

NET POSITIVE ENERGY - RETROFIT IN MOUNT HOLLY

The Wright Construction Company and Dewey + Associates, Architects and Planners, recently teamed up to complete a deep energy face lift to an existing home overlooking the Green, Taconic and Adirondack Mountains from Mount Holly, Vermont. The existing 2,350 S.F. home was enlarged by 930 S.F. to accommodate the owner's extended family and is now estimated to be a net positive annualized energy home.

With the engineering help of Bonhag Associates of Lebanon, NH, thirty-six net metered Helios 245W photovoltaic solar panels (8,820W total capacity) with 2 Kaco Blueplanet inverters and 64 S.F. of Wagner solar hot water collectors were added to the new standing seam metal roof which provides the owners with all of their calculated annualized needs

for power, hot water and space conditioning. The Water Furnace Envision ground water heat pump is run by the site-generated power and makes the balance of hot water whenever it is not generated by the sun. The heat pump will provide extreme summer day low velocity cooling capacity as well as humidity control for added comfort.

The home is exceptionally tight due to the wall and roof air infiltration upgrades which required the use of a new ReNewaire Energy Recovery Ventilator. Minimized electrical usage



KACO Solar PV inverters create AC power used by the ground-water source heat pump system.

through lighting design, controls and plug load usage planning reduces the use of entire banks of lights where the use of select lights is often all that is necessary. Honeywell programmable thermostats provide sophisticated controls for forced air heating zones, planned around logical daily household usage patterns.

The success of the new HVAC system was



South rooftop PV solar system is calculated to provide greater annual summer production due to low roof pitch. Two additional flat plate solar collectors provide hot water to occupants with any surplus contributing to space heating needs.



West end deck takes advantage of 70 mile view.

dependent upon the intense deep energy retrofit building shell upgrade to the exist-

ing effective R-13 walls, uninsulated floor slabs and effective R-22 roof assemblies. The roof rafters received 11" (R-71) of green spray foam insulation which allowed any attic duct work and recessed can light fixtures to reside in the attic without negative condensation or energy impacts. The new

R-22 insulated floor slabs wrap around the existing uninsulated slabs, thermally broken from the foundation walls and have new R-28 perimeter insulation. The existing conventional 2x6 stud exterior walls received new 2x4 exterior strapping, sheathing, 1" foil-faced rigid

foam board, house wrap, a drainage plane and fiber-cement siding. The strapping and wall stud cavities were filled with 7" of spray foam (R-45) and covered on the interior with a new poly vapor retarder and gypsum board. The new wall assembly has an effective R-Value of approximately R-51. The new garage addition has a (nearly) flat roof to prevent snow from obstructing the garage doors, to provide a future rooftop deck space and to allow the winter snow (about R-.5 to R-1 per inch) to add extra insulation to the garage roof.

The existing west deck was removed, redesigned and reconstructed, reusing much of



A new living room addition creates an open plan while preserving much of the original structure.

the existing composite wood/plastic decking and timber framing. The existing framing in the house was salvaged and reused in the new building program to the greatest extent possible, to reduce cost and save as much embodied energy used to create the original house as possible. Very few existing walls, floors or support beams had to be altered for the new floor plan layout, saving demolition, waste removal, material fabrication and construction

energy. The plan fully matches the owner's home use programming needs and provides a much needed public and service entrance to the house as well as an exciting open plan living room with cathedral ceiling and master bedroom addition which take advantage of the breath taking 75-mile view. The

owners opted to use local materials and craftsmen for many of the finish details to reduce shipping energy requirements and to support local businesses. The plan was developed to reduce cost, energy and site impacts by leaving



Trellis provides afternoon summer window and partial deck shading.

the driveway, walks, gardens, pond, water well and septic systems largely unaltered.

The success of the high level infusion of green technologies in the project was only made possible by the open minded nature of the homeowners who trusted the design/build team to hold their best interests at heart. The end result exceeded the owner's expectations.

Wright Construction Company, Inc. has been building fine homes, commercial, industrial and public works projects throughout New England for 28 years and is located in Mount Holly, VT.

Dewey + Associates, Architects and Planners has been blending quality architecture and sus-



Custom kitchen cabinets and flooring fabricated locally using local wood.

tainable design elements in all building types throughout New England and Ohio for 32 years and has designed many green residential and commercial projects over the years, including the current Vermont Builds Greener sustainable rating program certification record holder. They are located in Londonderry, VT. 

KEITH DEWEY, AIA
LEED AP + BD&C

DEWEY + ASSOCIATES
P.O. BOX 612 LONDONDERRY VERMONT 05148

ARCHITECTURE
CONSERVATION
PLANNING
GRAPHICS

VOICE: 802-824-5612
FAX: 802-824-3936
EMAIL: deweyai@aol.com

Winner of the 2010 AGC Best Builder Award for the Green Historical Preservation project to the Calvin Coolidge Museum & Visitors Center in Plymouth, VT.

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WRIGHT
CONSTRUCTION COMPANY, INC.

PO Box 189 / 31 Station Rd.
Mount Holly, VT 05758
P: 802-259-2094
F: 802-259-2689
www.WrightConstruction.com