



Project Overview:

Transform a 2 bedroom 1950s energy inefficient American house into an environmentally sustainable 4 bedroom residence with an expanded eat-in Kitchen and Family room, that is all powered by the sun and built by state-of-the art recycled and energy efficient products and appliances.

3 Part Goal:

- Save Money
- Save The Planet
- Appeal to mainstream America with functionality and style that fits into the traditional neighborhood

For More Details and complete Return On Investment (ROI) Calculations for over 50 different aspects of this project see: www.GREENandSAVE.com

The 'Before' Existing Front Façade: Mid-Winter 2005



High-Performance House Transformation © GREENandSAVE.com



The 'After' Completed Front Façade: Summer 2007



High-Performance House Transformation © GREENandSAVE.com



The 'Before' Existing Rear Façade: Mid Winter 2005

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The 'After' Completed Rear Façade: Summer 2007

High-Performance House Transformation © GREENandSAVE.com





How did we get from
'Before' to 'After'
?

The Eco-Inspector is surprised at the size of the Equipment



High-Performance House Transformation © GREENandSAVE.com



Excavation Begins: Early Spring 2006



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12" Concrete Block Construction Begins: Early Spring 2006



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Framing: Spring 2006



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Double walls and wet spray insulation



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Radiant Floor Coils with Thermal Mass Gyp Crete



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Gyp Board, Paint, and Cabinet Installation



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Eat-in Kitchen lighting, Fans, and Furnishings



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Kitchen Island and Cooking Area



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Front - Roofing Begins: Summer 2006



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Front - Stucco Paper Begins: Late Summer 2006



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Front - Exterior Complete: Summer 2007



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Back - Framing Continues: Summer 2006

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Back - Stucco Paper Begins: Late Summer 2006



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Back - Windows and Stucco Scratch Coat: Fall 2006



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Back - Finish Coat Stucco and Solar Thermal Panels: January 2007



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Back - Solar Photovoltaic Panels Installed: August 2007



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50 Eco-Sustainability Savings Points

The following pages include
the aspects of this project that Save Money
and the Environment

See Details at
www.GREENandSAVE.com

Active Solar:



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- #1: Solar Thermal – Hot Water Generation System – Roof Designed with 45% pitch or heat collection Panels
- #2: Solar Thermal - Domestic Hot Water
- #3: Solar Thermal - Radiant Floor Heat
- #4: PV Solar - Photovoltaic powered pump to run hot water for radiant floor system
- #5: PV Solar – Electricity Generation System – Photovoltaic Panels (5.16 k W) to run lighting and other electric needs.

Passive Solar:



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#6: All southern overhangs are calculated to the exact latitude for winter/summer sun angle from horizon

#7: Maximized Natural Ventilation

#8: Double Glazed Low E + Casement Windows instead of Double Hung

#9: High Ceilings in Kitchen/Family and each of the children's rooms with dual speed and reversible direction Ceiling fans – Summer warm air rises and winter fans and push down the warm air for recirculation.

#10: Deciduous trees on southern side for maximum winter heat gain and summer shading

#11: Southern orientation w/ major glass for heat gain.

Thermal Mass



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#12: ½” Thick Stone Tile in the Kitchen/Family Room Floor + the Master Bath Floor for heat storage and release.

#13: 1 1/4” Gyp Crete wet bed below the ½” tile for additional heat storage and release.

#14: 12” Thick Concrete Masonry Units (CMU) filled with Concrete below Kitchen/Family Room + Master Bath for heat storage and release.

Super Insulated



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#15: Double Wall at Family/Room Kitchen (2x6 and parallel 2x4)

#16: Wet spray 'gap filler' insulation

#17: Crawl space wall Insulation

#18: Radiant Floor Pipe insulation in crawl space

Recycled Materials



High-Performance House Transformation © GREENandSAVE.com

#19: Recycled material in 'wet spray' insulation

#20: Carpets - Children's room - recycled fibers

#21: Driveway - Base course Modified Gravel (Recycled Bricks, concrete, etc. from Philadelphia town house demolition)

#22: Patio - Base course Modified Gravel (Recycled Bricks, concrete, etc. from Philadelphia town house demolition)

Appliances/Mechanical:



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#23: Super efficient/ insulated back-up hot water heater for the solar radiant floor

#24: Tankless Hot Water heater for 'on-demand' flash heating, back up to the solar domestic hot water

#25: Re-circulator water coil that pre-heats the inbound domestic water and prevents 'waiting' for hot water at the faucet.

#26: Energy Star washer/dry in Master Bath

#27: Dual flush toilets

#28: Whole House Fan at 2nd floor Bedroom Wing and at Kitchen/Family room

#29: Dual-Fuel 'Heat Pump' with Multi-Zone HVAC and no Freon

Water Conservation / Treatment:



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(Dual Flush Toilets referenced in 'Appliances/Mechanical')

#30: Storm Water Management System

#31: Garden - Rain Water Cistern Collection from roofs of the 'Barn' and 'Tool Corral' Shed



#32: Windows spaced for cross views and interior lighting

#33: Sun Tubes - Children's bathrooms

#34: Upper glass panel on Exterior Mud Room door

#35: Translucent full door height panel on interior mud room door and bedroom window side of guest bathroom.

#36: Skylight in children's upper play area

Note: Recent studies have uncovered health risks related to over exposure to artificial light. Artificial light may induce cancer development as well as cardiovascular disease in modern societies. So, the more natural light the better.

Re-Use



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#37: Transplanting: All of the trees and shrubs that would have been destroyed with the addition have been transplanted.

#38: The remains of the demolition concrete from the existing patio and driveway that would have gone in to a land fill has been re-used as support for the landscape walls.

#39: Stone garden walls – salvaged from existing house partial stone faced

#40: Patio Stepping Stones from existing patio

#41: Garden Stepping Stones cut down from salvaged Center City Office Lobby interiors

Overall Greening



High-Performance House Transformation © GREENandSAVE.com

#42: Over 100 new trees and shrubs have been planted on the property in addition to 30,000 Sq. ft. of grass.

#43: Composting – For garden Top soil

#44: Vegetable Garden

#45: Eco-Friendly Cleaning Products

#46: Children's block toys cut from interior and exterior trim scraps

#47: Low and Zero VOC Paint

#48: Compact Fluorescent Lights

#49: Cork Floors in new areas like Basement and Loft

#50: Bamboo Floors in new areas like Office/Extra Bed Room

Notes on one of the sample rooms in the house



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The Kitchen / Family room addition includes:

Thermal Mass Radiant Tile Floors, Zero VOC Paint, Double Insulated Walls, Low-E Architectural Series Pella Casement Windows with transoms, Multi-Speed reversible Casablanca Ceiling Fans, Locally made cabinets with mirrored backsplashes to bounce natural light, Energy Star GE Profile appliances with 'Smart Water' filtration, Natural fiber carpet for the seating area, Non-Toxic Phosphate Free Method Home cleaning products, Dual under counter recycling bins, Standby Power Reduction for Laptop and TV, Salvaged chairs, a throw quilt made from old flannel shirts, and a combination Solar Hot Water and Photovoltaic rooftop panel system.



How will they Build?

The Eco-Inspector was raised over the course of the year and a half long project.

He now lives in a house that generates its own power, and he and his play-date friends may one day change the world.

Next-Generation construction simply Saves Money and the Planet.