

Portland, Maine Loft



Before



After

Richard Renner | Architects

[Full Case Study](#)
www.1000HomeChallenge.org
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Framing at windows



Framing at master bedroom



Framing - Loft, looking north



Gap between framing and exterior masonry wall to eliminate thermal bridging

Portland Loft



Insulation - Foam in walls; foam+cellulose in roof



Foam insulation at party wall



Foam insulation at exterior wall



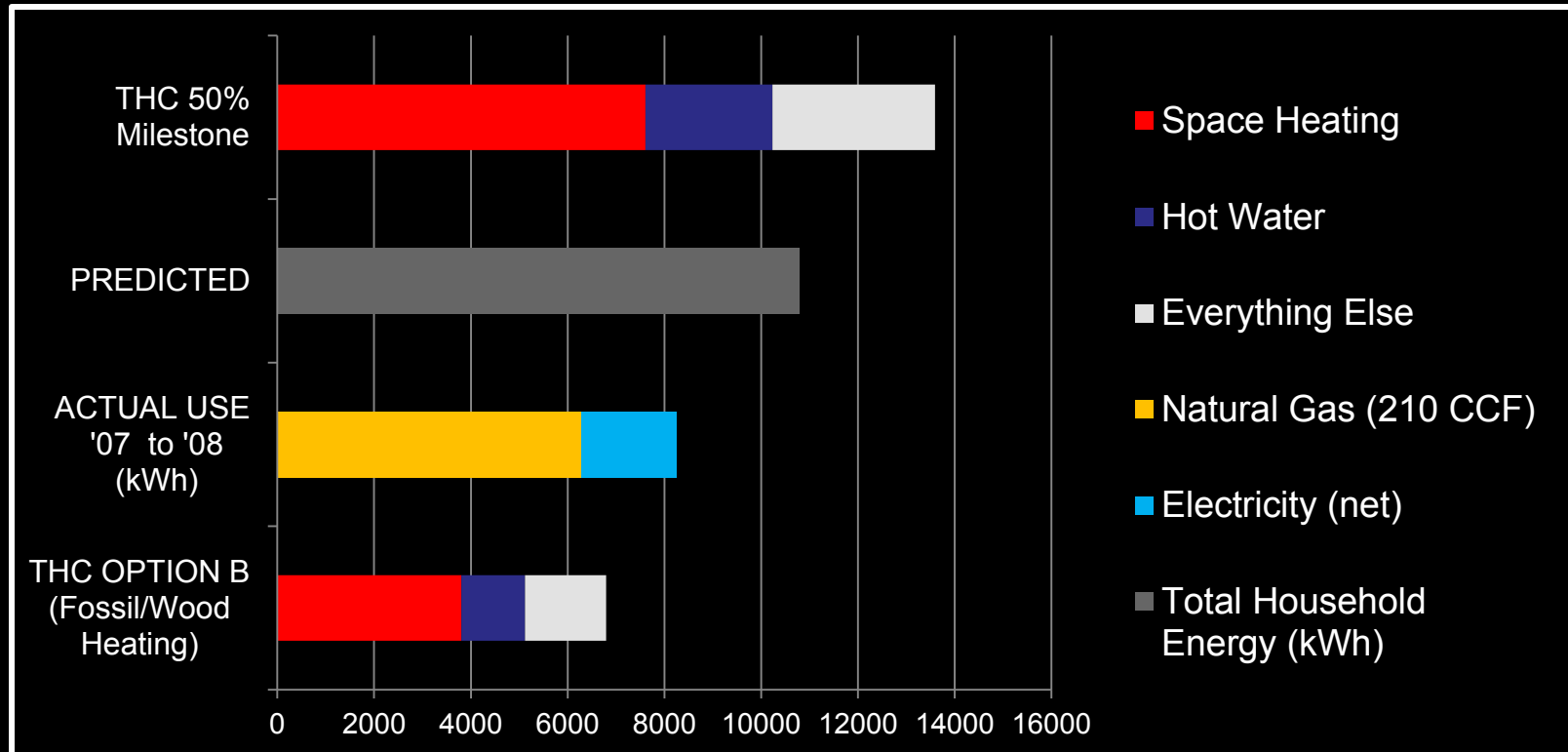
Foam insulation at roof monitor

Portland Loft



Completed loft looking toward kitchen and bedrooms

Comparing Predicted & Actual Post Use Against THC OPTION B Threshold & 50% Milestone (kWh)



This project does not quite meet the OPTION B 1000 Home Challenge threshold: 6,796 kWh/yr. (site energy).

OPTION B Inputs: ZIP code:04101; 2 occupants; 1,400 FFA; 45% common wall

Observations

- Impressive thermal performance possible – interior masonry retrofit
- Great attention to details
- New life for existing urban buildings possible
- Explore remaining gas baseload (cooking & DHW) & misc. electric load reduction options
- Challenging basement retrofit (see case study)

Observations Seven Years Later

- The high windows in the clerestory are only ten feet above the windows on the main level, but this is enough of a difference to create air flow for natural ventilation. These high windows deliver sufficient daylighting on all but the darkest days. A shade, which was planned but omitted for budget reasons, would have reduced solar gain in the summer.
- The bathroom has no windows, but Solartube skylights provide plenty of daylight.
- An unexpected benefit of triple glazing is that the loft is quiet in spite of its urban location.
- Locating the heat recovery ventilator above the bathroom ceiling makes maintenance more difficult. However, there was no other place to put it.
- Recessing the windows to maximize size and thermal efficiency required complicated head, jamb, and sill flashing. Snow frozen on the deep sill occasionally restricts the operation of the awning windows.
- The loft has been rented for 3.5 years to three different tenants, and energy use has remained pretty consistent.

Possible energy performance improvements

- Aggressively address passive loads. AFTER SEVEN YEARS: Not sure the magnitude is that high. On other more recent projects, we have installed an eMonitor to track the power consumption of each circuit, and this allows us to see where there are possible improvements, both in equipment and patterns of use. An eMonitor installed in the loft would tell us where to focus our attention.
- Closely coordinate heat recovery ventilation with open windows in warmer months. When the windows are open, turn the system completely off. AFTER SEVEN YEARS: We also looked at running the ventilation system at less than 100% during the heating season.
- Turn down the heat in the winter. Daily setback will not work well, because the system is radiant, but overall set points could be lower. Bedroom zone is currently set at 62 degrees; the rest of the loft is set at 65 degrees. Both could be reduced somewhat. AFTER SEVEN YEARS: Note done, because heating costs were already low.

Possible energy performance improvements - continued

- Put coffee in a thermos instead of using the coffee maker's heating element to keep the coffee warm. AFTER SEVEN YEARS: Not done, in part because in the several years before the loft was rented, occupancy was intermittent.
- The outside light at the front door is left on all night, because there is a graffiti problem in the neighborhood. Installing a motion sensor would reduce energy use.
- Install an exterior sunshade at the south-facing clerestory windows to reduce heat gain in the summer. AFTER SEVEN YEARS: This was implemented, but more because the lighted door attracted graffiti.
- Use the roof deck for drying clothes when possible. AFTER SEVEN YEARS: The deck was installed, but just before renting the loft. Also, access to the deck is difficult with a basket of wet clothes. However, there is little doubt that this would save energy.

Links

Fine Homebuilding: “Brick Rehab Meets LEED’s Highest Standards” - www.warmboard.com/wp-content/uploads/2008/09/wb_fhb_10-1108_all.pdf

Fine Homebuilding: “This Roof Grows Greener” - www.finehomebuilding.com/how-to/video/green-roof-in-portland-maine.aspx

Residential Architect: “Town Architect: Richard Renner Circumscribes His Carbon Reach” - www.residentialarchitect.com/heat-recovery-systems/town-architect.aspx

Maine Home + Design: “Taking His Own Advice” - www.mainehomedesign.com/features/621-taking-his-own-advice.html

Down East: “Green by Design” - www.downeast.com/magazine/2009/march/green-design

Contact Information

Richard Renner | Architects
35 Pleasant Street
Portland, Maine 04101
207-773-9699

133 South Main Street
Sherborn, Massachusetts 01770
508-651-2385

rrennerarchitects.com

rrenner@rrennerarchitects.com

