

## Deep Energy Retrofit, Newton, Mass.

### BACKGROUND

Chapman Construction/Design, a construction management firm specializing in sustainable interiors, building performance, and renewable energy, achieved the U.S. Green Building Council's Leadership in Energy and Environmental Design for Commercial Interiors (LEED-CI) Platinum certification for its two-story, 11,500 square foot office headquarters in Newton.

What began as a modest renovation grew to encompass an array of high performance building strategies including an improved building envelope, onsite solar electricity generation, solar domestic hot water, increased day lighting, high efficient lighting fixtures, lighting control sensors, and low-flow plumbing fixtures.

### DESIGN & IMPLEMENTATION

The building's efficiency was enhanced by a reduction in the light fixture count, and replacement of the remaining fixtures with high efficient lamps and ballasts. This brought the office lighting load to 35% below the ASHRAE standard. Other efficiency measures include daylight and occupancy sensors, window filming, shade awnings, a white roof with vegetated sections, and a new gas-powered furnace to enhance the overall building performance.

The roof-mounted 47kW photovoltaic array provides for 90% of Chapman's electricity needs. A monitoring system, which displays real-time energy production and usage data for visitors, is located in the lobby and is available on the internet at [www.chap-con.com](http://www.chap-con.com).

Water consumption was reduced to 60% below the ASHRAE standard by installing waterless urinals, dual flush toilets, and low-flow faucets. The renovation significantly reduced operating costs and serves as



a proving ground for the firm's other projects. The office has become an educational showcase of sustainable strategies, with the company offering frequent tours of the building.

### IMPACT

Improvements to the property have yielded \$20,000 in annual savings on electricity. With a \$130,000 grant from the Massachusetts Technology Council for the solar PV, the firm expects payback on the project to be approximately five years.



### PROJECT AT A GLANCE:

**ENVELOPE—ROOF/WALLS:** Roof upgraded to R-28 through rigid insulation and air sealing. White roof installed to help reduce cooling load. Exterior walls rated R-11. Window film added to reduce cooling load.

**LIGHTING:** Daylight and occupancy sensors installed in the office. Tubular skylights allow daylight, reducing electrical lighting loads.

**HEATING & COOLING:** New gas furnace and a high efficiency condenser replaced old inefficient electric HVAC system.

**ONSITE RENEWABLE ENERGY:** 47 kW photovoltaic system; Solar thermal system supplies hot water for the building.

**COST SAVINGS:** Estimated \$20,000/year saved on electricity, with payback on the total retrofit investment projected within five years.

**Chapman**  
Construction/Design