

BLOG

Zero net energy buildings around the US

Yoona Wagener, Customer Support Associate

April 10, 2014

Did you know that zero net energy (ZNE) buildings tend to use less energy than average buildings? A lot less. According to a recent report from the New Buildings Institute, they use only a quarter of the energy of average buildings. That fact and the recent launch of the Pathways to Zero Net Energy program by the Massachusetts Department of Energy Resources (DOER) got me thinking about how ZNE works in practice – how these buildings are achieving these dramatic energy reductions.

I decided to research what public and commercial buildings are doing throughout the country to qualify as Zero Net Energy (ZNE) buildings. Mainly, I wanted to know about technologies in use and distinguishing design features. To offer a flavor for what I found, here are three frequently talked about examples of innovative ZNE buildings that are also indicative of some trends in ZNE adoption.

U.S. Department of Energy's National Research Energy Laboratory (NREL), Research Support Facility, Golden, CO



The data center's design alone is worth a closer look. Thanks to the energy efficiency strategies employed there, the data center has shown a 55-71% reduction per user in energy requirements.

More on the building or design, accolades, and features can be found here.

Putney School Field House, Putney, VT



The data center's design alone is worth a closer look. Thanks to the energy efficiency strategies employed there, the data center has shown a 55-71% reduction per user in energy requirements.

More on the building or design, accolades, and features can be found here.

Putney School Field House, Putney, VT



Photo: www.putneyschool.org

Behavior-based energy-efficiency programs that engage students in bringing school energy use down have already proven to be effective. We have a great example here in Massachusetts in the Acton-Boxborough public schools. But what about engaging students in designing the buildings?

If the Putney School Field House is any indication, it's a good idea. A collaborative design project that involved both teachers and students, the Putney School Field House is New England's first ZNE athletic facility and was verified as a ZNE building in 2009. This 16,800 sq. ft. building holds LEED-Platinum certification. It is praised in company with the NREL's Research Support Facility and uses some of the same methods, primarily natural ventilation and daylighting — with large, operable clerestory (high, above eye-level) windows with blinds that redirect light from the ceiling — and solar energy harnessed by an on-site PV system mounted in the field adjacent to the building. In fact, in its first year the PV array's kWh generation exceeded energy consumption. Visit the Putney School's web site to learn more about the Field House's green and ZNE features.

TD Bank Branch – Ft. Lauderdale, Fort Lauderdale, FL



Photo: PR Newswire

The public sector has led the adoption of Zero Net Energy, but commercial ZNE buildings are appearing more and more. The Fort Lauderdale TD Bank branch is a great example. According to its announcement, it is the first commercial bank with a Zero-Net-Energy-verified facility. Starting in 2011 all TD banks have been designed with LEED standards in mind, but this particular branch, constructed in May 2011, officially reached ZNE status in January 2013. Like both the Putney School Field House and NREL's Research Support Facility, a photovoltaic system is used on site, enabling the facility to run completely on solar power. Energy-efficient design elements and considerations included shaded windows, increased insulation, daylighting with rooftop windows, and reducing plug loads (energy used by devices that are powered by being plugged into the wall) by monitoring the way office equipment was used and monitoring the energy use of other machines like ATMs and computers. Plug loads made up 40% of building energy consumption.

Resources

This piece was meant to give you a quick taste of what ZNE looks like in practice. There is a lot more to see if you are really interested. According to a recent report from the New Buildings Institute, there are 33 verified Zero Net Energy buildings and districts in the country and 127 more on the way. To learn more about other success stories and find ideas and information about getting to zero net energy, visit these helpful resources:

- The Whole Building Design Guide (WBDG) provides a good overview of Zero Net Energy buildings, including definitions, examples, and a number of resources on codes and standards. The WBDG also offers recommendations for design and sustainability strategies like passive solar design, daylighting, building envelopes, and building integrated photovoltaics, among others.
- The Department of Energy's Buildings Database is a good place to browse projects based in the United States and abroad. Some of the information available includes a profile of the design, finances, energy use, and building and architectural details.
- The New Buildings Institute's (NBI) recently released report, *2014 Getting to Zero Status Update: A look at the projects, policies, and programs driving zero net energy performance in commercial buildings*, provides a comprehensive look at projects that are Zero Net Energy Building certified or are emerging or planned, trends in new technologies and design strategies that are being successfully implemented, as well as a policy trend overview. You can read more about emerging and certified Zero Net Energy buildings (from the NBI's research report) in the case studies listed on their site.
- For more information on Zero Net Energy Buildings in Massachusetts, the report by the Zero Net Energy Buildings Task Force might be a good starting point.
- The International Living Future Institute provides Zero Net Energy certification. Their site offers information about certification and project registration.

Like this post? Want more? [Click here to subscribe to our free monthly newsletter](#)

← ZERO NET ENERGY

« Previous post: Does your school waste money when you're not there?

Next post: How Massachusetts buildings are getting to zero net energy »

Building Energy Efficiency Newsletter

Email Address

[SIGN UP NOW!](#)

Browse Categories

Renewables

Link Me Up

Tweet Friday

Authors

Eric Weisman, Manager, Customer Support

Fran Cummings, Vice President, Strategic Consulting

John Snell, Director, Analytical Services

Mariana Patton, Director, Communications

Paul Gromer, CEO

Sam Gachler, Director, Information Services

Steve Weisman, Vice President, Energy Management Services

Yoona Wagener, Customer Support Associate