From Townhouse to Green House

What was done to take an ordinary townhouse and make it into a more energy efficient and sustainable residence.

- Appliances
- Lighting
- Flooring
- Other Materials & Products
- Renewable Energy
- Eco Friendly Products
- What worked and did not work
- Water Conservation Measures
- Practices for Energy Conservation
- Practices for Sustainable Living
Appliances
Appliances

When selecting new and replacement appliances the first thing I looked for was the Energy Star Label.

- Ranges, Ovens, Microwaves and Clothes Dryers do not receive Energy Star Ratings
- Look at the Energy Guide Label – not all appliances are created equal
- Televisions & Audio Video Equipment
- Ceiling Fans & Lights
- Refrigerators & Freezers
- Computers & Monitors
- Heaters & Air Conditioners
- Hot Water Heaters

http://www.energystar.gov/
Appliances

GeoSpring Hybrid Electric Heat Pump Water Heater

- Uses an advance heat pump and traditional electric elements.
- Porcelain lined tank for insulation
- 10 Year Parts Warranty
- Programmable Controls with a Vacation Mode
- Incorporates Saver’s Switch Technology
- Xcel Energy $450 rebate (Available for 2012)
- Xcel allowed self installation
- Federal Tax Credit $300 (Expired)
- ENERGY STAR® qualified
- Powered by 100% Renewable Energy
LED Lighting
# LED Lighting Cost Savings

<table>
<thead>
<tr>
<th></th>
<th>Incandescent</th>
<th>vs.</th>
<th>LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulb Life</td>
<td>1500 hours</td>
<td></td>
<td>30,000 hours</td>
</tr>
<tr>
<td>Bulb Cost</td>
<td>$3.50</td>
<td></td>
<td>$30.00</td>
</tr>
<tr>
<td>Bulbs Wattage</td>
<td>65 watt</td>
<td></td>
<td>20 watt dimmable</td>
</tr>
<tr>
<td>Number of Bulbs</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Bulb Cost</td>
<td>$17.50</td>
<td></td>
<td>$150.00</td>
</tr>
<tr>
<td>Lumens of Brightness</td>
<td>640</td>
<td></td>
<td>830</td>
</tr>
</tbody>
</table>

**Annual Operating Cost**

<table>
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<th>vs.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Bulbs + Replacement</td>
<td>$3.41</td>
<td></td>
<td>$1.46</td>
</tr>
<tr>
<td>Electricity @ $.10 /kWh</td>
<td>$9.19</td>
<td></td>
<td>$2.92</td>
</tr>
<tr>
<td>Total Cost Each Bulb</td>
<td>$12.90</td>
<td></td>
<td>$4.38</td>
</tr>
<tr>
<td>Total for 5 Bulbs</td>
<td>$64.50</td>
<td></td>
<td>$21.90</td>
</tr>
</tbody>
</table>

Based on 4 hours usage per day. GE 65 Watt Flood vs. Lights of America 20 Watt Flood
LED Lighting Cost Savings

Estimated Savings for LED Bulbs

- Annual Savings $ 8.52/per Bulb $42.60/ 5 Bulbs
- Simple Paybacks/Years 3.11 years
- Return on Investment 32.15%
- Energy Cost Saving Over Life $225.00 $1,125.00
- Total Savings Over Life $291.78 $1,458.90
- Annual Energy Savings kWh 328.50 1642.50
- Annual Carbon Footprint Savings/LBS * 426.06 2130.32

* = Per DOE US Avg.

The bottom line is... Going Green is good for your wallet too!
LED Lighting
LED Lighting
Home Remodeling
Flooring

- Used Fast Growth Woods
- Bamboo
- Sustainably Harvested Brazilian Walnut
- No- Formaldehyde Carpet
- Nike Carpet Padding
- Recycled Aggregate Tile
Remodeling Materials & Upgrades

- No VOC Paints
- Biodegradable Flooring Chips
- Whole House Fan
- Solar Attic Exhaust Fan
Remodeling Materials & Upgrades

Bio Fuels Fireplace
Energy Monitoring & Management

- Black & Decker EM100B Energy Saver Series Power Monitor
- Kill A Watt Electricity Usage Monitor
- Filtrete Wi-Fi-Enabled Programmable Thermostat
Renewable Energy
Xcel Energy Windsource®

Benefits of Wind Energy

- No carbon dioxide emissions
- No sulfur dioxide, nitrogen oxide, or mercury emissions
- No water consumption requirement
- Creates jobs
- Creates income for farmers
- Wind is forever (renewable)
- Wind energy reduces need for importing energy and exporting dollars
- To qualify, you must be an electricity customer of Xcel Energy in Colorado
- Requires a one-year commitment for residential customers
5kW Photovoltaic Array

Key Considerations for Photovoltaic System

- Utility Rebates - Xcel Solar*Rewards: Currently $1.00 per kW
- Renewable Energy Credits (REC): Currently $0.09 per kWh
- Federal Tax Credit: Currently 30% of System cost after Utility Incentives
- Out of Pocket Cost
- Payback/Return on Investment
- Local Companies
- Monitoring System

System Cost

- Grand Total (@ $3.91 / Watt) $19,539
- Xcel Solar*Rewards (@ $1 / Watt) ($5,000)
- Out of Pocket Cost (@ $2.91 / Watt) $14,539
- 30% Federal Tax Credit * ($4,362)
- Final Cost (@ $2.04 / Watt) $10,177
- Time to Break Even 7 years 11 months
- Total Profit from Solar Investment / 30 years $42,770
Solar Suppliers

Lighthouse Solar
www.lighthousesolar.com

eGauge
capture your footprint [tread lightly]

LUMOS
**Ig280 Lightgauge Monitor**

**Direct Access | Monthly Summary | Tools | Help | My Lightgauge**

<table>
<thead>
<tr>
<th>Emissions Savings</th>
<th>Total Power Summary</th>
<th>Current Performance</th>
<th>Cumulative Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>since 09-29-09</td>
<td>since 05-29-09</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO₂ saved</td>
<td>Produced</td>
<td>Consuming</td>
<td>Produced</td>
</tr>
<tr>
<td>14,013.74 lbs</td>
<td>3.46 MWh</td>
<td>11.4 MWh</td>
<td>62.0 Wh</td>
</tr>
<tr>
<td>Miles not driven</td>
<td>Consumed</td>
<td>Net</td>
<td>Consumed</td>
</tr>
<tr>
<td>13,484 miles</td>
<td>1.35 MWh</td>
<td></td>
<td>43.0 Wh</td>
</tr>
<tr>
<td>Trees planted</td>
<td></td>
<td></td>
<td>Total</td>
</tr>
<tr>
<td>4.78 tree</td>
<td></td>
<td></td>
<td>22.0 Wh sold</td>
</tr>
</tbody>
</table>

*Time range: Mon Jan 23, 9:26 AM - Wed Jan 25, 9:26 AM (Energy: 11.5 kWh generated, 30.6 kWh used, 19.1 kWh net)*

*Time zoom: Max 1y 6m 3m 1m 3w 2w 1w 4d 3d 2d 1d 12h 6h 3h 1h*

*Power zoom: Auto 200kW 100kW 50kW 10kW 5kW 1kW 500W 100W 50W*

**Legend:**
- **Power used**
- **Power generated**
- **Energy from grid**
- **Energy to grid**

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**Lighthouse Solar**

**Be part of the solution**
Eco Friendly Products
Water Conservation
Eco Friendly Products

- Paper Products – Earth First Paper Towels & Bath Tissue
- Non – Toxic Cleaning Products - Method brand cleaners & Simple Green
- Biodegradable Products - Clorox Green Works
- Dishwashing Soap - Kirkland Environmentally Friendly Dish Soap
- Hand Soap – Method Hand Wash- Non Toxic Ingredients
- Bath & Shower Gel - Alpine Xtreme Biodegradable formula
- Laundry Soap – Kirkland, ECOS® & Boulder Cleaners
- Dishwashing Detergent – Palmolive Eco, Meyers, Method & 7th Generation
Eco Friendly Products

What Worked – What Did Not Work

✓ Paper Products – Earth First Paper Towels & Bath Tissue
✓ Non – Toxic Cleaning Products - Method brand cleaners & Simple Green
✓ Biodegradable Products - Clorox Green Works
✓ Dishwashing Soap – Kirkland Environmentally Friendly Dish Soap
✓ Hand Soap – Method Hand Wash- Performed best in automatic soap dispenser
✓ Bath & Shower Gel - Alpine Xtreme Biodegradable formula
✓ Laundry Soap – Kirkland, ECOS® & Boulder Cleaners
X Dishwashing Detergent – Palmolive Eco, Meyers, Method & 7th Generation
✓ Eco Dishwashing Detergent in Pre Wash & ½ of the amount of traditional dishwashing detergent.
Water Conservation Measures

- BlueSource HYR270 HydroRight Drop-in Dual Flush Converter
- Niagara Conservation 1.5 GPM shower head
Practices for Energy Conservation & Sustainable Living
Practices for Energy Conservation

- Measure & Monitor Energy Usage
- Turn off the lights!
- Replace incandescent bulbs with LED’s
- Turn off your Computer
- Use a Smart UPS
- Unplug small appliances with LCD screens
- Unplug the wall warts
- Shorter cycles for Dishwasher
- Shorter cycles for Washer
Practices for Sustainable Living

- Recycle, Recycle, Recycle
- Recycle Old Electronics (computers, monitors, TV’s, wall warts)
- Reuse Items
- Use Eco Products
- Buy Local
- Paper or Plastic?
- Composting
- Urban Gardening
- Alternative Transportation
- Telecommute
- Buy organic foods
- Purchase products from companies with that support sustainable practices
Questions