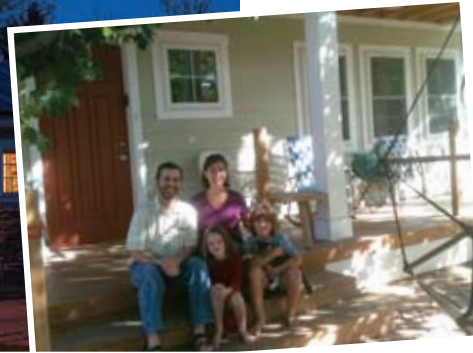




House photo by Philip Wegener



DEEP GREEN REMODEL

In 1954 Bill Wolfgram of High County Homes advertised Martin Acres as “the greatest addition in the history of Boulder.” Our house, was built in 1956, was 1100 sqft and had a HERS score of 190 – certainly not the most energy efficient home in the history of Boulder. The house had single pane, steel-frame windows coated with lead paint, no insulation in the walls or vented crawlspace, haphazard and dirty insulation in the attic, and a host of dysfunctional vents and fans. While the structure was in pristine condition, from an energy perspective it was drafty, hot in the summer, cold in the winter, and had substantial energy bills. The 15 year old 80% efficient furnace supplied dry, overheated air to a very leaky duct system. There was an open air combustion water heater inside the bedroom closet, and the attic was inadequately vented. The wiring in the home was ungrounded and the insulation was brittle and degraded. With two small bedrooms for four people, our house was crowded.

Rodwin Architecture and Skycastle Homes expertly assisted us with our remodel. To minimize costs and impact, our remodel was modest, adding only 355 sqft for a total size of 1455 sqft. Not only do small homes have an inherently smaller environmental footprint, they also encourage more conscious living by requiring that all spaces are utilized to their fullest. Our focus was on increasing the quality of our spaces rather than their size.

We installed locally-manufactured, thermally broken vinyl windows throughout the house (U = .29, SHGC = .28). New exterior walls are filled with cellulose or open cell foam as well as 1” polyisocyanurate foil faced rigid exterior foam (with a 3/4” drainage plane that allows the foil facing to act as a radiant barrier for a total R-value of 26). We sprayed approximately 10” of open cell foam on the underside of roof deck, eliminating attic venting entirely, and allowing us to use the space for storage.

In the crawlspace we installed a heavy duty cross-linked fiber reinforced vapor barrier on the soil, sealed the vents in the rim board, and sprayed 4” of closed cell foam from the top of the rim to the bottom of the foundation walls

(overlapping the vapor barrier) making the crawlspace a fully conditioned space.

All electrical wiring was brought up to code, and ducts were brought up to modern design standards, fully sealed with mastic and tied to a new HRV. Our natural gas furnace was replaced with a one-hole ground source heat pump to supply heating, cooling and about 45% of domestic hot water needs via a de-superheater. The water heater was replaced with a sealed combustion condensing on- demand water heater. The 5.4 kW PV system provides approximately 100% of our annual electrical usage. The addition includes a spot for an EPA phase II-compliant wood burning stove which can heat the entire house and was an excellent way to use framing offcuts.

We replaced the old noise makers with high quality Energy Star bathroom fans vented to the outside, and replaced 98% of the incandescent lights with tubular and compact fluorescents (no LED’s just yet). We also splurged on six Energy Star compliant light tubes that flood the interior spaces with natural light.

We used environmentally-preferred materials whenever possible. We specified FSC Certified framing and hardwood floors, chemical free “thermally modified” exterior wood decking, formaldehyde free subflooring, used an oil and wax finish for the hardwood floors, and made exclusive use of low VOC paints caulks, glues, and adhesives.

Infrared thermography and blower door tests during the building process allowed us to detect and correct leaks while construction was underway. We also made a nightly hobby of sorting and recycling demo materials and construction waste, regularly visiting ReSource.

Our house is now far more comfortable year-round, has better natural lighting, and functional spaces that allow our family to come together and be apart. Although we spent considerably more than the 1954 price of this house (\$13,195), our total energy consumption and associated annual CO2 emissions was reduced by more than 90%! The final HERS score of 5 suggests that this may indeed be “the greatest addition in the history of Boulder.”

YEAR BUILT, REMODELED: 1956, 2011

HOME SIZE: 1,435 SQ. FT.

CONTRACTORS

- Rodwin and Sky Castle Homes

ENERGY FEATURES

- HERS Rating: 5
- 5.4 kW PV system
- Geothermal system
- High-efficiency tankless water heater
- High-efficiency windows
- Zoned heating
- High-efficiency lighting
- ENERGY STAR Appliances

GREEN FEATURES

- Alternative construction
- FSC certified framing
- Green construction materials
- FSC certified hardwood floors
- Green wood decking
- Formaldehyde free subflooring
- Low VOC paints, caulks, glues, and adhesives
- Beetle-kill and salvaged firewood

WATER FEATURES

- Low-flow showerheads
- Faucet aerators
- Water efficient appliances
- Drip irrigation
- Pervious pavement

RE-USE/ SALVAGE FEATURES

- Deconstructed original structure
- Construction waste recycling
- Salvaged or recycled materials

TRANSPORTATION

- WalkScore.com: 77/100
- Participation in Bike to Work Day
- Carpooling
- Transportation options influenced choice in home
- Commute via Bike/ Bus

FOOD

- Preferential buy local and organic foods
- Shop at Farmers Markets
- Participation in Community Supported Agriculture (CSA) shares
- “Slow foods” preferred

COMMUNITY PARTICIPATION/ SUPPORT

- Boulder Green Building Guild

BOULDER