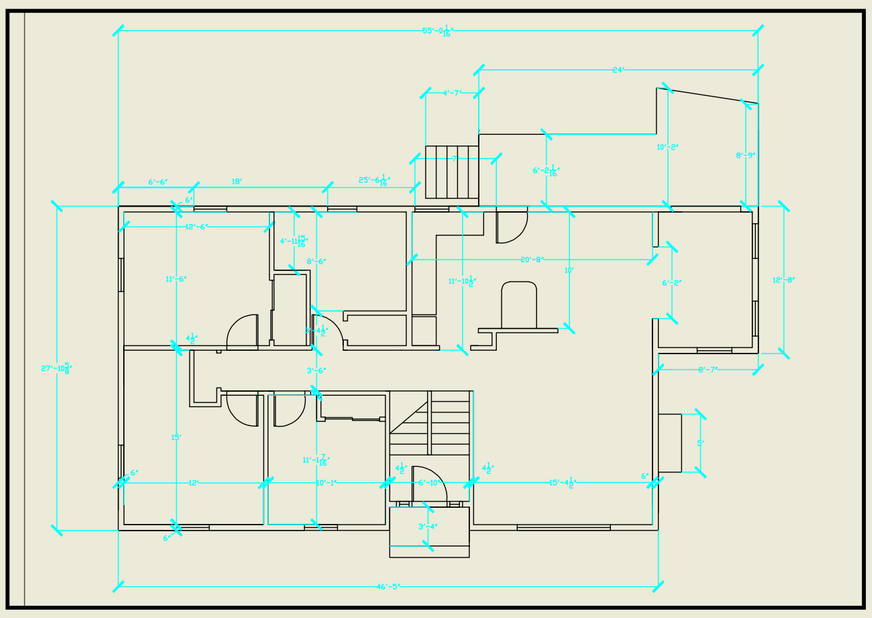
OnThePathTo
Sustainability

Livermore Home Deep Energy Retrofit

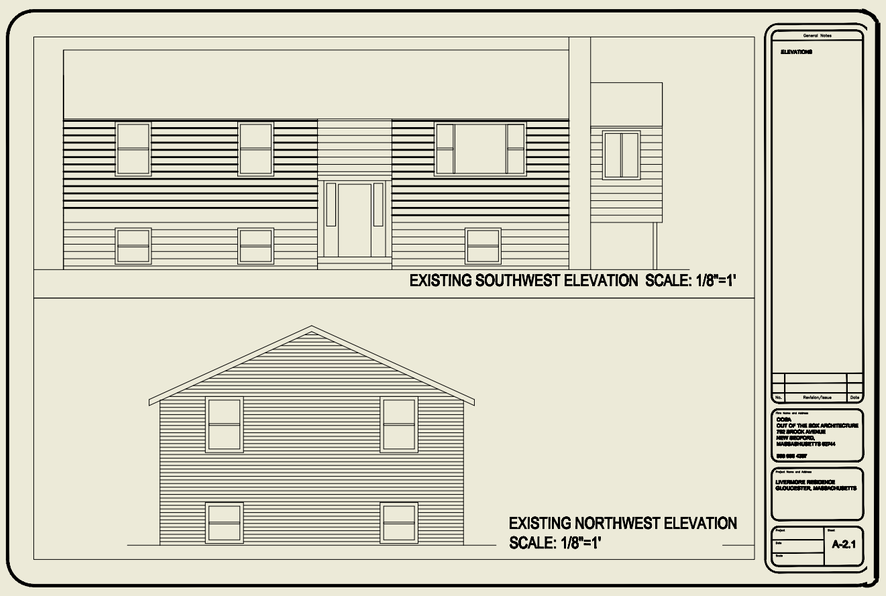
A 4.3 kilowatt (kW) photovoltaic (PV) system provides 186% of annual electricity needs for the house. Excess electricity is sold back to the electric company. The house achieved zero net energy in 2010.



Carbon Reductions:
Zero Net Energy
November 2009 - October 2010

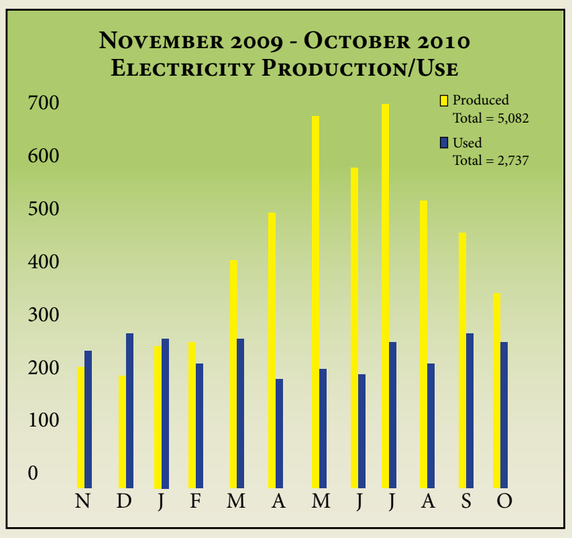
Pre-Retrofit	Usage	Carbon
Electricity	6,000 kWh	4.1 tons
Hot Water	180 therms	1.1 tons
Heating	700 therms	4.1 tons
Total		**9.2 tons**

Post-Retrofit	Usage	Carbon
Electricity	-2,345 kWh	-1.6 tons
Hot Water	49 therms	0.3 tons
Heating/Wood	2,506 lbs.	0.3 tons
Total		**-1.0 tons**



Innovative Larsen truss wall framing system minimized wood framing and thermal bridging and created space for the addition of 5″ (R-30) of insulation on the exterior.

Existing siding was encapsulated with closed-cell foam insulation, eliminating the need to remove and dispose of old siding material.



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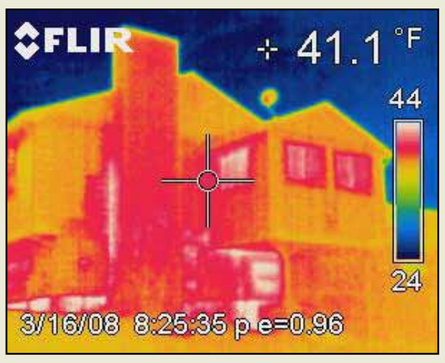
Windows are triple-pane, argon-filled, low-emissivity glazing in foam-filled fiberglass frames.

Air leakage was reduced from 3,400 to 500 cubic feet per minute (CFM) at 50 pascals of pressure, as measured by a diagnostic blower door.



A new exterior chimney insulation system was pioneered on the house.

The attic has R-76 insulation (cellulose) with a radiant barrier to reduce summer attic temperatures.

The Livermore house was turned into a laboratory for carbon reduction strategies.

An innovative basement floor and foundation wall insulation system was used.

Gable roof extensions were constructed to create an overhang that connects with the wall trusses.

A 3-panel solar hot water system provides over 70% of annual hot water needs for the house.

OTHER ENERGY-SAVING FEATURES:

- All Energy Star appliances
- All LED and CFL lighting
- Bricor 1.125 GPM showerhead
- Small Danish woodstove heats the entire house
- High-performance Panasonic bath fan with a 24-hour programmable controller for assured whole-house ventilation

This is what a suburban renewable power plant looks like.