

## New Construction, Montague, Mass.

### KEY DRIVER

Tina Clarke and Doug Stephens of Montague have been lifelong advocates of clean energy and greenhouse gas emission reductions. Clarke and Stephens set out to build a zero net energy home to achieve their goals for energy efficiency and long-term financial security, and to provide a home that could also serve as a model for the regional building industry and students. They teamed up with builder Bick Corsa, who built his first passive solar home in 1982, and other professional consultants, to construct their new home, known as the Montague Urban Homestead.

“We wanted to show what’s possible with efficiency and renewable energy,” Clarke said. Clarke and Stephens used the most advanced efficiency technologies to build their home. It is a paragon of super-insulation: their attic contains R-100 insulation for maximum effectiveness. Their home achieved a HERS rating of -8, producing more energy than it consumes.

### IMPACT

Clarke and Stephens were eager to facilitate a community- and industry-wide dialogue about home energy efficiency. In the late 1970s, Clarke worked for a home energy education workshop in Minneapolis, Minn., which succeeded in driving the community’s enthusiasm for energy efficiency and inspiring its members to act. Clarke and Stephens’ 1,152-sq.-ft. home now emulates that environment. They attracted over 220 visitors to each of their two open houses to learn about energy efficiency. They have also welcomed visits from student groups, local media, friends, and relatives who have been interested in their work. They even had site tours during the construction.

Clarke and Stephens received substantial rebates and subsidies, including \$1,250 from the ENERGY STAR Homes program, \$30,590 from the Mass. Renewable Energy Trust’s Commonwealth Solar program for the photovoltaic (PV) system, and state and federal tax credits. They estimated that their out-of-pocket cost for the PV was \$1/watt. The cost to construct their new home was approximately \$180,000. During the first six months, their home used only 42 percent of the renewable energy it produced. They exported the over 1,600 kWh of excess energy to the grid, which is leading to a shorter payback period for the larger PV system.



Clarke and Stephens' home won 1st place in the statewide [Zero Energy Challenge](#) competition.

Photo courtesy of Zero Energy Challenge

### ENERGY-EFFICIENCY SPECIFICATIONS

**WALLS:** Double-stud; 12” thick R-42 dense-packed cellulose “Cellu-spray” insulation

**ATTIC:** 30” thick R-100 blown-in loose-fill cellulose insulation

**FOUNDATION:** R-30 extruded polystyrene concrete slab insulation

**WINDOWS:** Thermotech, U-0.17; south-facing windows U-0.23, SHGC=0.44

#### HEATING & COOLING:

Passive Solar: South windows, dark concrete slab/high thermal mass; overhangs & trees/summer shading

Back-up: Fujitsu 9RLQ mini-split air source heat pump, seer=21, hspf=11; Sunmate Hot air solar panels

**VENTILATION:** Lifebreath 155 ECM heat-recovery ventilator transfers heat to provide clean indoor air

#### ONSITE RENEWABLE ENERGY:

26 Evergreen 190-watt solar PV panels; 4.94-kWh Fronius inverter ties to grid

**LIGHTING:** Compact & pin-based fluorescent

**APPLIANCES:** ENERGY STAR; no clothes dryer; SunDanzer solar refrigerator, 33 kWh/yr

**HERS INDEX: -8**