



THE  
ADDAMS FAMILY



# STEVENS-KAHN HOUSE DENVER, COLORADO

Updating a 1901 Victorian brick house to modern insulation standards

# Pre-Renovation





# Pre-Renovation



# Pre-Renovation-Discoveries and Challenges

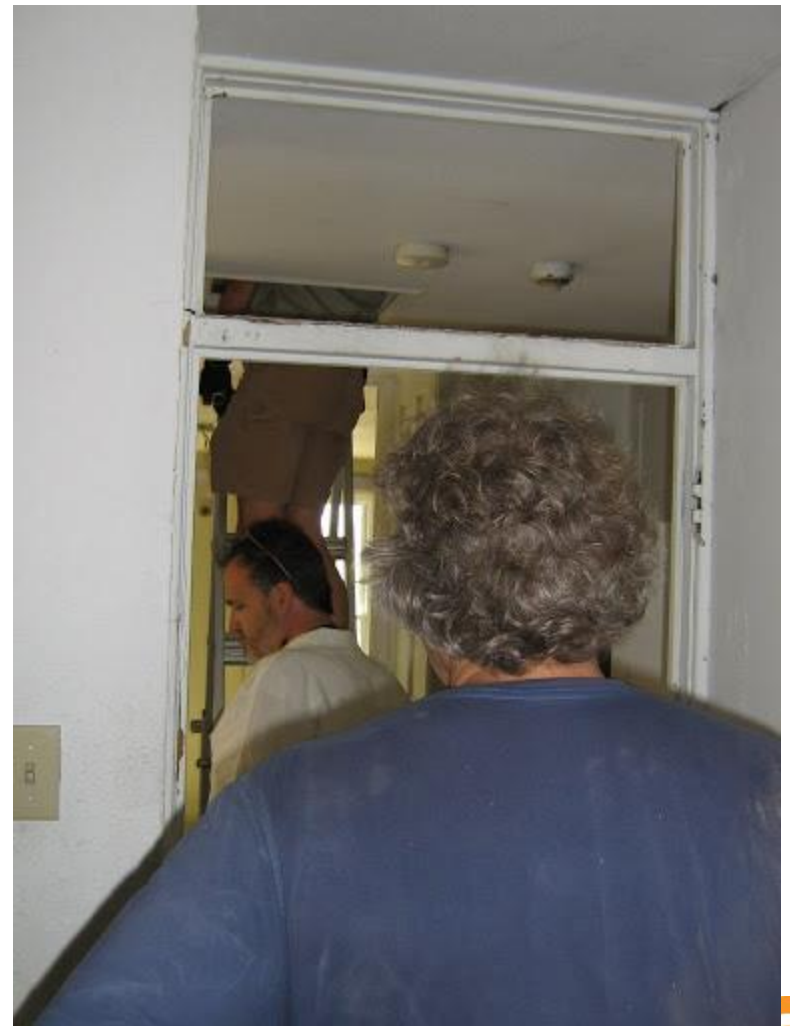


# Pre-Renovation



# Pre-Renovation

Asbestos tiles on the floor





# Pre-Renovation





# Pre-Renovation



Booker-T, My Man!



# Pre-Renovation



# Destruction Phase



**Basement mechanical room with 80% Goodman Furnace and basic water heater, both now cut in half for display in our training center.**





# Destruction Phase

**Weatherization insulation  
without air barriers.**



# Destruction Phase





# Destruction Phase





# Destruction Phase

**Mixed weatherization insulations and missed cavities**



# Destruction Phase

**Top floor attic with squirrel's nest stuffed into venting**



# Destruction Phase



Newspaper found under siding on exterior of framed 2<sup>nd</sup> floor





# Thermal Bypasses



# Structural





# Structural

**Tore down chimneys that were not going to be used**





# Structural

**Add beams to re-enforce floor and support 2<sup>nd</sup> floor bath**



# Structural

## Swamp Cooler



# Structural

**6 layers of shingles,  
3 cedar shake, and  
3 asphalt and some  
nice moss growth  
on north side**





# Structural and Aesthetics

**Add height and re-enforce roof to give 6 inches insulation depth on vaults (2x8s with 1 inch gap for cold roof)**



# Structural





# Structural





# Structural



There were some interruptions to the schedule.



# Windows and Skylights





# Insulation Install

- First Floor
- What I wanted
- Interior 2 inches of foam board for r-10 with 2x6 blown cellulose wall for a total of r-30 plus 2 course exterior brick

What I got

1 inch of foam board at r-5 with 2x4 blown cellulose for a total of r-18

Why?

My wife calculated that we would lose 100 sq ft on the first floor with my plan



# Insulation Install

- 2<sup>nd</sup> Floor R-10 Exterior foam board with 2x4 r-13 + blown cellulose for a total of r-23
- Basement 1 inch xps above grade + 2x4 blown fiberglass for a total of r-20
- Below grad 1 inch extruded polystyrene + 2x4 r-15 blown fiberglass r-19 (one wall framer put framing on edge for a 1.5 in + cavity) for a total of r-19



# Insulation Install

- 6 Attics plus vaults
- R-50 on 5 of the flat attics
- 6 inches of closed cell foam on vaults
- 7 inches of closed cell foam on roof deck of southwest roof where skylights are installed





# Fears

- Old houses in Denver have soft brick and mortar
- This house is painted exterior brick, but if moisture gets trapped will it deteriorate the mortar at an advanced rate?
- Dry climate, but moisture drive on south side.



# Electrical and Plumbing



# Exterior

**2 solar thermal panels**



**Discontinued continuous  
cement board soffit**





# Mechanicals



# Windows

- Fibertek Fiberglass window U-.31, SHGC .28 with oak interior finish



# Sudden Urgency to move in-Stuff happens



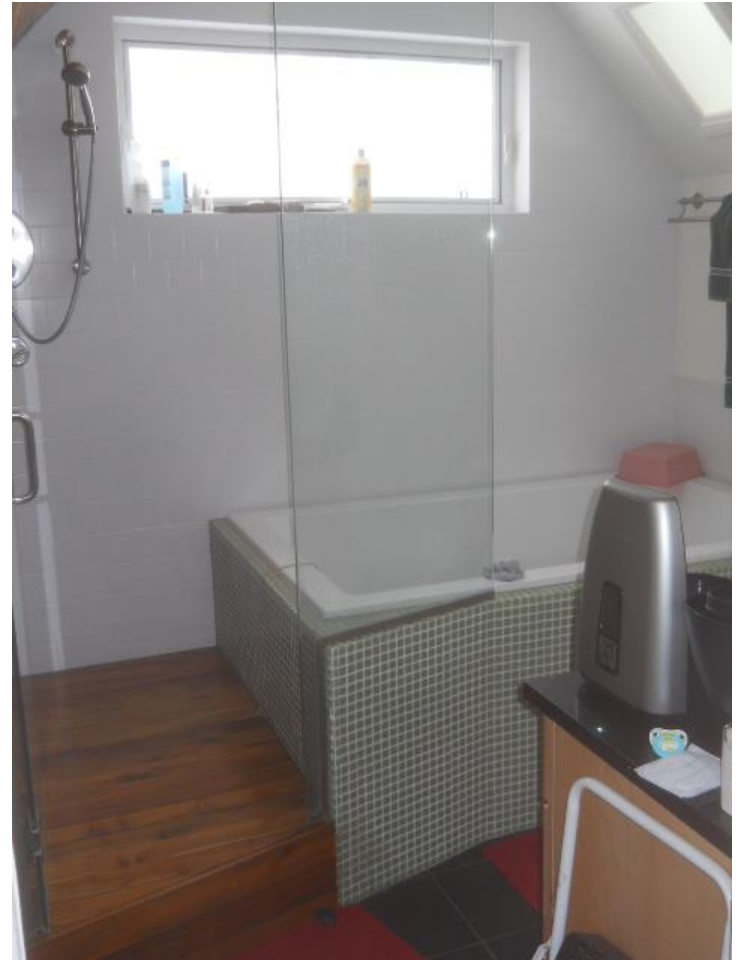


# Finished Interior

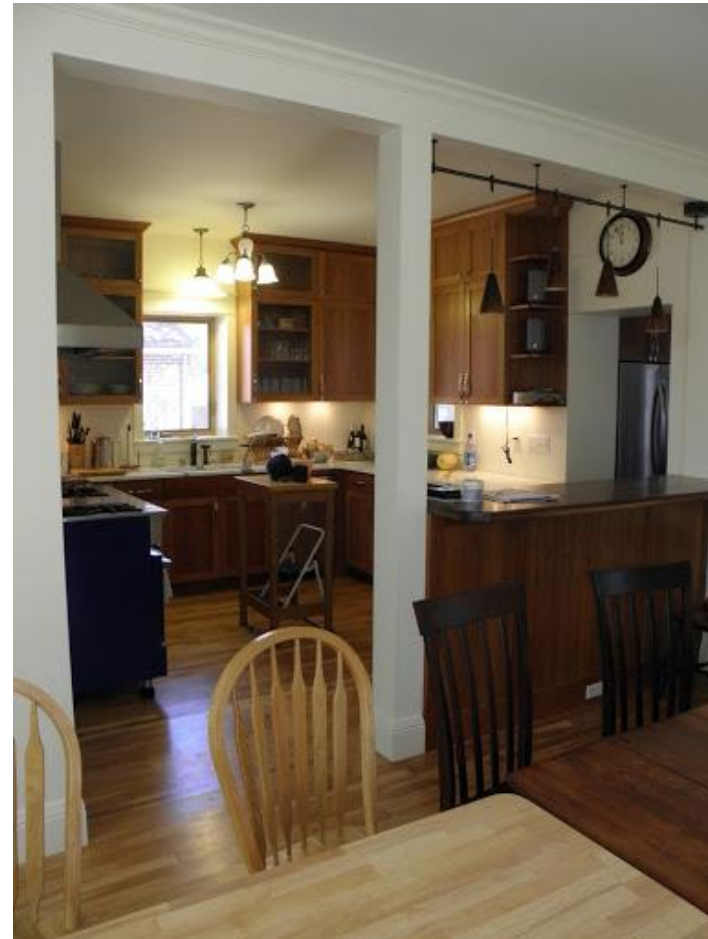
## No VOC Paint



# Finished Interior



# Finished Interior





# Finished Interior





# Home Energy Rating Certificate

Rebecca Kahn Remodel  
3550 Clayton St  
Denver, CO 80205



**5 Stars Plus  
Confirmed Rating**

## Uniform Energy Rating System

					Energy Efficient				
1 Star	1 Star Plus	2 Stars	2 Stars Plus	3 Stars	3 Stars Plus	4 Stars	4 Stars Plus	5 Stars	5 Stars Plus
500-401	400-301	300-251	250-201	200-151	150-101	100-91	90-86	85-71	70 or Less

HERS Index: **48**      Efficient Home Comparison: **52% Better**

## General Information

Conditioned Area: 2645 sq. ft.      House Type: Single-family detached  
Conditioned Volume: 22362 cubic ft.      Foundation: More than one type  
Bedrooms: 3

## Mechanical Systems Features

Heating: Fuel-fired hydronic distribution, Natural gas, 95.0 AFUE.  
Water Heating: Conventional, Electric, 0.92 EF, 120.0 Gal.

Duct Leakage to Outside: NA  
Ventilation System: Exhaust Only: 60 cfm, 15.0 watts.  
Programmable Thermostat: Heating: Yes      Cooling: Yes

## Building Shell Features

Ceiling Flat: R-50      Exposed Floor: NA  
Vaulted Ceiling: R-39, R-35      Window Type: Low E 31 / 28  
Above Grade Walls: R-18, R-23, R-20      Infiltration:  
Foundation Walls: R-20.7, R-11.0      Rate: Htg: 2051 Clg: 2051 CFM50  
Slab: R-0.0 Edge, R-0.0 Under      Method: Blower door test

## Lights and Appliance Features

Percent Fluorescent Pin-Based: 0.00      Clothes Dryer Fuel: Electric  
Percent Fluorescent CFL: 100.00      Range/Oven Fuel: Natural gas  
Refrigerator (kWh/yr): 416.00      Ceiling Fan (cfm/Watt): 70.40  
Dishwasher Energy Factor: 0.70

The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

REM/Rate - Residential Energy Analysis and Rating Software v12.96

This information does not constitute any warranty of energy cost or savings.

© 1985-2011 Architectural Energy Corporation, Boulder, Colorado.

Rating Number: 21560

Certified Energy Rater: Sean Enright

Rating Date: 11/03/2011

Rating Ordered For: Rebecca Kahn

## Estimated Annual Energy Cost

Use	Confirmed Rating		
	MMBtu	Cost	Percent
Heating	40.9	\$372	35%
Cooling	0	\$0	0%
Hot Water	0.8	\$18	2%
Lights/Appliances	25.9	\$687	64%
Photovoltaics	-0.0	\$-0	-0%
Service Charges		\$0	0%
<b>Total</b>		<b>\$1077</b>	<b>100%</b>

**This home meets or exceeds the minimum criteria for all of the following:**

EPA ENERGY STAR Version 2 Home

2003 International Energy Conservation Code

2004 International Energy Conservation Code

2006 International Energy Conservation Code

2009 International Energy Conservation Code

## Home Energy Rating Provider

EnergyLogic, Inc.

P.O. Box N/ 525 E County Road 8

Berthoud, CO 80513

Phone # 1-800-315-0459

www.nrglogic.com

*Sean Enright*

Digitally signed by

client2.xohm

Date: 2011.11.03

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Certified Energy Rater



# Actual Performance

- Energy costs around \$110 per month or \$1320 per year
- Comfortable except during lengthy hot weather events



# The End







