

**Residential Project Description -
The City of Lowell Green Building Excellence Award**

Name & Location of Building: Chris Gleba and Kris Erikson Residence, 48 Epping St., Lowell, MA.



Project Architect and Builder: Mark Yanowitz, Verdeco Design, LLC

Description of project:

Chris and his wife Kris have been slowly renovating their Epping Street home room by room for over 10 years. Throughout this renovation process they have rewired the house, fixed the plumbing, and made energy efficiency improvements such as installing a high efficiency natural gas boiler, radiant in-floor heating, and upgrading the interior finishes of the kitchen and baths.

The house, originally built in 1895, had a full unfinished basement with a fieldstone foundation built directly on top of granite ledge. While having the signature quaint New England look, the house was extremely inefficient with heat costing the family thousands each winter.

The project did not qualify for certification under the LEED for Homes program guidelines because it was neither new construction nor gut rehab. The project objectives respect the integrated design principles outlined through the LEED design process and that included following the Durability Guidelines outlined in LEED for Homes Project Checklist. This included resolving the storm water infiltration issues at the foundation.

An early decision made by the owners to install a poly vapor barrier influenced elements of this project requiring a “vapor-out” wall assembly and thoughtful integration of related building components to avoid trapping moisture within and around the exterior walls.

The owners were able to use National Grid’s Deep Energy Retrofit (DER) Pilot Program. National Grid established the DER pilot program to aggressively provide incentives to lower the energy demand of single and multi-family residences. The program’s primary objective is to improve energy performance (at least 50% better energy performance than code built or Federal Energy Yardstick homes), it also combines financial incentives with integrated design and technical support to also improve indoor air quality, durability, and overall occupant comfort.

The DER program goals were aggressive, including rigorous air sealing, R40 above grade walls, R5 (triple pane) windows and doors, and R60 roofs.

Understanding the need to design a vapor permeable wall assembly that could meet the energy efficiency goals along with addressing health and durability concerns, our attention turned towards rock wool insulation. Along with being vapor permeable, rock wool has excellent natural qualities. Being fire retardant, as well as moisture and mildew resistant, rock wool is an excellent candidate for wrapping the exterior of a building shell.

The structure was wrapped with Tyvek Commercial Wrap. Tyvek was selected because it was both an air and water barrier and it had the high permeability that we desired for the “vapor-out” assembly.



To achieve the DER program goal of R-60 at the roof, we over-framed the existing roof framing with new 16” TJI framing and filled the cavities with rock wool insulation by overlapping (3) layers of materials. Both wall and ceiling assemblies virtually eliminated all thermal bridging concerns.

Exterior finishes were selected with the goals of low maintenance, high durability, and recycled content considerations. Included within these selections were concrete, galvalume steel, and fiberglass.

Overall energy usage decreased by 54%, saving 6390kwh compared to the winter of 2011.

The air sealing was so effective (post construction blower door test showed a fraction of preconstruction air infiltration levels) and the heat loss so minimal that owners noted they never ran the boiler at night and the indoor air temperature would only drop a couple of degrees even when outside temperatures were in single digits! Furthermore humidity levels significantly dropped in the house. The basement “musty” smell disappeared, as did the house creaks attributed to expansion and contraction of materials. This was the only house in the neighborhood without icicles hanging off the eaves which is a further testament of a tight building envelope.

Recognizing the goal to significantly tighten the percentage of air leakage, we designed and installed a heat recovery ventilator (HRV) to provide fresh air and controlled ventilation throughout the house with minimal heat loss.

Along with adhering to the LEED for Homes Durability Guidelines to address potential issues surrounding water/moisture, air infiltration, and pests, strong emphasis was placed on healthy interior finishes, with particular attention to zero VOC paint and floor finishes.

A list of potential LEED for Homes credits relevant and achievable to this 2,500 SF, 4-bedroom residence project are the following:

- Integrated Project Team (ID1,2)
- Design Charette (ID1.4)
- Durability Planning & Management (ID 2.1 & 2.2)
- Innovative Design Process (ID 3.1)
- Site Selection (LL 2)
- Preferred Locations (LL 3.1, 3.2, & 3.3)
- Infrastructure (LL 4) & Community Resources / Transit (LL 5.2)
- Access to Open Space (LL 6)
- Minimize Disturbed Area of Site (SS 1.2)
- Landscaping (SS 2.2 – 2.4)
- Surface Water Management (SS 4.1 & 4.3)
- Nontoxic Pest Control (SS 5)
- Compact Development (SS 6.2)
- Indoor Water Use (WE 3.1)
- Optimize Energy Performance - Exceptional (EA 1.2)
- Enhanced Insulation (EA 2.2)
- Air Infiltration – Minimal Envelope Leakage (EA 3.3)
- Exceptional Windows (EA 4.3)
- Minimal Distribution Losses (EA 5.3)
- Very High Efficiency HVAC (EA 6.2)
- Efficient Domestic Water Heating (EA 7.1 – 7.3)
- Improved Lighting (EA 8.2)
- High-Efficiency Appliances & Clothes Washer (EA 9.1 & 9.2)
- Residential Refrigerant Management (EA 11.2)
- Environmentally Preferable Products (MR 2.2)
- Construction Waste Management (MR 3.1)
- Energy Star with Indoor Air package (EQ 1)
- Enhanced Combustion Venting (EQ 2.2)
- Moisture Control (EQ 3)
- Enhanced Outdoor Air Ventilation (EQ 4.2)
- Enhanced Local Exhaust (EQ 5.2)
- Air Filtering – Best (EQ 7.3)
- Radon Protection – Moderate Risk (EQ 9.2)