

## SOLAR THERMAL SYSTEM CASE STUDY

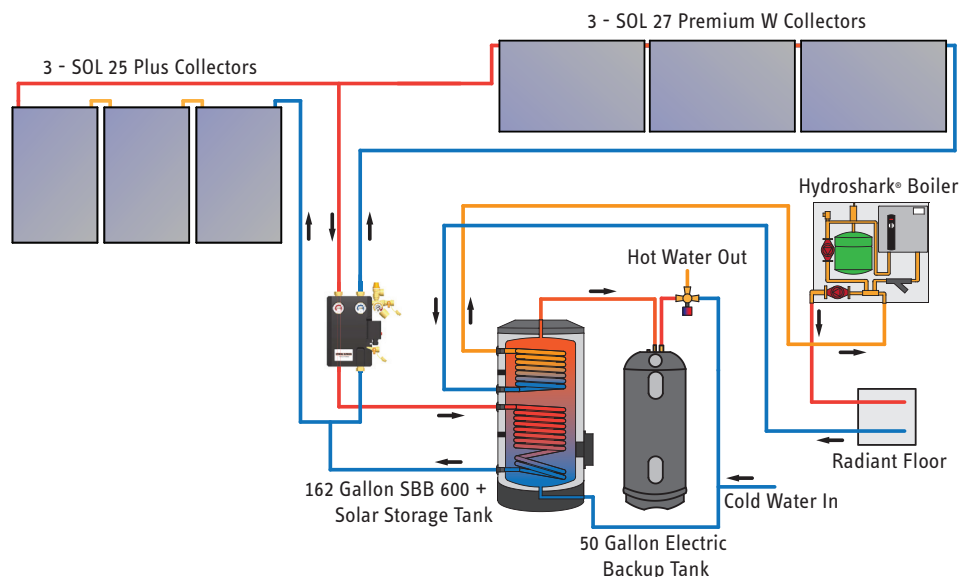
Deep Energy Retrofit, South Deerfield, Massachusetts

This deep energy retrofit began construction in 2013 on a residential home with 4 permanent occupants. Renovation continued on into the spring, and the solar thermal system came online in May 2013.

A brand new 1350 ft<sup>2</sup> concrete slab was laid on the foundation to provide radiant heat to the entire house. The heating system pulls energy from the 162 gallon solar tank, and utilizes a 20 kW electric boiler as backup.

The domestic hot water (DHW) also draws energy from the solar tank, and has a 50-gallon electric water heater piped in series for DHW backup.

The solar & heating systems are capable of being monitored and operated remotely using a Thermal-Grid DL2 datalogging system and a Nest Learning Thermostat™.



Since the solar storage tank feeds heat both to the DHW and heating circuit, the tank is rarely at its maximum temperature. By keeping the tank temperature continuously low, the collectors operate at their optimum efficiency.

Because the system provides for both DHW and heating, the homeowners expect an annual return on investment (ROI) of just over 8%.

The entire electric bill for the house, including all appliances, averaged about \$120 per month during the heating season.



The mechanical room is compact and contains all of the solar thermal and backup equipment for the domestic water and heating system.

### Project Partners:

#### NESEA -

Northeast Sustainable Energy Association

#### Beyond Green Construction -

Energy efficient home renovation

#### DA Gratz Solar -

Solar thermal installation

### By the numbers:

**Total area of collectors:** 168 ft<sup>2</sup>

**Estimated daily hot water use:** 65 gallons

**Monthly solar production:** 1.1 million BTU

**Electricity saved per year:** 4100 kWh

**Annual savings at \$0.17/kWh:** \$697

**System cost to customer:** \$8900

**Return on investment:** 8%/year

**Payback time:** 12 1/2 years

### Equipment:

3 Stiebel Eltron SOL 25 Plus & 3 Stiebel Eltron SOL 27 Premium collectors

Stiebel Eltron SBB 600 Plus, 162 gallon storage tank

Stiebel Eltron SOM 8 differential solar controller

50-gallon electric water heater

Stiebel Eltron Hydrosmart™ 20 kW electric boiler

Stiebel Eltron Flowcon FA solar pump station

Thermal-Grid DL2 datalogging system

This project was featured in the January 2014 issue of Solar Today magazine.