New Buildings Institute hit a milestone at the end of 2012, turning 15 years old. Thinking back on the changes that have occurred related to energy efficiency in commercial buildings over that time, the contrast is striking. Back then there was no LEED, no 2030 Challenge. The electricity industry was restructuring and investments in energy efficiency programs were plummeting. Energy codes were set at ASHRAE 90.1 1989 levels, and even when adopted were not enforced in many places. There was a growing interest among designers for better energy performance in buildings, but whether that would coalesce to create something different—we had no idea.

Fast forward to 2012 when the LEED-certified buildings stock hits 2 billion square feet, energy code stringency is improved by over 30% and efficiency program investments top $9 billion. The American Institute of Architects has committed itself to 2030 zero-energy goals. And remarkably, the prospect of a zero energy building is no longer simply a vision. There are real buildings across the country—21 by our most recent count—that use only the amount of energy that can be generated onsite with renewable resources. We anticipate that list could approach 100 verified projects by the end of this year.

These significant changes have been relatively swift, which indicates that many people have worked tirelessly to make them happen. NBI’s staff and collaborators have been part of that transformation every step of the way during these past 15 years. This small, no-nonsense, nonprofit organization has filled the critical gaps in building science research turning experience into guidance for design professionals and next-practice offerings for efficiency programs. NBI’s policy development and codes advocacy is catalyzing shifts in state and local priorities and has literally changed the face of commercial building energy codes and programs.

Continued movement of the industry to a framework of targeted energy outcomes is a future focus for NBI. This approach relies on setting energy targets for individual buildings, and using measured data to assess how effectively a building is operating. Targeted energy outcomes will become a common link for application to codes, policies and programs and give us a mechanism for achieving net zero goals and addressing ongoing building energy use in the vast existing building stock—a critical component of success for U.S. climate policy.

NBI holds a unique position bridging the energy and commercial building industries. Recently, the staff and board took a step back to assess this position and how we could best realize our mission. We understand that NBI advances energy efficiency by leveraging our deep technical knowledge and our national network to define and share “What’s Next?” for high performance buildings. This is what you get when you support NBI and our work.

While the pages of this report highlight some of our accomplishments during the last year, we wanted to acknowledge the leadership and commitment of NBI staff and stakeholders. NBI’s greatest asset is the innovative thinking of its employees and the relationships they hold—very valuable indeed.

David Hewitt
NBI Executive Director

David B. Goldstein
President, NBI Board of Directors

For more information about NBI’s work, visit www.newbuildings.org
Zero energy buildings crop up
NBI released the first-of-its-kind cost study on zero energy buildings. The study, *Getting to Zero 2012 Status Update: A First Look at the Costs and Features of Zero Energy Commercial Buildings*, identified 21 buildings around the country that consume only as much energy as they produce on-site with renewable resources. The buildings studied had incremental costs for the efficiency measures ranging from 3% to 10%, with some showing no incremental costs. The study was conducted in partnership with the National Association of State Energy Officials (NASEO) and the Zero Energy Commercial Building Consortium.

Addressing office plug loads
With rapidly growing energy demand, office plug loads deserve attention. NBI worked with Ecova under a Public Interest Energy Research (PIER) grant from the California Energy Commission (CEC) to complete the 2011 *Commercial Office Plug Load Savings Assessment*, which characterizes electricity use of plug load devices in two LEED-certified offices in California and explores opportunities for plug load energy savings. Findings suggest low- and no-cost savings opportunities through software, hardware and behavioral changes that were developed into a *Best Practice Guide for Managing Office Plug Loads*. The Guide helps office and facilities managers, as well as occupants, reduce energy use through five simple steps: Review, Remove, Replace, Reduce, Retrain.

Pushing for outcome-based compliance in the IgCC
The first-ever International Green Construction Code (IgCC) was passed in the fall of 2011, including several proposals by NBI along with partners such as The American Institute of Architects (AIA) and BOMA International. These proposals supported standards for improved energy performance in buildings related to metering, daylighting and energy metrics. One proposal that was not accepted but which received substantial attention was an outcome-based compliance path that would pave the way for use of advanced efficiency strategies. This optional and alternate compliance path would have set energy use targets for many building types, allowing those projects to comply by demonstrating actual post-occupancy performance. The proposal now serves as a model for local jurisdictions.
Dynamic developments in codes draw attention at GreenBuild

The link between codes and green buildings made it into the mainstream with a Green Codes Summit preceding the 2012 GreenBuild conference. The first-of-its-kind gathering featured more than 50 speakers and covered tracks following code work in California, model codes (green, water, international), efforts by cities and states as well as building performance. The focus on codes at this premier green building event represented a true milestone demonstrating that energy codes, in the right framework, have the potential to move buildings into the realm of extremely low energy use. NBI was a sponsor of the event and supported the program development—with Executive Director Dave Hewitt and Technical Director Mark Frankel featured as speakers.

NBI research lab is test bed for advanced packaged rooftop HVAC technology

NBI conducted field tests on the Daikin McQuay Rebel to help Northwest Energy Efficiency Alliance (NEEA) and the Bonneville Power Administration (BPA) better understand and determine the energy performance of these units compared with basic rooftop units (RTUs). The testing monitored three 5-ton rooftop units to determine their performance efficiency both in controlled conditions at NBI’s on-site lab and then in commercial use in Idaho. In addition to the Rebel, NBI tested an energy code minimum efficiency Precedent unit from Trane and a high efficiency AAON RQ series unit. DX package RTUs are found on over 40% of Northwest rooftops—most of them six tons or less.

FirstView™ diagnostics identify problem areas in energy performance

The majority of commercial buildings have little or no readily available feedback on energy performance. FirstView, a diagnostic tool developed by NBI, provides building owners, energy efficiency professionals and designers a means to extract more targeted and useful energy performance information from basic data inputs. Beta testing of the tool on California buildings, with support from California’s PIER program, proved that FirstView can accurately create a simplified building energy model and quickly diagnose problems and opportunities for improvement. Using only monthly utility bills and a few building characteristics, FirstView also compares a building’s performance against peers.

Study spotlights significance of operations and occupant behavior on energy use

With growing energy needs to run plugged-in equipment and more complex HVAC and lighting control systems in today’s commercial buildings, architects and engineers can only go so far in delivering on energy efficiency. NBI, in a joint study with Ecotope, summarizes the significant impact of operations and occupant behavior on energy use compared to design characteristics in a report titled Sensitivity Analysis: Comparing the Impact of Design, Operation, and Tenant Behavior on Building Energy Performance.
Search for savings through Deep Energy Retrofits (DER)

NBI, along with partners Preservation Green Lab and Rocky Mountain Institute, has been taking an extensive look at the potential for deep energy retrofits in existing buildings. With support from the Doris Duke Charitable Trust, The Kresge Foundation, NEEA and others, this research has resulted in a study of building examples including 11 case studies of successful deep retrofit projects and expansion of the Getting to 50 Buildings Database. In addition, two national leadership summits—in 2011 and 2012—brought together a cross-section of disciplines to examine the opportunities for creating replicable solutions and catalyze action in DER.

COMNET spins off LEED Online Portal + MGP Guide

Efforts by COMNET to standardize building energy modeling have been realized by the release of two new resources: Modeling Guidelines and Procedures (MGP) and the COMNET Energy Modeling Portal for LEED Automation Online. Both tools help energy modelers develop consistent and more accurate energy savings assessments for efficiency measures in commercial buildings. The MGP can be used to help determine eligibility for tax deductions and calculate point eligibility for green building rating systems. The LEED Automation portal offers an automated service to collect energy modeling simulation results, perform quality assurance checks and submit the results for review. Next steps: The LEED portal concept can be adapted for use in utility new construction energy efficiency program compliance and by local governments for energy code compliance.

Advanced Buildings® adds daylighting resource to its design tools

Advanced Buildings now includes a daylighting resource called the Daylighting Pattern Guide, covering best practice in integrating natural light into new and existing building projects. The online, no-cost guide presents 19 examples of highly effective daylighting designs in buildings across the country to help industry professionals integrate proven daylighting strategies into commercial building projects.

Evaporative cooling shows promise in rooftop units

A field study for NEEA tested a third-generation indirect-direct (IDEC) evaporative cooler on a commercial building rooftop in Boise, Idaho. This unit features a high efficiency configuration that takes the well-demonstrated performance of the IDEC evaporative section and attaches it to an existing direct exchange (DX) rooftop unit (RTU). This study builds on previous research related to evaporative cooling but focuses on using controls technologies to optimize operation of the units. Final results are based on extensive metered data that was collected during the cooling season and demonstrated a 56% reduction in energy use and a 65% reduction in electric demand when compared to RTU-only cooling.
Statement of Financial Position + Activities

**Vision Statement**
NBI believes in a built environment that makes a positive contribution to a sustainable society through dramatic improvements in energy performance.

**Mission Statement**
NBI takes leading-edge practices and technology applications for high performance buildings and translates them into innovative and practical solutions for the energy efficiency and commercial building industries.

**Organizational Values**
- Credibility + Quality
- Innovation
- Independence
- Nimbleness
- Collaborative + Dynamic

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### Staff

- **David Hewitt**
  Executive Director
- **Cathy Higgins**
  Research Director
- **Mark Frankel**
  Technical Director
- **Rochelle Hale**
  Operations Director
- **Stacey Hobart**
  Communications Director
- **Peter Wilcox**
  Director of Market Integration
- **Bonnie Andrews**
  Administrative Specialist
- **Tracey Beckstrom**
  Senior Manager of Strategic Initiatives
- **Mark Cherniack**
  Senior Manager
- **Amy Cortese**
  Senior Manager
- **Sean Denniston**
  Project Manager
- **Jim Edelson**
  Senior Manager of Codes/Policy
- **Tammie Ellis**
  Accounts Payable/Project Associate
- **Heather Flint Chatto**
  Project Manager
- **Barb Hamilton**
  Senior Lighting Manager
- **Dan Harris**
  Project Manager
- **Susan Grant Harris**
  Communications Specialist
- **Pat Heatherly**
  Contracts Manager
- **Mark Lyles**
  Project Analyst
- **Howdy Reichmuth**
  Senior Engineer
- **Amanda Reynolds**
  Accountant
- **Marci Shuman**
  Project Analyst
- **Connie Umphress**
  Communications Specialist

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  American Council for an Energy Efficient Economy
- **Brendan Owens**
  U.S. Green Building Council
- **Kurt Stenberg**
  Consulting Engineer
- **Gregg Ander**
New Buildings Institute (NBI) is a nonprofit organization dedicated to improving the energy performance of commercial buildings. As a technical resource for governments, utilities, energy efficiency advocates and the building industry, NBI facilitates the transfer of ideas between these groups and collaborates to put the best innovations for advanced buildings into action. The following utilities and public benefits administrators are currently working with NBI, and we thank them for their support.