EMA'S ENGINEERING TODAY

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Information and Helpful Hints for School Districts and the Architects who serve them.

Voice of Reason

There are many definitions of net-zero energy schools, but typically they are highly energy efficient buildings that use no more energy than they can produce at the site on an annual basis. Please call me to help you weigh the pros, cons, and strategies of net-zero energy.

Mike Clendenin, P.E.
EMA President and CEO

What does a Net-Zero Energy Building Really Mean?

In the ongoing quest to decrease the impact buildings have on the environment, we have begun to hear more about the concept of net-zero-energy buildings. The term itself sounds impressive. After all, when looking at low-energy use, how can you beat zero?

But exactly how do you define a "net-zero-energy building"? A clean measurable definition is needed because the way the **"zero-energy" goal** is defined affects the decisions Architects, Engineers, and Owners make to achieve and measure success. Let's look at some of the definitions in the market place today.

Net-Zero-Site Energy: A site Net-Zero-Energy Building (ZEB) produces at least as much energy as it uses in a year when accounted for at the site.

Net-Zero-Source Energy: A source ZEB produces as much energy as it uses in a year when accounted for at the source. Source energy refers to primary energy used to generate and deliver energy to the site (from a power plant, etc.).

Net-Zero-Energy Cost: In a cost ZEB, the amount of money the utility pays the building owner for the energy the building supplies to the electrical grid is at least equal to the amount the owner pays the utility for energy services and energy used in a year. Carefully examine utility rate structure, as most utilities do not allow any offset in costs for fixed charges and demand charges.

Net-Zero-Energy Emissions: A net-zero-energy emissions building produces at least as much emissions-free renewable energy as it uses from emissions producing resources (i.e. an electric utility).

Net-Zero-Offsite Energy: A building may be considered a ZEB even if 100 percent of the energy it purchases comes from renewable energy sources, even if the energy is generated off-site.

The logical conclusion is to lean toward the **Net-Zero-Site Energy** definition because the only way to measure "ZEB" is to look at the energy crossing the site. Definitions that include emission, cost, source, etc. are based on this measured information and then calculations are needed to get to the metric or definition selected. In fact through an agreement of understanding ASHRAE, AIA, USGBC, and IESNA have chosen site-energy measurements.

ASHRAE's Vision 2020 defines a ZEB as one that produces as much energy as it uses when measured at the site. On an annual basis, it produces or consumes as much energy from renewable sources as it uses while maintaining an acceptable level of service and functionality. Per ASHRAE a ZEB can exchange energy with the power grid as long as the net energy balance is zero on an annual basis. **ASHRAE recently confirmed with EMA that ZEB's, on an annual basis, use no more energy than is provided by on-site renewable energy sources.** Remember ZEB's includes only the energy flow of the building, not the overall sustainability of the building. A net-zero-energy building will have a higher first cost.

The best strategy for a ZEB using ASHRAE's site definition is to make the building as energy efficient as one sensibly can, then apply the on-site renewable energy. **Let EMA help you define what Net-Zero-Energy really means for your next school project.** For more information and review of your goals, please contact EMA's Mike Clendenin, P.E., Gary Bristow, P.E., or Josh Gentry, P.E. Also watch future EMA Engineering Today for articles on sustainability including how to navigate the Green Building Codes, Green & Energy Efficient Standards and Rating systems.

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IN THIS ISSUE

ENERGY STAR PARTNER

INDUSTRY NEWS

In the News: Carrollton-Farmers Branch ISD's Johnny Hibbs shares C-FB ISD's success in developing their in-house TIMES program. The TIMES program which combines the EPA Tools for Schools program with IPM, Moisture Management, Electricity Conservation, and Health Safety has been recognized nationally by the EPA, and has received several State of Texas awards as a result of this initiative.

The first of November, Hibbs was invited to Washington State University by Carrie Foss, the Urban IPM Coordinator for WSU, to share with other School Districts the successes that C-FB ISD has had with their Integrated Pest Management programs, and to demonstrate with the attending Districts how C-FB ISD has dove-tailed IPM policies into their comprehensive indoor environmental program.

Also, Hibbs recently presented their program and success at a U.S. EPA national school meeting in Dallas including schools as well as regional and Washington D.C. EPA staff. At this meeting, participants were invited to a campus at C-FB ISD to conduct an inspection and learn about the C-FB ISD recognized environmental program. C-FB ISD was asked by the Texas A&M AgriLife Extension Service to host this event, as they are a leader in environmental issues not just in Texas but in the southern region. **CONGRATULATIONS to Johnny Hibbs, Victor Melton, and C-FB ISD!**