nbi new buildings institute

Project Profile

Emerging Zero Net Energy Building

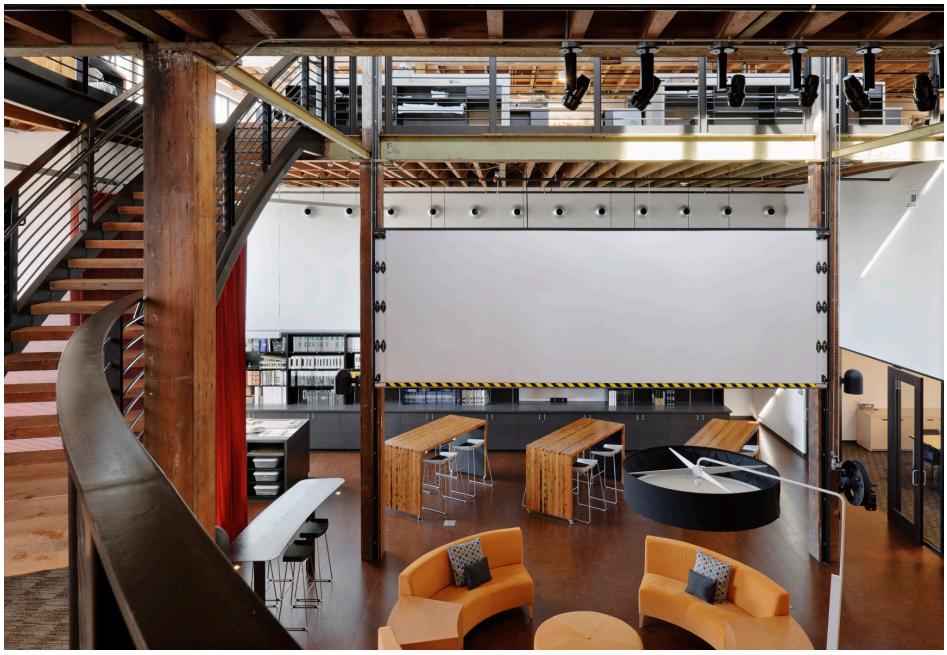

Photo courtesy of Rice Fergus Miller

Overview

Site Details

Building Size: 39,000

Location: Bremerton, Washington

Construction Type: Major Renovation

Construction Year: 1948, 2011

Building Type: Office

Climate Zone: 4C

Measured Energy Stats

24 - 3 = 21

BUILDING'S TOTAL EUI	RENEWABLE PRODUCTION EUI	BUILDING'S NET EUI

Site Energy Use Index (EUI) kBtu/SF/year

The Energy Equation: **the building energy use** *minus* **the renewables production** *equals* **the 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.

RICE FERGUS MILLER OFFICE & STUDIO

Rice Fergus Miller breathed new life into an abandoned 1948 Sears Automotive Center and positioned their new office solidly on the path to net zero. This urban infill transformation project took a dilapidated structure that had been abandoned for 23 years and turned it into a catalyst for the revitalization of downtown Bremerton. The 30,000 SF office space is a laboratory for innovative design and is among the highest performing buildings in the country.

Planning & Design Approach

Rice Fergus Miller channeled their collective design skills and commitment to create the most sustainable building possible. Early in the process they set the goal for net zero with a heavy focus on energy efficiency. They established a target energy budget based on potential solar production at the site and used energy modeling to evaluate options. A modest solar array is included on the roof with the understanding that additional renewables would be needed to meet net zero goals by 2030.

Energy Efficiency Strategies and Features

HVAC - The building uses a hybrid natural and mechanical system while maintaining a high level of personal comfort. Passive systems are utilized first so that HVAC systems can be turned off when not needed—approximately 40% of the time. Passive systems, including operable windows and ceiling fans, take advantage of the mild marine environment. Highly efficient Variable Refrigerant Flow (VRF) heat pumps are the prime source of mechanical cooling. This highly flexible system conditions 23 separate zones across the space.

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Project Team

Owner: Rice Fergus Miller

Architect: Rice Fergus Miller

Mechanical Engineer: Ecotope

Electrical Engineer: Gerber Engineering

Structural Engineer: PCS Structural Solutions

Contractor: Tim Ryan Construction

Financing & Cost

Cost / SF: $109/SF

Awards

LEED® Platinum

For more information:

Rice Fergus Miller website: http://goo.gl/sHqMbJ

New Buildings Institute Getting to 50 Database: http://goo.gl/9Tf0ri

New Buildings Institute

New Buildings Institute (NBI) is a nonprofit organization working collaboratively with commercial building professionals and the energy industry to improve the energy performance of commercial buildings.

High Efficiency Envelope - The shell is super insulated, and windows have high performance glass. The envelope is reported to exceed Passivaus Space Heating and Cooling requirements by a factor of two.

Lighting - Sidelighting and clerestories are part of the high performance lighting design. Photo sensors and occupancy sensors turn off lights when not needed, thus the lighting system operates well under the installed lighting power density of 0.59 W/SF.

Monitoring and Feedback - The office has a Direct Digital Control (DDC) system and an energy dashboard system, providing real-time feedback to occupants and building managers.

Plug Loads - Occupants are engaged in further reduction of energy loads. As in most offices, this includes turning off computers and lights when they are not in use.

Renewables - A 9.3 kW solar photovoltaic array is installed on the roof. The panels are positioned and wired to allow for ease of installation of future solar panels that will be needed to meet the goals of Architecture 2030 and the AIA's 2030 Commitment.

Lessons Learned

- Designing for 'Off'. Passive ventilation and daylighting strategies allow systems to turn off, saving energy when not needed.
- A high performance design needn't cost of a lot of money. It requires an owner's commitment, an integrated approach and attention to operations.
- Phasing in renewable systems allows the firm to meet 2030 goals but delays first costs associated with photovoltaics which are rapidly decreasing.
- Energy consumption can be reduced dramatically from code-level performance. The Rice Fergus Miller office operates at 78% less than code and saves the owner about $24,000 per year.
- Reusing existing - even dilapidated - structures has a significant impact. Not only was the embodied energy of structure harnessed, it also saved 58% in construction costs.
- Controls were a challenge, but crucial to energy saving features such as passive ventilation, server room heat recovery and nighttime set backs.