Getting to Zero begins with the end in mind

Increasing building energy efficiency is a process that we at New Buildings Institute have been active in for nearly 20 years. Whether driven by policy mandates, a corporate resolution, or by innovative engineers and architects striving for a better end result, NBI’s tools and resources can help. We offer methods of measurement and comparison, education, design guides and code development. Ultimately we are working toward dramatic reductions in energy use in the built environment so we recommend goal setting as the first necessary step. Whether the goal is designing to zero energy (ZE) or aiming for a lower energy use intensity (EUI) over time, starting should begin with the end in mind.

Comparing buildings becomes easier with common definitions and metrics. In 2016, the U.S. Department of Energy (DOE) established a common definition for ZE buildings. NBI participated in and supported the process by sharing experiences gained by working on ZE buildings since 2010. DOE released their definition for buildings, campuses, and communities, choosing “Zero Energy Building” as the preferred terminology. Along with the ease of common definitions to help propel zero energy performance, practitioners have been looking for a common metric to clearly relate energy performance.

The Zero Energy Performance Index (zEPI) was designed to do that. zEPI provides a scale for ranking commercial building energy performance from 100 to 0, with 100 being the average energy usage from the 2003 Commercial Buildings Energy Consumption Survey and 0 representing zero energy. A lower zEPI score indicates lower energy consumption and negative means the building produces more than it uses. zEPI was conceived by NBI Fellow Charles Eley, and further developed by NBI.

Research into technologies, trends and grid interaction shows what is fueling the growth of ZE. NBI’s latest building count in conjunction with our 2016 List of ZE Buildings shows growth in numbers, locations, types and sizes of commercial ZE buildings. Of buildings surveyed across North America, the report finds the number of projects achieving or pursuing ZE have more grown 74% since the last list was released in 2015. Education buildings such as K-12 schools and universities, continue to make up the single largest category in this year’s list at 38% of all ZE verified and emerging buildings.

In late 2015, NBI completed the Zero Net Energy Building Controls research project on behalf of Continental Automated Buildings Association (CABA). The study includes characteristics, energy impacts and lessons learned on

![ZEB Controls Diagram](image)

zEPI sets a constant goal of zero and shifts the conversation from percent better than code to percent from zero.
In 2015 we listed 191 ZE Verified and Emerging projects whereas this year we list 332, an increase of 74% in a single year!

advanced control systems in 21 of today’s leading buildings that are transferable to the greater small commercial marketplace. Proper grid integration techniques call for a building that is consuming and producing energy when needed to distribute that energy out to the wider grid, acting as a non-utility owned power resource.

A 2016 white paper by NBI, Zero Net Energy Buildings and the Grid describes a framework for employing design strategies and efficiency measures that ensure buildings of the future can benefit from and support grid modernization efforts.

California leads the country in ZE policies and projects, other states looking to replicate successes. To honor California’s early innovation and leadership in the K-12 and community college market, the state’s investor-owned utilities (IOUs), the California Public Utilities Commission (CPUC), and other agencies launched a recognition program and zero energy leadership awards to showcase the people, buildings and policies that are driving this new standard for school environments. NBI is administering the program on behalf of the IOUs, under the Proposition 39 ZNE School Retrofit Pilot Program, and the CPUC. These inaugural awards were presented on Nov. 2, 2016, during the 2016 Green California Schools and Community Colleges Summit in Pasadena, Calif. Also in support of Proposition 39, NBI staff held a series of 12 workshops supporting the program goals of getting school building stock to zero energy performance. These workshops targeted building designers as well as school administrators and community members interested in advocating for ZE retrofits to their school building.

ZNE Leadership Award honorees at the 2016 Green California Schools and Community Colleges Summit in Pasadena, CA.
NBI is leveraging all of this experience in schools in California with the U.S. Department of Energy (DOE) as national partner for the Zero Energy Schools Accelerator (ZESA). ZESA is an “ongoing strategy to advance energy efficiency in the new construction market and accelerate the market adoption of zero energy buildings.”

Cities and states across the country are stepping into the ZE space. The City of Cambridge, Mass. utilized NBI’s building energy assessment tool, FirstView®, as part of a municipal facilities assessment plan to assist municipal building managers in prioritizing buildings for ZE. Along with the assessment, NBI facilitated a series of four workshops that were designed to explore best practices in energy efficiency, greenhouse gas emissions reductions, resilience, accessibility, historic preservation and community value. Rhode Island and the City of Providence also sought help on their path forward to ZE. NBI worked with the Rhode Island Zero Energy Buildings Taskforce to conduct research to reveal current market barriers and opportunities to help provide the contextual and technical basis for advancing ZE in the state.

NBI continued its tradition of convening energy efficiency thought leaders with a 2016 Getting to Zero National Forum in Denver. The event gathered just over 400 enthusiastic attendees including designers, utility employees, owners/operators and others looking to learn the latest techniques and technical applications for getting to zero. The two-and-half day event kicked off with workshops and tours of successful ZE and high performing buildings in Denver and the surrounding area. Shortly after the Forum, ComEd, Seventhwave and NBI hosted a Real Estate Leadership Summit in Chicago, Ill., focusing on the question: “What is Chicago’s path to net zero energy buildings?” Nearly 90 real estate professionals, designers and utility representatives gathered to focus on how they might build capacity for zero energy buildings in the region.

402 attendees
102 presentations
25 sessions
5 tours

GETTING TO ZERO NATIONAL FORUM 2016

Chris Pyke of GRESB, Darlene Pope from JLL, and Kevin Kampschroer US General Services Administration speak at the closing plenary Cost + Value: Making the ZNE Investment.
Leading with stretch and multifamily codes

NBI’s tradition of Code and Policy innovation includes stretch codes for innovative cities looking to increase energy efficiency in local building stock and municipal portfolios.

Along with stretch codes, Community Building Renewal promises to make great gains for municipal portfolios. Stretch codes are proving to be effective ways to direct municipal energy goals and the goal of lower energy use in buildings. Working with the Northwest Energy Efficiency Alliance (NEEA), NBI highlighted the issues, priorities, and sequences that will lead to success in meeting legislated targets for code in the Washington State Energy Code Roadmap.

NYSERDA has tapped NBI’s success in the roadmapping process to help New York State get stretch codes in place that will push code in the state to 20% better than the current baseline.

NEEA and NBI have also developed a pilot program to help jurisdictions adopt meaningful policies to address the performance of public building portfolios. Using the FirstView tool, municipal buildings are evaluated and prioritized to identify where limited financial resources can be most effective in improving building performance. Bosie, Ida. and Tacoma, Wash. were among the first cities to pilot this program.

Multifamily code eyed for improvements to aid in clarity; new NBI tool helps track code and policy measures for best results. In 2015 NBI drafted and presented the first public “strawman” of a proposed section for multifamily buildings in the 2018 International Energy Conservation Code (IECC) to the Department of Energy’s Denver Energy Codes Stakeholder Meeting. This section would have created a unique multifamily chapter in the IECC energy code. Though it did not pass, NBI staff continues to pursue adoption locally.

Our Multi-Measure Matrix (M3 Tool) is an inventory of measures that appear in energy codes and standards as well as measures that are under development. This dynamic tool allows NBI to track and compare innovative and new code approaches to the most current iteration of base codes and standards. It provides utilities, cities and states with insight into the most impactful measures for their specific situation.

To see NBI’s Case Study on the zHome Multifamily Complex visit: newbuildings.org/hubs/zero-net-energy/#case-studies.
Deep energy retrofits move into spotlight

Deep energy retrofits continue to be a critical opportunity for energy efficiency improvements. With the vast majority of square footage found in existing building stock, NBI continues to focus on this sector.

**NBI staff working to make all buildings perform like new buildings.** CEO Ralph DiNola visited Washington DC in 2015 to brief congressional members on the work needed to bring existing buildings to the efficiency levels of new construction. The Alliance to Save Energy hosted the event in which Ralph outlined the actions needed to push for greater efficiency in retrofits.

**NBI has a long history creating solutions for the small and medium business (SMB) market.** These buildings are typically less than 50,000 square feet yet make up 98% of the U.S. commercial buildings and 45% of floor space. In September 2016 NBI with Ecology Action completed a three-year DOE funded project, called SmartScale, that shares a model for energy efficiency improvements in a wide-range of SMB building types.

**NBI’s New Construction Guide has been approved by the U.S. Green Building Council (USGBC) as a LEED Pilot Alternative Compliance Path (ACP).** By following the prescriptive path in the Guide, projects can earn up to 10 energy points in LEED v4. This adds to the ways builders can get credit for using the guide in their design process. Architecture 2030 has endorsed a prescriptive path to meet the current 2030 Challenge goal based on the Guide.

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There are 5.5 Million existing commercial buildings in the U.S. We will spend over $1 trillion on construction in 2015 with only about $50 billion focused on energy retrofits of commercial buildings. The savings potential is equivalent to 30% of annual electricity spending, and would create more than 3.3 million job years.*

*According to Deutsche Bank

An investment of less than $300 billion in existing building retrofits would yield more than $1 trillion in energy savings over 10 years.*

*The replacement rate (demolition & new construction) is less than 2% per year. This leaves a vast amount of outdated technologies in current building stock.*

newbuildings.org
NBI approaches 20 years

NBI adds dedicated individuals to its board of directors and group of Fellows. NBI’s Board of Directors has gained new members in Peter Turnbull from Pacific Gas and Electric, Patrick O’Shei from NYSERDA, Nancy Jenkins Ander with California Department of General Services, and Mark MacCracken of CALMAC. These individuals bring with them great wealth of experience and wisdom to guide NBI into its 20\textsuperscript{th} year and beyond. As our board has grown so has the group of NBI Fellows. We currently have three Fellows who support NBI’s mission. Most recently, former NBI Executive Director Dave Hewitt accepted the Fellows title as he continues to support the organization’s work.

NBI Director of Codes and Policy Jim Edelson receives the honor of the Jeffery A. Johnson Award. Jeff Johnson was NBI’s founding Executive Director, an avid outdoorsman who worked to protect the natural environment through better energy efficiency in the built environment. NBI is pleased to have the award “at home.”

In July 2015, NBI moved from Vancouver, Wash. to downtown Portland, Ore. This move places the organization within a quick walk of clients, sponsors, and partners to make the collaborative nature of the building sector easier to tap into.” The move to Portland allowed NBI to enter the 100 Best Nonprofits to work for in Oregon survey by Oregon Business. NBI ranked #25 under “Small Organizations: Fewer than 20 Oregon employees” in this inaugural entry.
## FY 2015-16

### Audited Financial Statements

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2015 NBI Board of Directors at new Portland, OR office.

*As of 12/2016

NBI Fellows are luminary energy efficiency professionals who have provided a significant contribution to society through their leadership, dedication and groundbreaking work. They serve as ambassadors, representing and supporting the organization’s mission and collaborating with NBI partners to advance energy efficiency in buildings.

**Fellows**

- **David Goldstein**
  Co-Director, Energy Program
  Natural Resources Defense Council
  President

- **Michael McAteer**
  Director, Commercial Energy Efficiency Services
  National Grid
  Vice President

- **Ed McGlynn**
  Vice President of Commercial & Industrial Product Management
  Franklin Electric
  Treasurer

- **Doug Baston**
  President
  North Atlantic Energy Advisors
  Clerk

- **Gregg Ander**
  Consultant

- **Marge Anderson**
  Executive Vice President
  Seventhwave

- **Jeff Harris**
  Chief Transformation Officer
  Northwest Energy Efficiency Alliance

- **Nancy Jenkins Ander**
  Deputy Director of Sustainability
  California Department of General Services

- **Patrick O'Shei**
  Director of Market Development
  NYSERDA

- **Brendan Owens**
  Chief of Engineering
  U.S. Green Building Council

- **George Malek**
  Energy Efficiency Director
  ComEd

- **Steve Nadel**
  Executive Director
  American Council for an Energy Efficient Economy

- **R.K. Stewart**
  Fellow since 2012

- **Charles Eley**
  Fellow since 2014

- **Dave Hewitt**
  Fellow since 2015

*From Left Back row: Jeff Harris, Marge Anderson, Gregg Ander, Nancy Jenkins Ander, Jan Berman, John Wilson, George Malek Front Row: David Goldstein, Michael McAteer*
Staff

Ralph DiNola
CEO

Jim Edelson
Director, Codes and Policy

Mark Frankel
Technical Director

Cathy Higgins
Research Director

Stacey Hobart,
Communications Director

Amy Cortese
Associate Director

Webly Bowles
Project Manager

Kevin Carbonnier
Project Analyst

Sean Denniston
Senior Project Manager

Heather Flint-Chatto
Project Manager

Anna Gabis
Controller

Susan Harris
Communications Specialist

Reilly Loveland
Project Analyst

Mark Lyles
Project Manager

Alexi Miller
Senior Project Manager

Jackie Waadevig
Office Administrator

Connie Umphress
Communications Manager

To read staff bios please visit the About Us section at newbuildings.org.

*As of 12/2016
“With the assistance of NBI’s network of energy and facilitation experts, we have been able to help identify expertise to help train state building professionals. The resources shared through NBI’s extensive energy and ZNE research efforts are a great benefit to not only California building professionals, but across the country.”

Dan Burgoyne, Sustainability Manager,
State of California Department of General Services, Office of Sustainability

“We were all very impressed by your team’s willingness to listen to our feedback/concerns and customize solutions to meet our needs. The result was a very successful project that delivered several outcomes that will positively affect our City in the decades to come.

Steve Burgos, Environmental Manager, City of Boise

To see NBI’s Verified ZE Building Case Study on 435 Indio Way visit: newbuildings.org/hubs/zero-net-energy/#case-studies
mission

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.

vision

We believe in a built environment that makes a positive contribution to a sustainable society through dramatic improvements in energy performance.