintenance.

FMOC members work with a number of different Institute programs, such as the buildingSMART alliance™ and others, to support development of the National Building Information Modeling Standard-United States™ (NBIMS-US™). They help expand and revise the Operations and Maintenance section of the WBDG Whole Building Design Guide® website. FMOC members also collaborate with developers and users of electronic data standards to promote use of the Construction Operations Building Information exchange (COBie).

COBie

Most building project contracts require project designers and contractors to hand over all of the paperwork owners and property managers will need to operate, manage and maintain the facility when a new building is constructed. Today, it is standard practice for the construction team to gather these equipment lists, product data sheets, warranties, spare parts lists, preventive maintenance schedules and other documents at the end of the job. This current procedure can be expensive because most information has to be retrieved from documents that the team filed earlier or recreated to replace paperwork that was misplaced along the way. It is also inefficient because facility owners and managers have to sort through boxes of data when they need to reference specific information.

COBie simplifies this paperwork process. COBie is a computerized, open-standard format for collecting information. Instead of providing paperwork at the end of the job, the designers and contractors will enter the data as it is created, over the course of the design, construction and commissioning process. For example, designers will submit floor, space and equipment layout information. Contractors will provide make, model and serial numbers of installed equipment, as well as manufacturers’ product specification sheets and recommended maintenance instructions.

NASA and the U.S. Army Corps of Engineers began developing COBie in 2007 with the support of FMOC. COBie is designed to work with basic spreadsheets as well as building information modeling (BIM) software. The COBie team designed the process for either option so that large and small projects within the facility acquisition industry can benefit from this new data collection process. By exchanging COBie data via spreadsheets, even small homebuilders can provide a simplified as-built BIM to their customers.

COBie is frequently cited as the leading practical example of how efforts to adopt open standards for building industry information exchange based on the NBIMS-US™ can transform building industry processes. Similar information exchanges are being developed to address equipment layout, energy and specifications.

FMOC is also working on other information exchange programs, such as:

• SPIe: The consistent definition and use of material, products, equipment and assemblies is vital to the exchange of building information. The goal of the Specifiers’ Properties information exchange (SPIe) project is to define minimum property sets for building model objects.

• QTie: The Quantity Takeoff information exchange (QTie) shows how the Industry Foundation Classes (IFC) building model will allow the facilities industry to adopt model-based processes for quantity takeoff.

• LCie: The Life Cycle information exchange (LCie) demonstrates how information flowing throughout a project can be captured and consolidated to ensure that the owner/occupier continues to have a clear and complete description of the facility.

An expanded description of information exchange activities appears in a separate section of this report.

In March 2011, FMOC held a meeting in Baltimore during the National Facility Management and Technology (NFMT) Conference. In addition, the committee arranged for several presentations during the conference, including a COBie Challenge, a panel on workforce development for high-performance buildings, and presentations on WBDG, and BIM for FM.

The Committee met again in December during the Institute’s Annual Meeting held in conjunction with EcoBuild America in Washington, D.C. Discussions at the meeting covered the Federal Buildings Personnel Training Act of 2010; COBie as a standard industry practice; development of COBie derivatives SPIe, the Operators Properties information exchange (Opie) and LCie; workforce development for high-performance buildings via science, technology, engineering and mathematics (STEM); linking WBDG with NASA and U.S. Department of Education STEM resources; and extending WBDG into Real Property Management.

The Operations and Maintenance Subcommittee for the WBDG Whole Building Design Guide®, many of whom are members of FMOC, met once during the year to review existing pages and new pages.

In addition, FMOC worked with the Construction Specifications Institute (CSI) and the Institute’s buildingSMART
alliance to provide OmniClass support on the OmniClass numbering system. They worked on: Table 11 Construction Entities by Function (Open Standards Consortium for Real Estate, U.S. Department of Defense and U.S. Geological Survey); Table 14 Spaces by Form (gbXML); Table 33 Disciplines and Table 34 Organizational Roles (Standard Occupational Codes, North American Industrial Codes, and United Nations International Standard Industrial Classification of All Economic Activities); and Table 49 Properties (International Framework for Dictionaries).

Learn More:

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Looking Ahead

The FMOC will again coordinate several events at the National Facility Management and Technology Conference, including a COBie-spinoff Challenge and presentations on NBIMS, BIM for FM, the Federal Buildings Personnel Training Act of 2010 and WBDG. The FMOC will continue working on COBie, SPie, QTie and LCie.

FMOC Members

Chair: William Brodt, NASA
Scott Aaron, c2c Surveys
Peter A. Aguirre, Aguirre
Asli Alccamete, Carnegie Mellon University
Ahmad Allahverdi, CPT
Michael Allen, Burns & McDonnell
Jack Allison, Dallas Fort Worth Airport
Dhari Alshammary, APICORP
David Anspach, U.S. Air Force
Alex Araujo, Texas A&M University System
Eric Archie, Archway Builders, LLC
Gregory Arkin, ACAI Associates, Inc.
Werner S. Baath, Jacobs Engineering
Gianmarco Baldini, Faculty of Architecture
Cindy Baldwin, ACAI Associates, Inc.
Ron Balmer, Bridges & Paxton Consulting Engineers, Inc.
Richard Bates, Ryan
Companies US Inc.
Liz Beaman, University of Texas at Austin
Tom Bee
Gary L. Beimers, McGraw-Hill Companies
George J. Benda, Chelsea Group, Ltd.
William Benson, Graphisoft U.S., Inc.
William Berner, Tremco Roofing and Building Maintenance
John Bernhardt, APPA
Ken Bever, MIMOSA
Unmesh Kumar Bhargava, Bhargava International, Inc.
Tim Biggins, Office of the Secretary of Defense
Richard Binning, Wakefield Beasley & Associates
Jaimie Bimarker, Digital Drafting Systems, Inc.
D. L. Bishop, NAVFAC Atlantic
Mohammed Biswas, Design + Construction Strategies
Cliff Black, Firestone Building Products
Paul Blanchard, GMB A+E
Timothy Blatner, DeStefano
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Jason Combs, Woolpert, Inc.
G. C. Comfort, Red Coats
Tony Considine, University of North Carolina
Peter Costanzo, Avatech
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Marc Fagan, Banchan Associates, LLC
Will Fagan, Carter, Gable Lee
Guillermo Faus-diaz, Link Construction Group, Inc.
David Fett, Portsmouth Public Schools
Andreas Fix, George Mason University
Liann Flannery, Tremco Inc
Francisco Forns-Samso
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Eric Francis, Burns & McDonnell
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Dan Gelderman, Calibre Ryan Ghere, MABEC Group
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Gary Gray, IBM
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Paul Green, Smithsonian Institution
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Francois Grobler, U.S. Army Corps of Engineers
Steve Grosz, Distributed Information Technologies, Inc.
Ramesh Gulati, AECI/ATA
Stephen Hagan, U.S. General Services Administration
Public Building Service
David Hague, National Fire Protection Association
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Kai D. Haller, Kai David Haller Architects, Inc.
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Information Exchanges

In 2005, the National Aeronautics and Space Administration (NASA) and the White House Office of Science and Technology Policy provided the National Institute of Building Sciences Facility Maintenance and Operations Committee (FMOC) with two grants to begin developing tools to coordinate how information is exchanged during building projects. FMOC formed a project team of designers, builders, owners, commissioning agents and software firms and set out to identify the requirements for the information exchanges needed, from construction to operations handover.

COBie

That initial tool, known as the Construction Operations Building information exchange (COBie), which delivers building asset information, has since grown from an idea to an internationally recognized standard implemented in commercial software that is used across the globe. The Engineer Research and Development Center (ERDC) Construction Engineering Research Laboratory (CERL), a laboratory of the U.S. Army Corps of Engineers (USACE), has led the COBie project. COBie specifications can now be found in USACE, U.S. Department of State Overseas Buildings Operations and U.S. General Services Administration (GSA) contracts and proposals.

COBie provides a vendor-neutral interchange format that allows building asset information to flow without the multiple stages of rediscovery and rekeying of data required today. In mid-2008, participants in the COBie development process expressed interest in a fully international version of COBie specification. In late 2009, the COBie team released the international COBie format and the Facility Management (FM) Handover Model View Definition (MVD) format. (The FM Handover MVD is only the second official MVD published through the buildingSMART alliance.) As of 2010, COBie is now mandated for public building projects in the United Kingdom.

In the summer of 2011, COBie was submitted as a ballot to become a part of the National Building Information Modeling Standard-United States™ Version 2 (NBIMS-US™ V2). The NBIMS Project Committee membership voted in November, approving the ballot to include COBie Version 2.26 into the upcoming NBIMS-US™ V2.

Throughout the year, the buildingSMART alliance posted a number of educational videos about COBie on its YouTube page to help people learn more about the tool. And, during the COBie Challenge held at the Institute’s Annual Meeting in December, vendors of Computerized Maintenance Management System (CMMS) and Computerized Asset and Facility Management (CAFM) system software demonstrated how their products consumed COBie data.

SPIe

In late 2007, members of the Specifications Consultants in Independent Practice (SCIP) and Construction Specifications Institute (CSI) began developing product type templates from outline specifications. The objective of the Specifiers Properties Information exchange (SPIe) project was that this set of product templates could be used by manufacturers to export product data into an open-standard format consumed by designers, specifiers, builders, owners and operators. Demonstrations of these templates, published in the first productguide™ on the WBDG Whole Building Design Guide®, showed the technical feasibility of using open-standard product data to deliver this information. In 2010, ERDC worked with AEC3 UK to develop a tool to automatically export the entire set of building product data from IFC into a standard set of files. This set of 1,200 generic templates is the basis for the current version of the productguide™ available on the WBDG.

The initial concept of the SPIe project was to reach out to product manufacturers and their associations directly. While some limited success was achieved in 2010, contacts with manufacturer associations did not yield the expected groundswell of interest in creating specifications for the open exchange of structured product data. Therefore, the team determined another direction was needed. Concurrent with development of the 1,200 product templates, the SPIe team received requests from additional groups to include property sets related to sustainability and operations with specifications properties. The timing of these parallel efforts in the fall of 2011 has provided an important opportunity to collaborate the requirements of multiple communities into the original scope. This will provide a richer set of building information and reduce the number of times manufacturers need to be engaged to automate the production of their product templates.

The SPIe team’s first round of sustainability properties was collated by two Chicago architecture firms (Kristine Fallon and Associates and Primera Architects) for a subset of the overall 1,200 product templates. CSI’s National Technical Committee is currently reviewing this subset list. This initial list and product templates are available on the buildingSMART alliance website under active projects.

A December 2011 presentation of progress on the Specifiers Properties information exchange project demonstrated that the development of non-proprietary product templates for product data and geometry is no longer a technical question. Presenters from industry, academia and government demonstrated the need and willingness to engage to create open-standard product and geometry templates through the procedure introduced by CSI. Two of the leading product web-catalog suppliers applauded the effort that would allow their products to transform the currently tedious and difficult effort of product discovery and selection.

COBie activities in 2012 will focus on two priorities: first, the COBie calculator, a spreadsheet tool that allows the user to determine the costs and benefits of the use of structured asset information through the life of a project, and second, integrating COBie into the ProjNet™ secure, on-demand design review tool for use on federal design and construction projects.

Looking Ahead

COBie activities in 2012 will focus on two priorities: first, the COBie calculator, a spreadsheet tool that allows the user to determine the costs and benefits of the use of structured asset information through the life of a project, and second, integrating COBie into the ProjNet™ secure, on-demand design review tool for use on federal design and construction projects.

Relating to SPIe, in 2012, CSI will embark on a national project to engage its entire membership, as well as members of other associations, product manufacturers and interested stakeholders. Beginning in January 2012, CSI members will be asked to review the entire set of 1,200 productguide™ templates.
National Clearinghouse for Educational Facilities

The National Clearinghouse for Educational Facilities (NCEF) website, www.ncef.org, is the premiere source for research and resources on the planning, design, funding, building and maintenance of schools for all levels of learning. Established by the U.S. Department of Education in 1998, the Clearinghouse is managed by the National Institute of Building Sciences. A variety of people use the site, including educators to research educational facility issues; design professionals as a technical resource; state and local officials to inform their decision-making on school construction; and citizens to help them understand matters affecting school facilities in their communities. NCEF has over 25,000 resources and gets 1.2 million visitors a year.

In 2011, NCEF enhanced the look and feel of its website by expanding the site layout and improving the display of information on the homepage, increasing the number of photographs of schools around the country, improving navigation and enhancing the efficiency in website maintenance. As a way of increasing the visibility of the Clearinghouse, NCEF integrated social media into the website and, in July, began posting on Twitter. NCEF now has more than 425 followers and is included on 24 curated lists, reaching several thousand additional followers.

In April, NCEF participated in the School of the Future Student Design Competition. Sponsored by the Council of Educational Facility Planners International and the National Association of Realtors in collaboration with the U.S. Environmental Protection Agency, the American Institute of Architects, the American Federation of Teachers, the National Education Association and more than 20 other associations and private companies, the annual competition challenges middle school teams across the country to think creatively as they design tomorrow’s green schools to enhance learning, conserve resources, be environmentally responsive and engage the surrounding community.

NCEF participated in a Congressional Green Schools Caucus briefing in July, which was co-chaired by Representatives Ben Chandler (KY-6), Robert Dold (IL-10) and Jim Matheson (UT-2). The NCEF Director gave an overview of the current federal and state landscape for educational facilities and talked about NCEF’s involvement in the Coalition for Green Schools.

In August, an NCEF quote appeared on a front-page story of the New York Times. The article, which focused on reducing energy bills in schools, included a quote from the NCEF Director, who addressed the funding that states received through the federal stimulus package. The article provided a number of ways schools could lower monthly energy expenses and included examples from around the country.

NCEF provided important support for President Obama’s American Jobs Act proposal. The proposal, which the White House announced in September, allocated $25 billion to modernize and renovate schools. NCEF disseminated key data on the age and condition of America’s schools, prominently featuring White House information on the NCEF website, and tracking national news stories promoting the Act.

In December, NCEF published a new study that looks back at the designs of school buildings of the recent past, identifying trends in energy consumption, ventilation, heating, air quality, lighting and acoustics. The study, A History of School Design and its Indoor Environmental Standards, 1900 to Today, was written by Lindsay Baker, a doctoral candidate at the University of California, Berkeley.

Learn More:

Staff Contact: Judy Marks, Hon. AIA, Program Director, jmarks@nibs.org
Website: www.ncef.org

Looking Ahead

In 2012, NCEF staff will continue to maintain and update this comprehensive online resource for interested parties around the globe. The Institute has developed a vision to recreate NCEF as an interactive information hub. NCEF would expand its role of consolidating sources for research-based intelligence and serving as a resource for those organizations that contribute to its base as well as general users in the educational community. NCEF would function as a community website hub and portal for all of its supporting organizations, offering peer-reviewed, research-based information to a specialized audience who would help to shape its direction and content. As such, NCEF could serve as the vehicle for connection and expansion among all disciplines concerned with creation and operation of educational facilities.
The National Institute of Building Sciences 2011 Annual Meeting, held December 5-9, 2011, in conjunction with Ecobuild America in Washington, D.C., served to highlight the projects and programs of the Institute. It was a great opportunity for Institute members, partners and other building professionals to witness the Institute in action, while finding out the latest trends in technologies and developments for the building industry.

Many Institute councils and committees convened throughout the week, including the National Institute of Building Sciences Board of Directors; Consultative Council and Coordinating Council; the Council on Finance, Insurance and Real Estate (CFIRE); the Building Enclosure Council (BEC) and Building Enclosure Technology and Environment Council (BETEC); the Building Seismic Safety Council (BSSC); the buildingSMART alliance™ Board of Direction and bSa Membership; the Facility Maintenance and Operations Committee (FMOC); the High Performance Building Council (HPBC); the National Council of Governments on Building Codes and Standards (NCGBCS); and the WBDG Whole Building Design Guide® Board and Advisory Committee. In addition, there were meetings of the Haiti Working Group; the National BIM Standard-United States™ Planning and Project Committees; and the ProjNetSM User Group.

The Building Enclosure Technology and Environment Council (BETEC) Symposium, which focused on "High Performance Light Framed Walls: Code Requirements, Durability, Constructability Concerns and Field Experiences," was extremely well attended. The all-day event put the focus on upcoming code changes for light-framed walls. The BETEC Symposium speaker presentations are now available online at www.nibs.org/betec.

The Institute coordinated dozens of educational sessions for the buildingSMART alliance™ Conference. The sessions were broken into four building information modeling (BIM) related threads, including: BIM in Education, BIM Standards, BIM Experience/User Apps and the BIM Life Cycle.

In their keynote session, U.S. Department of State's Bureau of Overseas Building Operations (OBO) Information Resource Management Division Director Robert E. Clarke and OBO Information Resource Management Application Development Branch Chief Danilo Stapula presented, "COBie and BIM: an Integrated Standards-Based Environment for Building Management." With more than 130 people in attendance, this exciting inside look at OBO kicked off the COBie events and served as the official keynote address of the 2011 Ecobuild America Conference.

The information exchange demonstrations that followed included the Construction Operations Building information exchange (COBie) CMMS/CAFM Challenge, the Life Cycle Model (LCie) and Specifiers Properties information exchange (SPie).

During FEDCon® '11, attendees learned about federal agencies' construction plans and budgets for the coming year directly from the decision makers as they shared the inside scoop on expected 2012 activities. Officials from a number of federal agencies, including the U.S. Air Force, U.S. Army Corps of Engineers, U.S. General Services Administration, U.S. Naval Facilities Engineering Command (NAVFAC), U.S. Department of State, U.S. Department of Transportation and U.S. Department of Veterans Affairs, presented their construction budgets for the current year and planned budgets for future years. They discussed the types of buildings to be designed, offered regional and international...
construction information, and provided the overall direction of their design/construction programs. Mike Kangior, Senior Policy Advisor, Office of Policy at the U.S. Department of Homeland Security gave the keynote during a sit-down lunch.

The FEDCon speaker presentations are now available online.

More than 100 Institute members and friends gathered to recognize industry leaders at the Institute’s Annual Reception and Awards Dinner. This year, the Institute presented awards to Michelle Fox, PhD, Chief Strategist for Education and Workforce Development for the Office of Energy Efficiency and Renewable Energy (EERE) within the U.S. Department of Energy (DOE); Get W. Moyo, DSc, PE, Vice President at AECOM; and Mila Kennett, Senior Program Manager in the Infrastructure Protection and Disaster Management Division (IDD) of the U.S. Department of Homeland Security (DHS) Science & Technology Directorate (S&T). Read more about the award winners on page 6.

Looking Ahead

In January 2013, the Institute will hold its Annual Meeting and Awards Banquet as part of a new, free-standing event—Building Innovation 2013: The National Institute of Building Sciences Annual Conference and Expo. Scheduled for January 7-10, 2013, in Washington, D.C., the theme of the conference will be “Improving Resiliency through High Performance.” Planning for the conference will occur throughout 2012.

Membership

The National Institute of Building Sciences works in partnership with its members to develop solutions for the built environment. Many of these committed professionals are experts in their field, have decades’ worth of experience and are the leaders of their professions. They all play a significant role in the Institute’s mission. Dedicated members serve on councils and committees, volunteer for projects and offer their insights to advance building science, all for the purpose of improving the safety and performance of the built environment.

The Institute appreciates the commitment of its membership, which includes representatives of government agencies, design professionals, members of the construction industry, manufacturers, insurance representatives, educators, researchers and others. It is through the participation and contributions of the membership that the Institute is able to serve the nation and the public interest. This Annual Report is a testament to their dedication.

Contributing Organization Members

- AISC
- AceCad Software Ltd.
- American Institute of Architects
- Bentley Systems, Inc.
- Canadian BIM Council
- Construction Specifications Institute
- FM Global
- Gilbane Building Company
- GRAPHISOFT
- HOK
- McGraw-Hill Companies
- National Fenestration Rating Council
- Nemetschek Vectorworks
- RCMS Group
- Sheet Metal & Air-Conditioning Contractors
- National Association
- Skidmore, Owings & Merrill, LLP
- Technical Sales International
- Trimble Navigation
- U.S. Army Corps of Engineers
- U.S. Coast Guard
- U.S. General Services Administration
- U.S. Department of Veterans Affairs
- Webcor Builders

Sustaining Organization Members

- ACAM Associates, Inc.
- American Iron & Steel Institute
- American Society of Professional Estimators
- American Wood Council
- Architect of the Capitol
- ASHRAE
- ASSA ABLOY Door Security Solutions
- Autodesk, Inc.
- Beck Technology
- Brick Industry Association
- Building Owners & Managers Association, Intl.
- Building Systems Design, Inc.
- C/F Data Systems, LLC
- Centennial Contractors Enterprises, Inc.
- Charles Pankow Foundation
- Component Assembly Systems
- CTI Consultants Inc.
- D. C. Taylor Co.
- Digital Vision Automation, Inc.
- East Coast CAD/CAM
- EIFS Industry Members Association
- EnLink Geoenergy Services, Inc.
- Estimé Enterprises, Inc.
- Himman Consulting Engineers, Inc.
- HKS, Inc.
- Institute for Business and Home Safety
- IntelliBuild, a division of Canam Group
- International Association of Plumbing & Mechanical Officials
- International Code Council, Inc.
- J.C. Cannistraro, LLC
- Jaros, Baum & Bolles
- Jones Lang LaSalle
- Kristine Fallon Associates, Inc.
- Legrand
- McCarthy Building Companies, Inc.
- NASA
- National Association of Home Builders
- National Fire Protection Association
- National Institute of Standards and Technology
- NAVFAC Atlantic
- New Tapestry LLC
- North American Insulation Manufacturers Association
- Omegavue
- Performance Building Institute
- PLANiT Measuring
- RSMeans Co., Inc.
- Strategic Development Council
- Submittal Exchange
- Treelligence, Inc.
- UL LLC
- URS
- Virginia Department of Housing & Community Development
- Weidlinger Associates, Inc.
- Wisconsin Department of Administration
- WSP Flack + Kurtz
Moving Forward:
Findings and Recommendations from the Consultative Council
Moving Forward:
Findings and Recommendations from the Consultative Council

Introduction

The building community faced numerous challenges in 2011. Employment in the sector remained down; developers, designers and contractors had fewer projects; and homeowners and commercial building owners continued to face economic tests when selling or leasing their properties. While these challenges greatly impacted the building sector, the shared concerns across disciplines prompted a concerted effort to identify paths forward.

The National Institute of Building Sciences Consultative Council provides a forum to address the common desire to find solutions to these and other big-picture issues affecting the building industry and the nation. Initially established by the Institute’s enabling legislation in 1974, the Council recently underwent a re-formation to its structure and mission. The updated Council includes representatives of leading organizations within the building community. Together, they are working to develop findings and recommendations to improve the built environment and the community that supports it.

In 2011, the Council focused in greater depth on four topic areas identified in last year’s report:

• Defining High Performance and Common Metrics,
• Codes and Standards Adoption and Enforcement,
• Energy and Water Efficiency, and
• Sustainability.

Members of the Consultative Council and other representatives from across the building community participated in Topical Committees to examine the previous findings and recommendations and offer additional insight into further opportunities in these areas. This summary and the associated full-length report reflect their work.

Defining High Performance and Common Metrics

Increasingly, the building industry is seeing an evolution. High-performance building efforts are moving from voluntary systems, such as rating systems and guidelines intended to change the marketplace and create demand for green buildings, to the use of model “green” codes and standards adopted by jurisdictions.

High-performance buildings, in addition to ensuring a design meets a set of criteria “on paper,” must be constructed to plans and specifications and then commissioned and operated as real buildings. To demonstrate performance, the building industry needs understandable criteria and metrics, along with innovative project delivery methodologies and strategies. Achieving high performance requires a focus on actual performance throughout a building’s life cycle—from design and construction through operations and maintenance to deconstruction.

The definition of a high-performance building established by Congress in the Energy Independence and Security Act of 2007 (EISA) still remains relevant. However, many of the attributes it includes require further definition, along with identifying and defining sub-attributes and metrics to demonstrate actual achievement.

Identified measures of building performance should include both quantitative and qualitative values; they should be measured and verified through the use of meters and occupant surveys. From the aggregation of both data types, a high-performance building system should derive an allowable measure for energy use, water use, etc., on a per person or unit output basis (e.g., kBTU/sq.ft./person/year or gallon/sq.ft./widget/year).

The Institute (through its High-Performance Building Council) should identify the components and attributes that make up a high-performance building; the standards and relevant standards development organizations (SDOs) affected by each component; and the metrics involved. The Institute should form, with the engagement of the National Institute of Standards and Technology (NIST), a Standards Integration Group (SIG). The SIG would facilitate the use of common metrics or measurement protocols, with the goal of advancing a holistic approach when demonstrating performance within and among

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1The Energy Independence and Security Act (EISA) of 2007 (Title IV, Energy Savings in Buildings and Industry, Section 401, Definitions), definition of a “high performance building” is as follows: A building that integrates and optimizes on a life-cycle basis all major high-performance building attributes, including energy conservation, environment, safety, security, durability, cost-benefit, productivity, functionality and operational considerations.
high-performance building attributes. The SIG also should identify the current gaps in appropriate standards and work with existing SDOs to fill those gaps. Where attributes and existing standards appear to overlap, collaboration across SDOs would be encouraged.

The building industry requires consistency when setting the measurement and definition of minimum required performance levels. Existing programs and methods should form the basis for measurement and reporting. Actual performance levels that will qualify as "baseline," "benchmark" and "high" performance should be defined, along with the applicable standards, test methods and order of testing during the project delivery process. Where practical, standards should focus on measured results and then be tracked to a performance results index (PRI), with established goals by building type and location.

**Recommendations**
- The building community should work to define sub-attributes and metrics to demonstrate the achievement of high-performance buildings—including both qualitative and quantitative measures.
- The Institute (through its High-Performance Building Council) should identify the components and attributes of high-performance buildings and develop a matrix of the standards affected by each component and the relevant metrics.
- The Institute, with the engagement of NIST, should form an SIG to encourage collaboration, facilitate use of common metrics and identify gaps in appropriate standards.

### Codes and Standards Adoption and Enforcement

When adopted by jurisdictions, codes and standards establish the community’s expectations for protecting the health, safety and welfare of its citizens. Such codes and standards are developed and then adopted through a series of actions that assure engagement from all relevant stakeholders. This engagement, along with effective adoption and enforcement, ensures the building industry follows codes and standards, thus meeting the community’s expectations.

Codes and standards provide a common language and requirements for the design, construction and operations of buildings. This commonality provides many benefits for the public, the building industry and government. The public is assured that buildings provide a minimum level of protection from hazards, are accessible to users and maintain public health. Within the construction industry, manufacturers know they have the consistency in requirements necessary to invest in the production and development of products that meet these common needs; designers and contractors have consistent criteria to follow; and owners have buildings that possess a consistent baseline of attributes. Each industry segment can also develop the education and training activities it needs while being mindful of the overall codes and standards, and all industry members can work under these mutual requirements to achieve a common result. Governments can develop criteria with building expert input to assure technical feasibility and cost-effectiveness, access to an education and training infrastructure, and cost savings due to consistent methods for review and enforcement.

The compliance verification mechanisms for codes and standards drive how SDOs develop their codes and standards, set the level of stringency and whether the codes and standards are applicable across the building’s lifespan. For instance, traditional plan review and construction inspection by state and local agencies (or their agents) cover up to, but not beyond, initial building occupancy. This limits the ability to confirm the building’s actual performance as intended by the adopted codes or standards. New compliance paths must be identified to open opportunities for codes and standards developers to explore new formats, criteria, adoption mechanisms and/or timelines for compliance verification, which will result in increased compliance rates and/or reduced costs. In the absence of market or other forces to ensure continued performance of the building and its systems, building officials need compliance verification processes and the available resources to ensure ongoing compliance. Codes require certain system capabilities, but once occupancy occurs there is no way to ensure that actual operation and maintenance of the systems match those envisioned by the code.

In the past, strong consensus-based standards development programs have encouraged growth in the industrial segments by ensuring that American businesses understand the health, safety and performance-based requirements for their products, systems and services. This created a level playing field where manufacturers could successfully compete. However, the current economic downturn is creating new and significant challenges for the code enforcement community.

Municipalities are delaying the adoption of updated model codes due to the perception that updated codes increase construction costs while providing an uncertain return on investment. Countering this perception requires the development of more widely accepted metrics to demonstrate payback periods for energy and water-efficiency provisions, as well as better methods to present how code updates are based on the latest knowledge and experience to protect public safety. Faced with the prospect of enforcing more codes of increasing complexity with fewer people, many municipalities resort to concentrating on enforcing only the basic life safety requirements of the construction codes. With these constraints, building officials are less likely to enforce energy and water efficiency provisions, which in turn means the energy and water efficiency gains expected from updated codes are not being fully realized.

New technological advancements, such as building information modeling (BIM), can play a role in relieving these constraints. They can help by improving the quality of code compliance verification. They can also improve the municipality’s ability to cope with the burden of enforcing more complex provisions because jurisdictions can evaluate the data contained within the model codes and other requirements electronically. However, work still remains before BIM accomplishes the levels of interoperability needed to be deployed as a code-checking tool. Further, jurisdictions also need the training and tools to utilize BIM.

A strong codes and standards development community supports a strong and robust economy. Government at all levels...
must work together with standards and codes developers to address the challenges of better articulating the benefits of participation in their various development processes. They need to encourage more widespread verification of compliance with construction codes and support the development of BIM and other technology-based initiatives that help streamline approvals and improve the quality and consistency of enforcement.

**Recommendations:**

- Both regulators and the building industry should support efforts by codes and standards developers and adopting jurisdictions to explore alternative ways to format criteria to simplify and enhance compliance verification.
- Members of the building community should investigate energy-based metrics as alternatives to the prescriptive approach in model codes and standards.
- NIST, the U.S. Department of Energy, the Institute and others should encourage cities and smaller communities to adopt and enforce updated model codes.
- Software developers, regulators and building professionals should support the ongoing development of BIM for ultimate use as an automated code-checking tool that can improve compliance and streamline the approval process.

**Energy and Water Efficiency**

Achieving real-world energy and water use efficiencies in buildings requires decisions based on good science. Recently, a number of buildings constructed to meet the requirements of various green rating system programs have not achieved the anticipated efficiencies. These highly publicized failures have received a great deal of attention and are being used to call into question the cost effectiveness of green building design. However, the root cause surrounding these results resides not with a failure of the program itself or with a failure of the installed technologies, but rather with an inability for the building community, including the developers of green building codes, standards and rating systems, to access accurate data to better understand current energy and water use in buildings.

There is an urgent need to conduct research and begin gathering, collating and understanding current energy and water use in buildings. This information would foster better decision making regarding the most cost-effective technologies to deploy in various building types and in different regions of the country.

The connection between water and energy is a significant policy issue in need of national attention. Electricity generation needs water; pumping and treating water requires electricity; and water heating uses natural gas and oil, as well as electricity. Yet national research into the deep connection between water and energy has been insufficient.

The California Energy Commission found that 19% of the state’s electric energy load comes from the pumping and treatment of drinking water and wastewater, and 32% of its gas load is related to the heating of water by consumers. However, few other states have done this analysis, and there has been no national research into this important area. There must be a national research program directed to understand the complex relationship between energy and water, including production, infrastructure, training and funding.

Thermal insulation is routinely used to improve the thermal efficiency of hot water delivery systems. Although specific requirements vary, all major building energy codes currently require some pipe insulation on domestic hot water (DHW) piping. DHW piping insulation requirements have been based on the energy savings associated with reduced heat loss from piping systems. However, thermal insulation also helps conserve water by reducing the time it takes from the initial demand for water (turning on the tap) until the water is delivered to the demand point at the required temperature. A study is needed to quantify the potential energy and water savings associated with increasing the use of pipe insulation.

Having a consistent approach, and an appreciation of value and of mandates, is crucial to ensuring that the water-energy nexus is better understood so that future decisions can be made with an appreciation for the balance between energy and water considerations. Auditing of energy and water use can help provide much needed data. To be comprehensive, auditing programs must include critical elements to ensure the usefulness of the data for making informed decisions about achieving new efficiencies.

The following general improvements in energy audit methodologies should be considered:

- The availability of metering technology, building controls and equipment to record building energy use and building attribute outputs (temperature, humidity, air quality, lighting quality, etc.) can and should drive what information is collected and how it is reported.
- How information will be used should drive how needs associated with building data are identified and, to the degree those needs are not being met, drive increased emphasis on development of technologies or approaches to gathering that information.

Water audits, similar to energy audits, provide a comprehensive understanding of how a building consumes water. A comprehensive water audit is a systematic process whereby all major water-consuming equipment and processes are evaluated to estimate the water consumption over a given period of time (typically annually). If a building owner knows his/her biggest water user, investing in processes and technology can have a serious impact on water reduction and facilitate better management. Real-time data collected on building end-use equipment can help in accurately determining efficiency opportunities.

In addition, the nation’s water distribution infrastructure urgently needs auditing. While the construction community struggles to reduce water consumption in buildings, water distribution infrastructure wastes up to 25% of treated water due to leakage between the point of treatment and the building. According to Congressional Budget Office estimates from 2002, it will take $335 billion over the next 20 years to repair and update water distribution systems and an additional $300 billion to do the same for sewer systems. Large and small water utilities alike must document the need for and seek regulatory authority to appropriately price water to include provisions for required improvements to their local infrastructure.
The process of repairing the nation’s crumbling infrastructure can create tens of thousands of long-term American jobs. The United States Conference of Mayors estimates that every job created through rebuilding water systems creates more than 3.6 jobs elsewhere and every dollar invested in water infrastructure adds $6.35 to the national economy.

Generally, there is a lack of information on commercial end-use water use and very little research has been conducted on the topic. The need for more comprehensive building water use data is vital to the continued improvement of water management in buildings across the country. Water use intensity data can be used within codes and standards to develop performance-based standards; by water utilities to identify large and inefficient users; by water auditors to develop water management strategies; and by federal and local governments to craft water use policies. Advanced metering and sub-metering technologies can assist researchers in developing pipe sizing methodologies that would ultimately be incorporated into the plumbing codes.

State and local governments must immediately begin to require that all buildings be metered for water use, at the gross building level at a minimum, but ideally sub-metered for all significant water uses within the building. Installing meters and billing according to usage is the single most effective water conservation measure a water utility can initiate. As recently measured by utilities, unmetered water consumption is reduced 15% to 30% when utilities implement metering and commodity rates.

At a minimum, building owners should know, through metering by utilities and/or measuring of delivered energy forms, the aggregate energy use of a building or group of proximate buildings under common ownership. With such information, it is possible to explore how different buildings of the same type and use, subject to the same or similar variables, perform in comparison to one another. Ideally, energy use data for various functions (e.g. lighting, temperature, air quality, insulation, etc.) for the energy expended in the building. Having a more refined measurement and demonstration of energy use and delivered building services should serve to prioritize the need for new technology, as well as the need to use the current technology in the right places to achieve the most benefit.

The Commercial Buildings Energy Consumption Survey (CBECS) conducted by the DOE’s Energy Information Administration (EIA) is a national sample of the U.S. commercial building stock and their energy-related building characteristics, energy consumption and expenditures. Due to several challenges, the current CBECS data is nearly 10 years old. Without up-to-date information, it is difficult to assess how different buildings perform relative to their peers and how the building stock overall improves. CBECS funding must remain consistent to allow future surveys to be conducted.

The best way to compare energy use in buildings or to determine whether buildings are progressing towards set goals is to establish a baseline from which to measure. As evidenced above, this baseline can be based on the performance of the existing building stock (such as CBECS) or the expected building performance based on a particular version of an energy code or standard. The lack of a common baseline can hamper the assessment of building performance.

Rather than a common baseline referencing past performance, a finite future goal can provide consistency in showing progress towards a goal. For example, net-zero energy use may be an appropriate baseline. While not achievable in all buildings, net-zero energy use provides a consistent point of measurement toward which every building can aspire.

While net-zero energy use does not generally impact the safety inherent in existing delivery infrastructure, net-zero water efforts require careful consideration. Existing water infrastructure and plumbing is based on historic flow rates. Decisions to implement some water efficiency strategies that reduce water consumption levels without fully understanding the systemic implications of reducing flows in water supply pipes and sanitary systems can result in unintended consequences.

Continued flow reductions on both water supply and sanitary drain systems, without fully understanding the implications of these flow reductions, place the health and safety of occupants and the efficacy of plumbing systems at risk. Researchers need to better understand water use in buildings to properly size water pipes to balance the needs for energy and water efficiency with the need to maintain residual pressures for safety and other performance concerns.

Even though appliances and fixtures are becoming increasingly more efficient and consuming less water, they still discharge water into sanitary waste systems. In the near future, Graywater Reuse Systems will be able to significantly reduce the amount of wastewater going into residential sanitary drainage systems. These Reuse Systems collect discharged water from lavatory basins, clothes washers, bathtubs and shower fixtures in a residence for reuse (usually for irrigation purposes).

Such interest in the use of non-potable water for various applications has surged in recent years, driven in part by the emergence of new stretch codes and standards, as well as the recognition that water is a finite resource. Currently, however, there are no federal regulations governing water quality or permissible utilizations for non-potable water. In 2004, the Environmental Protection Agency released EPA/625/R-04/108, Guidelines for Water Reuse. While that document is instructive, it is not binding.

Regulations are highly variable throughout the nation on how non-potable water can be used in applications inside and outside of buildings. Many states do not even have such regulations. The lack of uniform regulations is currently the greatest impediment to more widespread use of non-potable water in buildings and on building sites.

The preemption clause in the Energy Policy Act of 1992 (EPACT 92) (42 U.S.C. 6297(c)) prevents states from establishing more stringent water efficiency requirements for products covered in EPACT 92, the Energy Policy Act of 2005 (EPAct05) and contained within 42 U.S.C. 6295 (j) and (k) without first obtaining a waiver from DOE. However, some jurisdictions, believing the preemption clause to have expired, have enacted water efficiency requirements more stringent than allowed. DOE did not enforce preemption in these cases, thus perpetuating the view that the preemption clause had expired. The fact that the referenced standard has not been revised, even while many more water-efficient devices have become available, is complicating the situation.
The lack of enforced preemption has the effect of allowing states to adopt more stringent water consumption requirements and removes perceived impediments to the adoption of green building codes and regulations. However, it may also produce a high degree of variation in state regulations around the country, a source of concern for the manufacturers of water-efficient products. A high degree of variation in the regulations between states may require manufacturers to develop different products for different states, pushing up distribution, marketing and development costs. Further, poorly chosen maximum use limitations could negatively impact the performance and effectiveness of these products.

**Recommendations:**

- SDOs should update or develop new consensus standards designed explicitly for benchmarking a building’s energy usage, and consider “net-zero energy” as the goal.
- The U.S. Government should develop incentives for state and local governments to immediately require water metering of all buildings and to adopt and properly enforce comprehensive “green” building or plumbing codes.
- The U.S. Government should support the research and development of less invasive water sub-metering technologies and employ these technologies to better understand complex water use patterns associated with various building types.
- The U.S. Government should encourage and provide a tax incentive to building owners that voluntarily get their buildings audited and implement the recommendations from the audits to reduce their energy and water use; the degree of incentive should increase in relation to the reduction in energy and water use. Widespread energy and water auditing will provide the data and information required to establish more accurate baseline metrics, prioritize installation of energy and water-efficient technologies that offer the best return on investment and provide real-time or near real-time feedback to building owners.
- State and local governments should require water utilities to conduct independent leakage audits and report the percentage of water leaking from their distribution systems, along with a plan for the repair and update of systems that demonstrate excessive leakage.
- The U.S. Government should become more actively engaged in the development of research programs and provide financial support for scientific study to ensure that increasingly taxed water supplies are used as efficiently as possible while still maintaining health and safety.
- The U.S. Government and the building community should support research to quantify the long-term costs and benefits associated with increasing the use of pipe insulation on hot water pipes.
- DOE should undertake a review of the current water efficiency standards and test procedures contained within 42 U.S.C. 6295 (j) and (k) to determine whether improving the water efficiency requirements for any or all named products is technologically feasible, economically justified and consistent with the maintenance of public health and safety. If the permissible water consumption standards are reduced, DOE should reinstate the preemption of state restrictions contained within 42 U.S.C. 6297(c) in the interest of promoting uniform standards, interstate commerce, and public health and safety.
- The Environmental Protection Agency should set uniform national non-potable water quality standards, along with permissible utilizations of non-potable water. Water quality standards should reflect the minimum and maximum water quality parameters required to protect public health and safety, as well as the integrity and function of plumbing systems and devices. Where scientifically sound information is unavailable to establish standards, research should be undertaken to fill knowledge gaps.

**Sustainability**

Federal, state and local governments have established a variety of regulations to promote public health, safety and welfare and to protect the environment. Many different regulatory agencies, each with its own procedures, have jurisdiction over different aspects of building and infrastructure projects. Long, expensive delays often are imposed on building and infrastructure projects before approvals can be obtained from all regulators. Innovations for sustainability can exacerbate such delays. Modern information technologies, such as BIM, allow efficient sharing of pertinent information and can facilitate streamlining.

**Triple-Bottom-Line Definition of Sustainability**

The Institute and all other stakeholders concerned with sustainability need to be clear that a sustainable society and built environment meet the triple bottom line: human needs for economic growth, environmental stewardship and social progress. Therefore, the definition of sustainability should address the economic, environmental and social concerns of all stakeholders. Policy makers and members of the building community are encouraged to utilize a common definition for sustainability. A potential starting point is identified as follows:

- Sustainability is a set of environmental, economic and social conditions in which all of society has the resilience, capacity and opportunity to maintain and improve its quality of life indefinitely without degrading the quantity, quality or availability of natural, economic and social resources.

**Education/Training in Sustainability for Professionals and Technicians**

Knowledge and practice for sustainability are evolving rapidly; their successful application requires strong educational programs for the building community workforce (including programs for professionals, technicians and trades, and pre-
career and continuing education). Educational needs go beyond the workforce of the building community (designers, constructors, operators, maintainers and regulators) to include owners; real estate, finance and insurance industries; policy makers; and the general public. Sustained educational efforts are needed for building occupants and operators as building systems are upgraded and occupants and operators change.

The Consultative Council member organizations have the following links to educational activities on their websites:

AGC: Green Construction Education Program: www.agc.org/cs/gcep
AIA: Continuing Education System: Sustainable Design: www.aia.org/education/ces/AT=2587
ASCE: www.asce.org/education/continuing-education
ASTM: www.astm.org/commit/sustain.html
BOMA: 360 Performance Program: www.boma.org/getinvolved/boma360/Pages/default2.aspx
HVAC Excellence: www hvac excellence org
IAPMO: www.iapmo.org/pages/education-andtraining.aspx
ICC: www.iccsafe.org/Education/Pages
IES: www.ies.org/education
NIA: www.insulation.org/midg/

Recognition of Life-Cycle Performance by the Financial and Insurance Communities

Currently, in common budgeting practices there is an organizational disconnect between construction (capital) and operations. This disconnect decreases the ability to realize savings based on life-cycle costing. Sustainability requires achievement of economic, environmental and social benefits over the lifetime of a building or infrastructure project. Because people tend to focus on minimizing first costs and ignore externalities, they often perceive sustainability to seem un economical. Thus, mechanisms (e.g., budgets, insurance and tax incentives) are needed to facilitate the financing of sustainable life-cycle performance for buildings and related infrastructure. Life-cycle costs and the productivity and well-being of those served or affected by the project also need to be taken into consideration.

Champions of Sustainability in the Public and Private Sectors

Each group of stakeholders (at the national, state and local, industry and project levels) needs credible, knowledgeable, patient and charismatic leaders (“champions”). Substantial attention should be given to identifying, informing and empowering potential champions.

Recommendations:

• The Institute should work with organizations supporting development of more efficient regulatory processes that take advantage of digital technology. Organizations participating in the Consultative Council and other building community stakeholders (including regulators) should participate in such a process to assure inclusion of all important considerations.

• The Topical Committee should further its efforts to describe how individuals in the building community can contribute to sustainability.

• The Institute should produce a thirty-minute audio-visual module for educators to address sustainability and building sciences. The Sustainability Topical Committee will collaborate with the Education and Training Topical Committee and the Sustainable Building Industry Council (SBIC) in this effort.

• The Topical Committee will work with the Institute’s Council on Finance, Insurance and Real Estate (CFIRE) to promote recognition of life cycle economic, environmental and social performance when making finance and insurance decisions.

• Potential champions of sustainability should be identified in the High Performance Building Congressional Caucus; state and local government associations; the Institute’s Board of Directors and Consultative Council; professional societies and trade associations; and advocacy groups.

Consultative Council Member Organizations

ASTM International
American Institute of Architects
American Society of Civil Engineers
ASHRAE
Associated General Contractors
Building Owners and Managers Association, International
Construction Specifications Institute
ESCO Group
Extruded Polystyrene Foam Association
Glass Association of North America
Green Mechanical Council
HOK
Illuminating Engineering Society
International Association of Lighting Designers
International Association of Plumbing and Mechanical Officials
International Code Council
Laborers’ International Union of North America
National Insulation Association
National Opinion Research Center at the University of Chicago
United Association of Journeymen and Apprentices of the Plumbing and Pipefitting Industry

Consultative Council Officers

Chair: Doug Read, ASHRAE
Vice Chair: Ron King, National Insulation Association
Secretary: Tom Meyer, ESCO Group

Topical Committee Facilitators

Defining High-Performance & Common Metrics: Paul Mendelsohn and Jessyca Henderson, American Institute of Architects
Energy and Water Efficiency: Peter DeMarco, International Association of Plumbing and Mechanical Officials
Education and Training: Larry Bulman, United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry
Codes and Standards Adoption and Enforcement: Nancy McNabb, National Institute of Standards and Technology
Sustainability: Richard Wright and Michael Sanio, American Society of Civil Engineers
Existing Buildings: Ron Burton, Building Owners and Managers Association, International
## Statements of Financial Position

<table>
<thead>
<tr>
<th></th>
<th>September 30</th>
<th>2011</th>
<th>2010</th>
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<tbody>
<tr>
<td><strong>ASSETS</strong></td>
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<td><strong>CURRENT ASSETS</strong></td>
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<td><strong>PROPERTY AND EQUIPMENT</strong></td>
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<td>Furniture and Equipment</td>
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<td>Less Accumulated Depreciation and Amortization</td>
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<td><strong>LIABILITIES AND NET ASSETS</strong></td>
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<td><strong>CURRENT LIABILITIES</strong></td>
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<td><strong>Total Liabilities and Net Assets</strong></td>
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<td>$ 8,830,927</td>
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## Statements of Activities

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<th>September 30</th>
<th>2011</th>
<th>2010</th>
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<tbody>
<tr>
<td><strong>REVENUE</strong></td>
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<td>Contracts and Grants</td>
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<td><strong>EXPENSES</strong></td>
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<tr>
<td>Contracts and Grants</td>
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<td>Personnel</td>
<td>1,758,436</td>
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<td>Subcontractors and Consultants</td>
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<td>Other</td>
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<td>Institute Programs and Related Activities</td>
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<td>Personnel</td>
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<td><strong>Change in Net Assets</strong></td>
<td>$ 237,707</td>
<td>$(17,951)</td>
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</tbody>
</table>

The accompanying notes of the Institute’s audited financial statements are an integral part of these financial statements. For a complete copy, write to: National Institute of Building Sciences, 1090 Vermont Avenue, NW, Suite 700, Washington, DC 20005-4950
The Institute Staff

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President

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Executive Assistant to the President

Administration:

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Vice President/Chief Financial Officer

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General Counsel

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Director, Consultative Council/Presidential Advisor

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Editor/Director of Communications

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Director, Marketing & Publications

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Manager, Accounting and Network Resources

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Administrative Services Specialist

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Receptionist

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Program Director

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Program Director

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Program Director

Nanne Davis Eliot, NCARB, Esq.
Program Director

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Program Director

Drew Rouland, PMP
Program Director

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Director, Information Technology

Alynne C. Skrabalak
Assistant Program Director