



Zero Net Energy Project Profile

Education



Photos: Chad Ziemendorf

OVERVIEW

Site Details

- Building Size:** 46,000 SF
- Location:** San Leandro, California
- Construction Type:** Retrofit
- Construction Year:** 2013
- Building Type:** Education- general
- CA Climate Zone:** 3

Predicted Energy Stats

$$18 - 18 = 0$$

BUILDING'S TOTAL EUI	RENEWABLE PRODUCTION EUI	BUILDING'S NET EUI
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Site Energy Use Index (EUI) kBtu/SF/year

The Energy Equation: **the building predicted energy use minus the predicted renewables production equals the predicted net energy of the building.** Buildings may be 'Getting to Zero' and have a net EUI above zero. If renewable production exceeds energy use its net EUI is below zero (negative) and it is creating surplus energy.

ZERO NET ENERGY TRAINING CENTER

When it came time to upgrade their training facility, the IBEW Local 595 and NECA chapters targeted net zero energy. They wanted to demonstrate that this goal was achievable and train their electrical contractors on the latest, cutting-edge energy efficiency strategies and renewable energy sources. If California hopes to achieve its goals of all new residential construction being ZNE by 2020 and new commercial ZNE by 2030, it is critical that there be a workforce in place that has the skills to install, operate and maintain the lighting and building automation systems as well as the renewable systems used throughout the project. The building features both flat and tilted roof-mounted photovoltaic panels, a dual-axis solar tree which tracks the sun for maximum generation, and three 12 kW wind turbines.

Planning & Design Approach

Overarching project goals were:

- Have the facility function as a fundamental component of the training curriculum
- Incorporate a variety of leading-edge building components
- Commit fully to collaborative design delivery
- Minimize consumption as much as possible before focusing on the energy supply side
- Actively commission from design phase through first year of occupancy

Energy Efficiency Strategies & Features

Integrated Design Delivery: In order to achieve the ZNE goal, the team started early and worked iteratively ensuring that the building systems, design and occupants were being considered simultaneously. The design team started with a list of over 60 different ideas that were eventually whittled down to the handful that were implemented in the building.

Passive Heating and Ventilation: All south-facing rooms include 10 feet of exposed concrete adjacent to the windows. During the cooler fall and winter months, these can absorb and store heat from the sun. A roof monitor located



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Team/Owner Details

Owner: International Brotherhood of Electrical Workers Local 595 (IBEW) and the Northern California Chapter of the National Electrical Contractors Association (NECA)

Architect: FCGA Architects

Green Building Consultant: Environmental Building Strategies

General Contractor: NOVO Construction

Renewable Energy Consultant: Cubed Energy Solutions

Awards

Targeting: LEED® Gold Certification

toward the center of the building faces south, allowing the sun to fall on and heat a concrete wall during the cooler months. Additionally, the front of the building features a storefront of operable windows that can provide an intake for air which then forces warmer air out through operable windows located in roof monitors.

Variable Refrigerant Flow (VRF) System: Mechanical heating and cooling is provided by four VRF units which circulate refrigerant to remove and redistribute warm air within the building. This configuration allows for a high level of zonal control (only conditions spaces that are occupied rather than the whole building) and can efficiently provide simultaneous heating and cooling when needed.

Daylighting: One of the signature design features of the Training Center are the numerous north-facing roof monitors. Besides being used as an outlet for exhausting warm air, these monitors allow natural daylight to meet a majority of the lighting requirements. Controls turn on electrical lights when additional lighting is needed. Hallways and circulation areas are daylit by solar tubes.

Lessons Learned

- Since the Center was completed there has been significant interest and publicity associated with the project. This includes a feature write-up in Forbes Magazine, an opening event that included the Governor of California and increased interest from potential trainees. The Center plans to build on this interest by becoming a distance learning hub in net zero and sustainable energy programs.
- It was important to find the right bank and appraiser to work with on project financing. These partners needed to have the foresight to understand the added value that comes from building a net zero energy building.
- It is critical to have a team in place from the beginning that includes the right experts. This requires spending the appropriate amount of resources up front, which differs from a typical design, bid, build project.

For more information

Greensource: <http://goo.gl/HbjHls>



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