
Getting to Zero 2012 Status Update: A First Look at the Costs and Features of Zero Energy Commercial Buildings

SUMMARY

New research by the New Buildings Institute (NBI), with support from the Zero Energy Commercial Buildings Consortium (CBC) and the National Association of State Energy Officials (NASEO), takes the most comprehensive look yet at the growth in zero energy commercial building projects in cities across America.

Getting to Zero 2012 Status Update: A First Look at the Costs and Features of Zero Energy Commercial Buildings steps beyond the studies of individual projects, with a first-of-its-kind national survey of the diverse ways architects and builders are developing structures that are so energy efficient they use no more energy over the course of a year than can be generated by on-site renewable resources.

The report provides analysis of the cost implications of zero energy buildings and identifies technologies and design features commonly found in these structures.

SCOPE

The report draws on data from **60** completed projects across the country, that fall into two principal categories:

Zero Energy Buildings (ZEBs): commercial buildings that are already achieving net-zero energy consumption;

Zero Energy-Capable buildings (ZECs): commercial buildings that achieve energy performance similar to ZEBs and could achieve net-zero energy consumption with the addition of on-site power generation.

An additional 39 buildings were identified as possible ZEBs, however were not included in the report analysis as they are under construction or recently completed with limited performance data.

MAJOR FINDINGS

Among the significant findings in the report:

- **Growing Trend:** While the number of verified¹ ZEBs remains relatively small, they are increasing in number.

¹ The study focuses on structures where researchers were able to obtain reliable energy consumption and generation data. Because this information is not uniformly available, the actual numbers of ZEBs and ZECs is likely to be substantially higher than number of the verified projects.

- **Zero-Energy is Achievable for *Many* More.** The efficiency levels needed for ZEBs are readily obtainable with current technology and at reasonable incremental costs for many common building types.
- **Incremental Costs are Within Range.** Modeling studies indicate incremental costs for efficiency features of between 3% and 18%. Deriving incremental costs from the few ZEBs that had data was difficult because of the limited information. However, the few reported ZEBs appear to show lower overall incremental costs than the modeled estimates. Those costs are between 0% and 10%.

A study of construction costs of ZEB building on Stanford University's campus found no correlation between whether or not a building was constructed to achieve zero energy and the cost per square foot. Another study of the Hudson Valley Clean Energy Headquarters in New York found that the monthly energy savings exceeded the increased mortgage costs resulting from ZEB by **\$139/month**.

- **Well-Established Technologies and Design Strategies Responsible for Most Energy Savings.** Common design strategies and materials are employed by architects and builders to achieve energy savings. Daylighting, high efficiency lighting, high efficiency envelope, and well-insulated windows were used in a majority of projects.
- **Broad Geographic Application:** There are examples of commercial structures achieving zero energy or zero energy-capable performance across a diversity of climates, some with relatively low energy prices. The West, the Pacific Northwest and the Northeast are at the forefront of this building trend. Colorado, Oregon, and soon Illinois are home to some of the largest projects.
- **Growing Diversity of Building Types:** Architects and developers are employing zero energy technologies and materials to meet a wide variety of needs. Traditionally, buildings have been small, but the square-footage of successful projects is growing as is the type of buildings achieving zero energy status. These include academic buildings, houses of worship and small retail establishments like credit unions.
- **Local governments Innovating Policies to Encourage ZEBs:** State and local governments have begun to develop policies to encourage zero energy buildings as a standard objective. For example, the Massachusetts Department of Energy Resources has developed a zero net energy buildings plan. And the California Public Utility Commission has developed a "Zero Net Energy Commercial Action Plan" to engage key players in the commercial building sector to adopt net zero energy strategies.