BORDEN LIGHTING

999 Montague Street
San Leandro, CA 94577
phone 510.357.0171 fax 510.357.3832

E-News
FEBRUARY 2016

NET ZERO ENERGY BUILDINGS

"We shape our buildings; thereafter, they shape us."
Winston Churchill

One of the greatest challenges we face in shaping our buildings is managing energy consumption. Commercial and residential buildings consume approximately 40% of the energy and 70% of the electricity generated in the United States. Commercial buildings doubled their consumption of electricity from 1980 to 2000 and consumption is expected to increase another 50% by 2025. Currently fossil fuels generate almost all of this energy. Our dependence on fossil fuels tethers us to volatile fuel prices, uncertainties of supply, and the largest single source of CO2 emissions. Our quest is to become untethered. The holy grail of this quest is the Net Zero Energy Building ("NZEB").

On the face of it, the NZEB is a simple idea: construct a building that generates enough renewable energy to offset the energy it might otherwise have to purchase from the local utility. This simple idea requires two components: (1) minimize energy usage, and (2) maximize renewable sources of energy. But several devilish details lurk in this simple idea. What about purchasing energy from off-site renewable sources? How about costs? What about emissions? The U.S. Department of Energy's approach is to have not one, but four, Net Zero definitions:

- Net Zero Site Energy – The building produces at least as much energy as it uses in a year.
- Net Zero Source Energy – The building produces at least as much energy as it uses, including the energy used to transport the energy to the building (i.e. accounting for the transmission energy losses).
- Net Zero Energy Costs – The amount of money the utility pays the building owner for energy exported from the building to the grid is at least equal to the amount the owner pays the utility over a year.
- Net Zero Energy Emissions – The building produces at least as much emissions-free renewable energy as it uses from emissions-producing energy sources.

Regardless of how Net Zero Energy is defined, the proof arrives at year-end. Each year, when actual figures are in, each building must measure itself against the Net Zero benchmark. Lighting, which typically consumes from 20% to 30% of a commercial building's energy, is an important facet of any sustainable NZEB. Borden Lighting is proud to have provided energy-efficient LED fixtures to three projects in northern California that are already meeting the challenge of this quest.

Honda Smart House

At the West Village in Davis California, Honda and UC Davis have developed the Honda Smart Home U.S. to demonstrate a NZEB residential project. A 9.5 kW solar photovoltaic system on the roof is designed to generate more electricity than the home, and a Honda FIT EV will use in a year. This assumption is based on the energy efficient features of the home, including geothermal heating and cooling and passive solar design. LED lighting, also provided in part by Borden Lighting, is used throughout the house. Examples of the sustainable materials used in construction are sustainably harvested lumber certified by the Forest Stewardship Council and a metal roof (more easily recycled than asphalt). In addition, 96% of the construction waste, including drywall, brick, plastics, and lumber were recycled. The home will be used as a laboratory where stakeholders – Honda, UC Davis, PG&E – can evaluate new approaches to and technologies for sustainability. *See photo at right*

VF Outdoor

Set on 14 acres on Alameda's Harbor Bay, VF Outdoor, the world's largest apparel company, opened a four-building campus in July, 2012. Seeking to be one of the most sustainable office complexes in the United States., the company's campus achieved a LEED NC Platinum certification – the highest certification awarded by the U.S. Green Building Council. Its renewable energy facilities include a 50,000 watt solar array and five cylindrical wind turbines. To utilize this energy more efficiently, the campus includes thick-wall insulation, an air system that doesn't use refrigeration, and dual-pane glazed windows. Energy efficient LED lighting fixtures are used throughout the campus. Overall, the campus is designed to generate 15% more power than it needs.

See photos below

919-WD

VF Outdoor

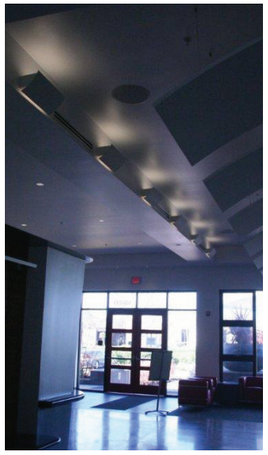
Honda House

719 with Amber LEDs

IBEW/NECA Training Facility

The International Brotherhood of Electrical Workers Local 595 (IBEW) and Northern California Chapter of National Electrical Contractors (NECA) have partnered to create the Zero Net Energy Center (NEC) in San Leandro, California. The NEC is a retrofit of a 1980s building, the first retrofit recognized by the U.S. Department of Energy as meeting the requirements of a zero energy building, thus demonstrating that sustainability need not be synonymous with new construction. It will house an educational and training facility for 2,000 apprentice and journey-level electricians. It features three wind turbines and a 35-foot photovoltaic panel that changes angles during the day to follow the sun. Energy efficiency is achieved through integrated natural light and ventilation, passive solar design, and LED lighting throughout. The goal is to achieve a 29% energy-use reduction, compared to new commercial construction in California in 2012. Obviously, training apprentice electricians in this facility can have a significant ripple effect.

See photos below



IBEW/NECA NZEB

551

Following Churchill's dictum, as these, and other NZEB, are shaped, how will they shape us? One hopes they will make us more sensitive to the resource limitations of our planet and the opportunities within these limitations.

Reported by Tom Jones