

New Construction, Greenfield, Mass.

KEY DRIVER

In 2006, the non-profit organization [Rural Development, Inc.](#) (RDI) initiated the Affordable Green Homes Program and began constructing its first near zero net energy home. RDI continued this Program in 2007 with the development of the Wisdom Way Solar Village in Greenfield. Wisdom Way is a community of 20 environmentally friendly homes that are near zero net energy for low- and middle-income homeowners.

DESIGN & IMPLEMENTATION

The Wisdom Way community offers a range of homes from 1,140 sq. ft. with two bedrooms to 1,773 sq. ft. with four bedrooms. The homes are rectangular with double-wall construction and dense-blown and loose cellulose insulation. Each home utilizes solar-water heating and photovoltaic solar power, which generates from 2.8 to 3.4 kilowatts. Two of the homes are fully accessible for residents with physical disabilities.

Wisdom Way's homes are so well insulated that even the smallest boilers and furnaces available produced too much heat. Hence, each home is heated by a small natural gas space heater (12,000 BTU) on the first floor. Although the bedrooms' heating requirements (or loads) are only about 2,000 BTU per hour, RDI was concerned about the possibility of a 4°F differential between the second-floor and first-floor rooms, which could cause discomfort. To help establish temperature equilibrium, energy design consultants from Steven Winter Associates, Inc. (SWA) designed an innovative air-distribution system with a WhisperGreen fan that exhausts air from the first floor into the second-floor bedrooms.

IMPACT

RDI estimated the total cost of "above code" efficiency improvements per home to be \$38,000. The highest cost was the solar PV system (approx. \$25,000). Because the RDI project had both energy efficiency and affordability benefits, it received grants and subsidies totaling over \$5.8 million. This funding reduced the investment from \$38,000 per home to \$10,000 per home, which will be paid back from energy savings.

RDI entered one of its Wisdom Way homes in the [Zero Energy Challenge](#). The home scored a HERS 7 and received third place honors in the Challenge. Each Wisdom Way home is expected to receive certifications for LEED Platinum and Mass. New Homes with ENERGY STAR.

ENERGY-EFFICIENCY SPECIFICATIONS

WALLS: Double 2x4 with 12" thick R-42 dense-blown cellulose insulation

ATTIC: 14" thick R-50 loose cellulose insulation

BASEMENT CEILING: 11.5" thick R-40 blown cellulose insulation

WINDOWS: Triple-pane, U-0.18 BTU, SHGC=0.23; south-facing windows: U-0.26 BTU, SHGC=0.37

HEATING & COOLING: Sealed combustion gas-fired heater (12,000 BTUs); efficient, exhaust-only WhisperGreen ventilation system; solar water heater; auxiliary tank-less gas water heater

ONSITE RENEWABLE ENERGY: Each home uses 2.8-3.4 kW photovoltaic system

LIGHTING: Compact fluorescent

APPLIANCES: ENERGY STAR refrigerator & dishwasher

HERS INDEX: 7



Photo courtesy of RDI