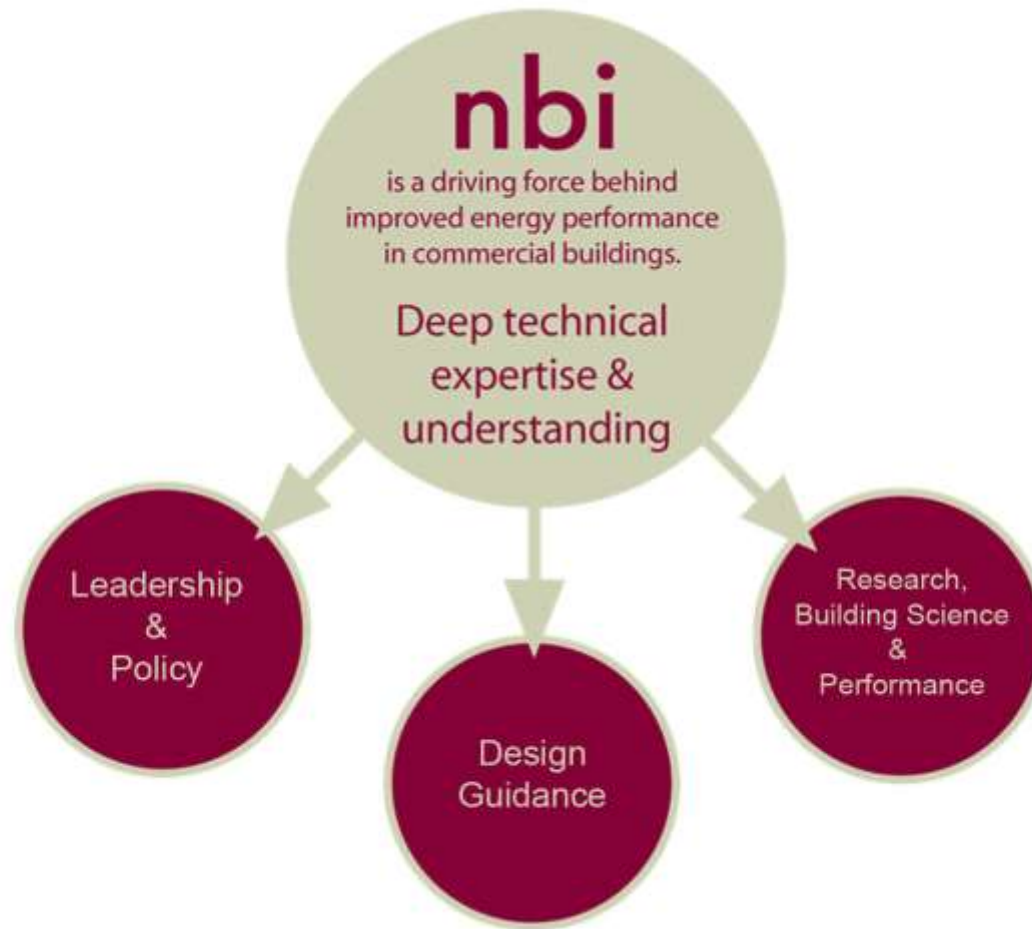


Net Zero Energy Buildings Action Plan and Policy Toolkit

Setting Big Goals to drive
energy efficiency policy

Nature of Our Work



NBI's Work to Support ZNE

- NBI is working with the National Association of State Energy Officials to develop a “ZNE Policy Toolkit” for States & Local Governments w/ Communications
- NBI will be tracking ZNE buildings and the most efficiency commercial buildings in the country
- NBI working on Deep Savings in Existing Buildings
- NBI working on the next generation of energy codes
- NBI working with utilities on “Next Practice” programs

Getting to Zero Report



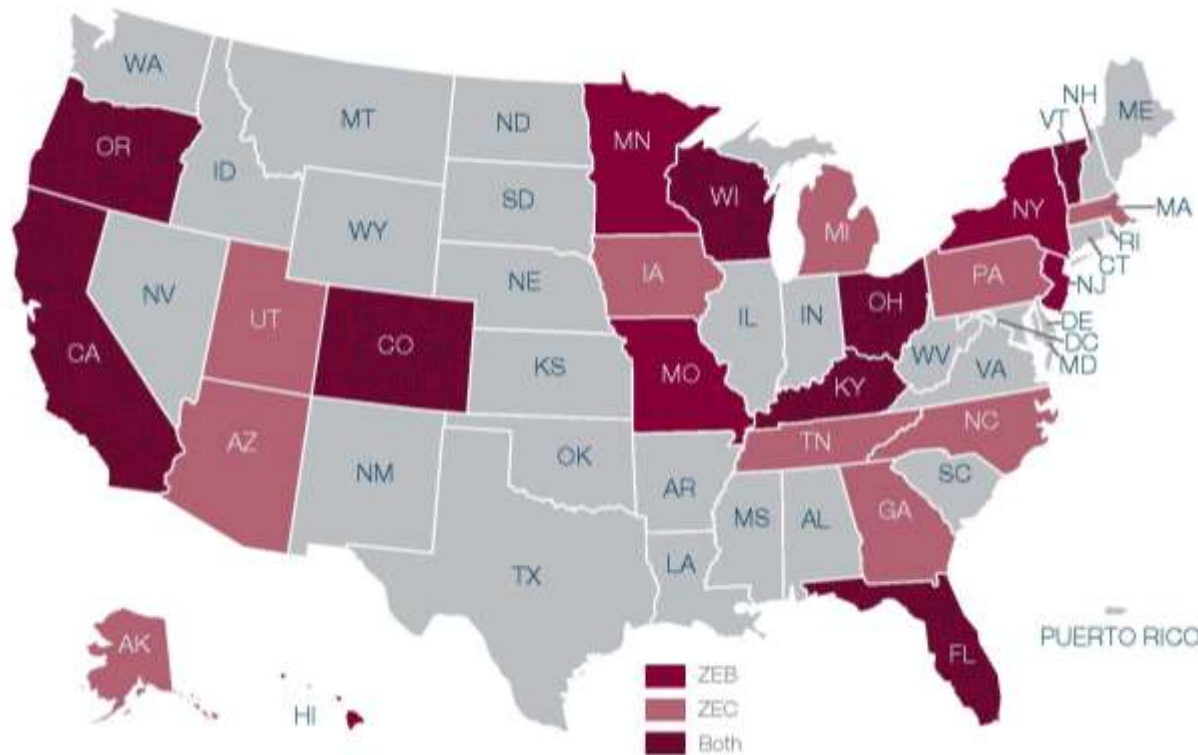
- Size and source of available quality data
- Energy efficiency measures
- Estimated incremental costs from model-based studies
- State policies and program support

NZE Definitions

- **Net Zero Energy Buildings (ZEB)**
 - *Buildings with measured results and a few modeled buildings; meet annual needs with on-site renewables*
- **Zero Energy Capable Buildings (ZEC)**
 - *Demonstrated efficiency in range of ZEB's but w/no renewables*
- **Zero Energy Equivalent Buildings (ZEE)**
 - *Low-energy building that gets (investment grade) renewable energy from off-site, either the grid or a shared renewable generator*

What We Found

Location of the 60 zero energy and ZEC projects



- 21 buildings had sufficient data to call them ZEBs
- 39 buildings are recently constructed or in process with ZEB intentions
- 39 buildings are ZECs – Zero Energy Capable efficiency levels

Status of ZNE Buildings in US

- 99 ZNE, emerging ZNE, or ZNE capable buildings identified in January.
- ZNE buildings now in 35 states – CA & OR lead
- Moving into more “normal” buildings
- Incremental costs of 3 percent to 7 percent for several common building types.

What We Found: Built Examples



1. All buildings use PVs to generate on-site renewable energy
2. Buildings use readily available technology and integrated design
3. Unique or experimental systems are infrequently used
4. Priority attention to E.E. details include minimizing plug loads and other “unregulated” loads

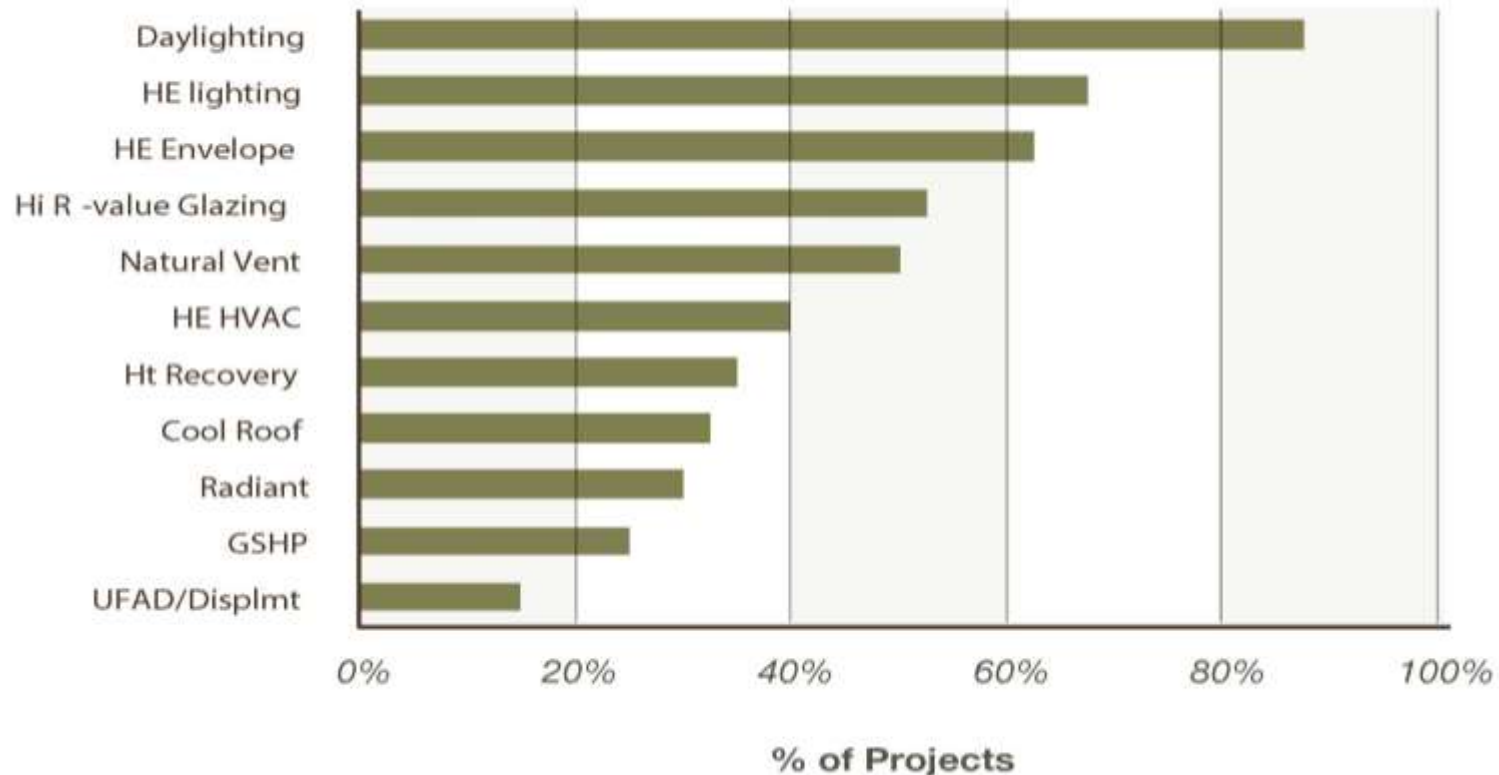
What We Found: Built Examples



5. Vast majority of ZNE buildings are small or very small
6. Beginning to see buildings supported by program efforts – i.e. Living Buildings, Energy Trust of Oregon, Savings by Design
7. Earliest are academic buildings, environmental centers, or demonstration buildings with low occupancy
8. More recent include office buildings, K-8 schools, a credit union, and buildings that represent a large number of average buildings

What We Found: Energy Efficiency Measures

ZEB and ZEC Buildings: Technology Penetration



What We Found:

Measuring the Costs of ZEBs

Difficult to isolate cost of individual measures

- Deep energy savings require IDP that considers interaction of measures.
- Incremental cost must be based on a hypothetical comparison to “what would have been built”
- Even when attempts at costs and savings are made, changes are often not tracked through many revisions
- Building costs vary by climate, location and date of construction
- Good data on a few projects, but hard to generalize

ZNE & ZEC Buildings are Possible & Visible in Many Building Types Across the US



Small-Med Commercial Offices



K-12 Schools



Large Office Facilities



Environmental Centers



Higher Education Institutions



Government Offices

Conclusions

- Examples are expanding and are more representative. A “second generation” of more typical building types and ownership patterns is emerging.
- More about integrated design than technology innovation
- Built ZEBs examples too limited, too diverse to conclude much on costs
- EE needed is readily available at reasonably incremental cost for some building types
- States and cities leading critical policy and program efforts

ZNE Policy Efforts

- National ZNE Planning
 - Commercial Buildings Consortium, NASEO Toolkit
- State ZNE Planning
 - CA, Mass, Pima County, AZ
- ZNE and stretch energy codes
 - Massachusetts, OR, CA
- Executive Orders
 - CA, GSA, DOD
- Performance Disclosure - SF, NYC, many others

The Current Effort

- National Zero-Net Energy Action Plan - expand and accelerate net-zero energy commercial building policies and programs that result in a significant increase in the development of new & existing NZE commercial building projects
- Lack of national leadership and funding of advocacy efforts inhibits the advance of ZNE projects nationwide
- NASEO and NBI working together to :
 - Assess desirability of a National ZNE Action Plan
 - Identify potential elements it should include
 - Develop Policy Toolkit – including communication tools
- Two Workshops:
 - San Francisco - July 24th
 - Washington, DC – October 16th
 - Discussions include:
 - Review current state ZNE movement
 - Discussion of structure a national ZNE initiative & success factors
 - Strategies for communications and driving demand
 - Current barriers to widespread ZNE adoption
 - Tools that could help state and local governments advance ZNE

Measures of Success

- Energy budgets become commonplace for every building team's program and overall budget
- Benchmarking of a building's energy performance is known and communicated
- Building energy codes shift from a prescriptive model to a performance-based model
- ZNE becomes linked with certification systems, such as LEED and ENERGY STAR
- A significant percentage of Fortune 500 companies and governmental organizations own and/or operate a ZNE building as well as floor space
- Governors, Mayors & CEOs become champions for ZNE
- Occupant comfort & productivity become credible, widely-accepted NZE benefits
- Designers and owners integrate features that will accept advancements in technology
- ZNE elements spill over into people's lifestyle and decision making
- A "high-quality" building becomes synonymous with ZNE

Communications & Demand

- Development of a common language
- Market Segmentation & Stakeholders
 - Governors, Mayors, Legislatures / City and County Councils
 - Directors of State Energy Offices, Building Officials, Building / Planning Code Developers
 - Utilities
 - Building owners
 - Tenants
 - Investment capital firms / Lenders
 - Architects and Engineers
 - Builders and Contractors
- Core Messages for Specific Markets

Barriers to Advancing NZE

- Design / Construction Barriers
 - Practice standards
 - Technologies
 - How buildings operate
- Information / Data Barriers
 - Lack of benchmarking data
 - Lack of performance
 - Lack of cost data
 - Lack of case studies of completed projects
- Resistance from Key Stakeholders
 - Political Leaders
 - Owners
 - Lenders / Investors

Potential Tools / Strategies

- Utilities Coordination
- Benchmarking Ordinances
- Advanced Energy Codes
- Model Ordinances : tax abatement programs, Property Assessed Clean Energy (PACE) programs, tax incentive financing structures (TIFS) and model urban tax policies
- Research on the cost-effectiveness of ZNE approaches
- Building operator certification of ZNE buildings
- Tips and tricks/best practices for achieving ZNE based on case studies
- Alternatives to cost-effectiveness that include non-energy benefits
- Building operator certification of ZNE buildings

ZNE Policy Trajectory

DRAFT

ZERO NET ENERGY POLICY TRAJECTORY FOR STATE & LOCAL GOVERNMENTS

ZNE POLICY- ENACTMENT
Establish ZNE Goals & Metrics
eg. CA AB 32, OR SB 79, MA Directive



	Initial		Mid-Term		Long-Term
Data Policy	Data reporting and Standardization	→	Disclosure Ordinances (eg NYC, SF)	→	Establish Data Collection Policies and Protocols
Public Buildings Policy	Require data reporting, Meet minimum performance Procurement, Operations	→	Feedback and Diagnostics, Minimum 75% reduction Green Leasing	→	Net Zero requirement / "Lead by Example"
ZNE Buildings Policy	Adopt Base Codes Revise Base Codes (4x to Step Down to Zero)	→	Adopt Stretch Codes Optimized ZNE code	→	Revise Stretch Codes (3x to Step Down to Zero)
ZNE Appliance Policy	Enact Appliance Standards	→	Revise Standards and Add New Appliance Categories		
Renewables Policy	Remove Existing Code Barriers	→	Adopt Renewables Ordinance	→	Create Incentives for Renewables
Programs in Support Financial	Property tax abatement Utility incentives	→	Create Utility Incentive Programs Loan Funding	→	
Programs in Support Technology	Create Technology Demonstration and Deployment	→	Create Economic Program Strategy tied to ZNE	→	
Programs in Support Outreach	Develop Outreach and Education Programs	→	Develop Industry Education Programs	→	

Please Join the Discussion

**Getting to Zero Report and additional information
available at**

<http://www.newbuildings.org/zero-energy>

And share your NZB stories with us there too!