

## **VALLE GROUP BUILDS 1 OF ONLY 24 PASSIVE HOUSE'S IN THE USA**

### **Passive House Design Reduces Energy Use by at Least 50%**

FALMOUTH, MA, January 1, 2012 --- The Valle Group has recently completed one of only 24 certified Passive Houses built in the United States. A Passive House is one of the world's most energy efficient homes, built to a rigorous standard set by the Passive House Institute for air tightness and insulation. By using solid building science to reduce its ecological footprint, a Passive House is the frontrunner in today's green construction industry.

The home, located in East Falmouth, MA, was constructed with 17" thick exterior walls and includes a full photovoltaic solar array for electricity and hot-water production. R-values far surpass those of a standard home; including R-105 in the ceiling, R-72 in the walls and R-77 in the floor. Current energy codes for a home built in Massachusetts would be R-38 in the ceiling, R-20 in the walls and R-30 in the floors.

#### **The Passive Design Process**

The Passive design is a process that analyzes all systems of architectural design (ie. insulation systems, heat systems, and electrical systems) using computer models. The Falmouth home was designed by architect Steven Baczek from Reading, MA in conjunction with certified Passive House Consultant Mike Duclos from Stowe, MA.

Prior to construction, a Passive House must undergo full certification from the Passive House Institute located in Urbana, Illinois ([www.passivehouse.us](http://www.passivehouse.us)). During the pre-certification review, the home design is entered into a computer program which models the building's heat loss and thermal bridging to identify any potential weak spots. By utilizing this computer program, designers can predict where the building is most likely to "leak" before it is constructed, thereby allowing design modifications to be implemented prior to breaking ground to better increase energy-efficiency.

#### **The True Meaning of "Passive"**

The Falmouth home is approximately 2,000 square feet and was built using traditional wood-frame construction techniques. In order to meet the stringent requirements of the Passive House Institute, exceptional design, planning and execution of the homes construction was necessary. Several insulation products, including blown-in cellulose, blown-in fiberglass and rigid insulation, were used throughout the house to achieve the rigorous standard for air tightness.

The windows used are triple-glazed and custom-built. The use of different glazing techniques for the windows based on their orientation within the house allows for maximum solar gain on the south elevations and a minimum heat loss on the north elevations. Once the sun's heat is captured, the building insulation and air-tightness prevent the heat from escaping. This "passive" concept allows solar energy to be captured and retained, instead of relying on "active" heating systems.

### **Eliminating Leaks & Keeping the Air Fresh**

The virtually air-tight home underwent numerous blower-door tests during construction to detect and eliminate any leaks in the building. A blower-door test pressurizes the home and calculates the difference in air-pressure from the outside to determine the amount of air leakage. During this test, a fog machine was also used to visually inspect any air-leakage. Once the home was completed, a final blower door test was performed with the leakage measured in cubic feet per minute (CFM) at a constant Pascal pressure (Pa). For the Falmouth home, the cumulative leakage of the entire home was the size of a playing card, versus a sheet of plywood for a similarly sized standard built home.

With the home being virtually air-tight, a system of mechanical ventilation was used to introduce fresh-air into the home and exhaust stale-air. This was done through a heat-exchange system which captures the heat from the stale exhaust air and introduces it back into the building through the incoming fresh-air. The heating load for the home is minimal, which allows for a high-efficiency electric air-source heat-pump to be used in lieu of a boiler or furnace. The actual heating load of 8.6 MMBtu's per year is at least 50% below the annual level of heating and cooling energy consumption of a similar home in the same climate zone.

### **Use of Sustainable Products**

Beyond the extreme energy-efficiency components of this building, the home also features numerous sustainable features including hardwood floors reclaimed from old mill buildings, a natural soapstone kitchen countertop, zero VOC paints, re-cycled insulation, natural cedar exterior clapboards and trim, and low maintenance non-invasive native landscaping. Built for a client who is an avid gardener, the waterfront home sits on approximately six acres of wooded land and includes a large organic garden.

### **The Numbers**

<b>Blower Door Test</b>	116 CFM at 50 Pa. or about 0.54 ACH @ 50 Pa
<b>Windows</b>	U-Value = 0.190, SHGC = 0.460
<b>R Values</b>	Exterior wall: R-72, Floor: R-77, Ceiling: R-105
<b>Air Source Heat Pump</b>	Electric, Heating 10.6 HSPF, Cooling 24.2 SEER
<b>Solar PV</b>	(16) Evergreen solar panels (ES-A-210W); 3.36kw
<b>Thermal PV</b>	(3) 4'x8' flat plate collectors with an 80 gallon Superstore Tank

### **About The Valle Group, Inc.**

The Valle Group is a diversified residential construction and development company specializing in the building of energy-efficient homes and thoughtfully planned communities. Throughout Cape Cod and Southern New England, The Valle Group is known for their meticulous work and reputation for integrity & professionalism.

Located in Falmouth, MA, the company provides full design-build services as well as pre-construction budgeting, land and building feasibility studies, permitting, construction management, and interior design services for projects from renovations and additions, to complete responsibility for the design & construction of new homes and neighborhoods.

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**Photos**

Photos by John L. Moore. Several high resolution photos available upon request.



