What’s New?
Recent Developments at NBI

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New Buildings Institute

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NBI Update

Today’s Topics:

- Who is New Buildings Institute?
- Our Role in Energy Efficiency
- Some Recent Accomplishments
- Our “Next Practice” Initiatives
Who’s NBI?

- NBI is a non-profit “think tank” devoted to being a driving force for efficient buildings
- We focus on small and mid-size commercial buildings
- Our interest areas include:
  - Advancing effective building codes
  - Design guidance for new buildings
  - Optimal operation of existing buildings
- Based in Vancouver, WA, NBI works across the US and Canada
What We Do: Research

Looking into new technologies, practices, and policy options that promote efficiency
What We Do: Development

Developing the raw research data into something that’s more widely understood.
What We Do: Guidance

Research → Development

Providing Guidance for Utility Program Deployment

Deployment → Deployment
What We Do: Standardization

Turning the Lessons Learned into Codes and Standards
Completing the Circle

NBI’s Objective:
Finding what’s Possible,
Proving the Concept and
Helping make it Practical

Research | Development
Standardization | Deployment
Utilities Under Pressure

Utilities face competing demands:

- Increased energy savings goals
- Decreased savings potential (due to new codes and standards)
- Many new efficiency technologies
- Options for new program delivery channels
Increased Expectations

Larger budgets come with higher goals

Source: CEE
Decreased Opportunities

Energy Savings
ASHRAE 90.1 - 2004 Baseline

25% Savings
(25% cut in program potential)
NBI provides program guidance leads codes … allowing some utilities to claim credit for code energy savings
Recent NBI Accomplishments

Systematic approach to highly efficient commercial buildings including:

- Deep Savings Case Studies
- FirstView™ Building Diagnostics
- Producing Plug Loads Guide
- Field testing high performance RTUs
- Creating a Daylighting Pattern Guide
- Hosting Deep Savings Summits
Next Practice in EE Programs

“The future is not what it used to be” Mickey Newbury

Energy efficiency will be different in the future. We won’t be able to succeed with the technologies, programs, and approaches that we have used in the past.

Some future trends include:

- Significant Advances in Lighting
- Vast Opportunities in Rooftop HVAC
- Deeper Savings in Existing Buildings
- More Focus on Multifamily Properties
- A Push for Better Building Designs
Next Practice Objectives

- Guidance and supplemental materials *serve as the technical basis* for next practice in commercial efficiency programs
- Support with implementation framework and approach to market strategies
- Market integration with key allies and partners
- Address regulatory barriers such as codes and cost-effectiveness
Next Practice Objectives (cont.)

- Establish and maintain key national linkages to leverage effectiveness
- Facilitate information sharing through a network of partners (sharing success stories and lessons learned)
- Support the application of initiative resources
Next Practice Initiatives

Shaping the future of energy efficiency programs in five key areas:

- Advanced Lighting/Controls
- Commercial Rooftop HVAC
- Deep Savings in Existing Buildings
- Saving Energy in Multifamily Properties
- High Performance New Construction
Advanced Lighting/Controls
Advanced Lighting/Controls

- **Primary Objective**
  Build on and integrate ALG Online as a program resource. Focus on the value and application of solid state and advanced light sources and more advanced control strategies that will play a key role in future commercial efficiency programs.

- **Other Allies/Funding Sources**
  PNNL, CEE, Enlighted, Osram-Philips, NEEA, Design Lights Consortium, California Lighting Technology Center, D&R Int’l, and current ALG Online subscribers
Lighting Power Density

Average Hourly Power Density on Weekdays at the Cadillac Fairview Office (W/SF)

45% savings
Additional Controls Savings

Average Hourly Power Density on Weekdays at the Fred Hutchinson CRC Office (W/SF)

- Existing System (weekday)
- Adjusted Baseline (weekday)
- Out of Box (weekday)
- User Preference (weekday)

Additional 40% savings
Commercial Rooftop HVAC
Commercial Rooftop HVAC

- **Primary Objective**
  Create a multi-stage approach to rooftop HVAC with options covering repairs, retrofits, and replacement.

- **Other Allies/Funding Sources**
  NEEA/Bonneville Power/Idaho IDL
  NWPCC Regional Technical Forum
  Western Cooling Efficiency Center
  National Labs (NREL, PNNL, ORNL)
  Consortium for Energy Efficiency
  Energy Trust of Oregon
What’s Coming Next

RTU Measured Savings Protocol

- NBI will publish a white paper on an approved protocol for obtaining field measured savings from various RTU repair, retrofit or replacement strategies.
Initial field testing shows impressive results. **Energy savings of 30% or more** over a code-base baseline unit (even without utilizing the most advanced variable supply fan controls).

Found **significant afternoon peak demand reductions** shown too.

Source: Daikin McQuay
Deep Savings in Existing Buildings
Existing Building Efficiency

- **Primary Objective**
  Develop new information and tools to support deep savings in existing commercial building programs.

- **Other Allies/Funding Sources**
  Doris Duke and Kresge Foundations, CEC PIER Program, Ecova, Urban Land Institute GreenPrint Center for Building Performance, Ecology Action, Rocky Mountain Institute, Weidt Group, National Trust for Historic Preservation – Preservation Green Lab, PNNL, NEEA
Key Strategy Areas

- **Simplified Solutions**
  - Plug Loads Guide
  - FirstView Diagnostics tool
  - Energy Solutions Predictor (ESP) tool

- **Bright Spots**
  - Sensitivity Analysis
  - Case Studies and Database
  - The Case for Small Owners

- **Urban Scaling**
  - Urban Strategy Guide
  - Real Estate Metrics
Deep Savings Case Studies

Deep Energy Savings in Existing Buildings Case Studies

Why High Performance
Webinars
Projects + Case Studies
Getting to 50 Buildings Database
Existing Buildings Case Studies
Net Zero Case Studies
Daylighting Case Studies
Research

Eleven Case Studies from:
A Search for Deep Energy Savings in Existing Buildings
September 2011
Research and findings in support of Nation's Existing Building Energy Initiative and NBI's Saving 50 projects
Multifamily Energy Efficiency
Multifamily Properties

- **Primary Objective**
  Expand our building prototype models to include the underserved multifamily sector – both new and existing properties – with better market connections and more technical tools.

- **Other Allies/Funding Sources**
  MacArthur Foundation
  Enterprise Foundation
  National Multifamily Housing Council
  CNT Energy
  ACEEE
Energy-Saving Potential

Annual Potential Savings from Multifamily Buildings by State
at 15% electricity and 30% natural gas efficiency improvement

Source: ACEEE and CNT Energy
High Performance New Construction
New Construction

- **Primary Objective**
  Build on our Core Performance® technical guidance to deliver the next set of integrated design features and advance program strategies that can ultimately lead to net zero buildings.

- **Other Allies/Funding Sources**
  USGBC (Core Performance® LEED energy credits)
  D&R International (research partner)
  Advanced Building network/sponsors
Core Performance

A supplement aligned around the IECC 2012 code is now available.
Zero Net Energy

If “less is more”, zero is ideal. NBI’s aiming for ZNE commercial buildings

- Partnering with NASEO
- Planning to create a national ZNE registry
- Hoping to create more ZNE case studies
- Possible ZNE Technical Guides
  - K-12 Schools
  - State/Local Governments
Daylight Pattern Guide

Pattern 2: Window Area (Horizontal Windows)
30% Glazing Area

A horizontal band of windows at 30 percent of the wall area provides daylight illumination that meets or exceeds commonly accepted minimum daylight illumination criteria at approximately 55 percent of the adjacent 24-hour section. Excessive contrast remains between the interior surfaces and the glazing. The interior surfaces are beginning to receive some illumination to balance the contrast with the windows. This is most noticeable on the 'cast' wall at left.
Initiative Development Partners

Full Funding Partners

- Efficiency Vermont
- National Grid
- NYSERDA

Plus other commitments still pending
Initiative Development Partners

Partial Funding Partners

- ComEd
  (New Construction, HVAC)

- SMUD
  (Lighting)

Plus other commitments still pending
Additional Partners Welcome

It’s not too late for others to join NBI in shaping the next practice for the future.
Partnership Options

- **Partial funding partners** can participate in the co-creation of tools and guidance for the specific initiatives they choose to fund.

- **Full funding partners** can participate in all five initiatives with the same early involvement, early use benefits.

Note: Full partners enjoy a sizable discount over those funding individual initiatives.
Questions?

If you have any questions, please pose them now or feel free to follow-up with NBI later. Direct your questions to:

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Thank You

“Coming together is a beginning. Keeping together is progress. Working together is success.”

Henry Ford
Building Energy Signatures

Using monthly billing data (both gas and electricity), FirstView creates a building “signature” showing performance relative to outside temperature … and providing a “first view” of the building’s key areas for improvement.
Plug Load Guide

Plug loads are one of the largest and fastest growing end uses in commercial buildings.

Source: Graph created by Ecova with data from EIA 2008 Annual Energy Outlook
Thought Leader Summits

- **Boulder** (2011) – Convened national experts in critical aspects of energy efficiency in existing buildings including program design, implementation, and more.

- **New Orleans** (2012) – Held a “deep savings” summit focused on sparking action and creating scale for deeper efficiency in commercial building