Net Zero Energy Home
Killingworth, CT

LEED for Homes Platinum

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<tr>
<th>LEED Points</th>
<th>Points Available</th>
<th>Points Achieved</th>
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<td>10</td>
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<td>Sustainable Sites</td>
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<td>Water Efficiency</td>
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<td>Awareness &amp; Education</td>
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<td>2</td>
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<td>Total</td>
<td>136</td>
<td>98</td>
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“We wanted the home to show the building community that energy efficiency and zero energy can be achieved without compromising the desired look or feel of the home”

-George V. Keithan, Homeowner

HERS -7 (minus 7):
7 units of surplus energy achieved using passive solar thermal, active solar electric and thermal, passive thermal envelope maximization, LED lights, low energy HVAC, geothermal heating/cooling, low flow fixtures, and lowest energy appliances

Project Size: 3,600 SF

Homeowner Incentives From:
CT Light and Power
CT Clean Energy Fund
Standout Green Features:

Utilities

The mechanical equipment in the home is the same size of the equipment that would be needed for a home less than 1/3 of the size due to the tight building envelope. Custom low temperature air handlers, with low-pressure coils and ductwork were installed to minimize the amount of required energy for space temperatures and maximize energy savings in motor efficiency. The air handlers use only 95 degree F water, which will operate on both the geothermal water loop and the solar hot water panel water. This low temperature operation will maximize the effectiveness of the solar water system to heat the home. The Geothermal HVAC system is comprised of a 400-foot standing column well which is also the residences domestic water well which eliminated the cost of drilling. The well has a 30 gpm yield used for the domestic water and the geothermal with a 9gpm flow rate to geothermal, COP at 4.0 and EER at 20.6. This home uses no fossil fuels therefore there is no boiler or furnace in the home. To control the indoor air quality of the home, there is a whole house Energy Recovery ventilator installed and MERV 8 air filters in all AHU’s.

Other renewable energies utilized by the home include solar hot water and solar electricity. The roof of the barn is where the 65 Schuco solar photovoltaic panels are installed that provide all of the electrical power for the residence. The extra electricity produced is sent back to the power company. On the roof of the main house are 10 AET solar hot water panels for heating the domestic hot water and the radiant floors. Altogether these panels will generate 20,000 kwhr/yr of electricity.
Efficiency

All of the windows in this home are Marvin tri-pane with a 0.25 U-value. The south side of the house is where most of the windows for the home are located for optimum sun-lighting. There are sunshades installed above the windows on the exterior of the home to help keep it shaded during the hot summer months, consequently reducing the solar heat gain and keeping the interior temperature of the home comfortable without having to use any air conditioning. The lighting in the home is all LED, no incandescent light bulbs were used.

“A net-zero energy house is not a single technology but a suite of closely integrated technologies. An essential principle is whole-house integration—careful planning to make all the components work together to achieve maximum energy savings”

-George V. Keithan, Homeowner
Project Team:

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Architect: J. Whitney Huber, AIA

Builder: Essex Squared

Certification Provider: The Center for Ecotechnology in Northampton Mass

HERS Rater: The Center for Ecotechnology in Northampton Mass

Landscape Architect: O’Neill Landscaping

Interior Designer: Victoria Ludington

MEP Engineer: Consulting Engineering Services, Inc.

Structural/Civil Engineer: GNCB Consulting Engineers, Inc.

Resources:
USGBC green homes - http://greenhomeguide.com
Northeast Sustainable Energy Association - http://www.nesea.org

The Connecticut Chapter of the US Green Building Council

http://www.ctgbc.org