

# SOLAR THERMAL SYSTEM CASE STUDY

Nonotuck Street Apartments, Holyoke, Massachusetts

**STIEBEL ELTRON**

**Simply the Best**

The Nonotuck Street apartment building houses 10 apartments and approximately 16 residents.

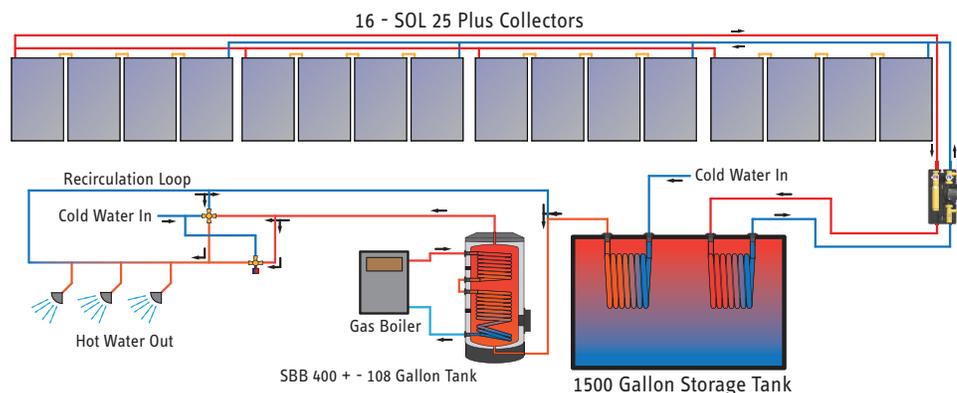
The building was designed from the ground-up as a high-efficiency structure. The system was installed in July 2008 when the structure was built.

High-efficiency gas condensing boilers back up the solar system, and also provide radiant heat to the floors of the apartments.

A large atmospheric tank serves as the store for the solar energy. As domestic hot water (DHW) is drawn, cold water is pre-heated through the solar tank, and piped into a Stiebel Eltron SBB 400 Plus storage tank.

If the water is up to temperature, the boiler doesn't fire.

This setup ensures the residents always have hot water, even when the sun isn't shining.



The mechanical room houses 1500 gallons of thermal mass storage in a site-built tank and a Stiebel Eltron SBB 400 Plus 108 gallon backup storage tank.

The DHW system is plumbed to recirculate once the temperature in the loop drops below a usable temperature. A 4-way valve regulates the recirculated water returning back into the DHW loop. A larger 3-way valve regulates water coming from the solar tank and the backup heater.

The ratio of gallons of storage to number of collectors is 93:1, which is much higher than in typical solar thermal systems. The large volume ensures that the tank temperature stays consistently low, and the collectors operate in their most efficient state.

## Project Partners:

### Stiebel Properties Inc.

Property management & building maintenance  
**Green in Green Construction**  
Solar thermal installation

## By the numbers (data tracked since 6/7/12)

**Installation cost:** \$42,000

**Incentives at time of construction:** \$23,300

**Installation cost after incentives:** \$18,700

**System payback time:** 9½ years

**Solar production per month:** 8.5 MMBTU

**Yearly CO<sub>2</sub> emissions saved:** 14,000 lbs

**Natural gas saved per year:** 1,200 therms

**Yearly savings:** \$2,000 (at \$1.60/therm)

### Calculated yearly savings vs. #2 oil:

\$4,000 (at \$3.70/gal)

### Calculated yearly savings vs. propane:

\$5,400 (at \$3.30/gal)

### Calculated yearly savings vs. electricity:

\$5,400 (at \$0.17/kWh)

## Equipment:

16 Stiebel Eltron SOL 25 Plus collectors  
(465 ft<sup>2</sup> of surface area)

1500 gallon thermal mass storage tank  
Stiebel Eltron SBB 400 Plus, 108 gallon  
storage tank

Stiebel Eltron SOM 7 Si differential controller

Stiebel Eltron Flowcon MAX pump station

230 kBTU/hr natural gas condensing boiler

Apollo 1 datalogging system