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# Solar & Geothermal

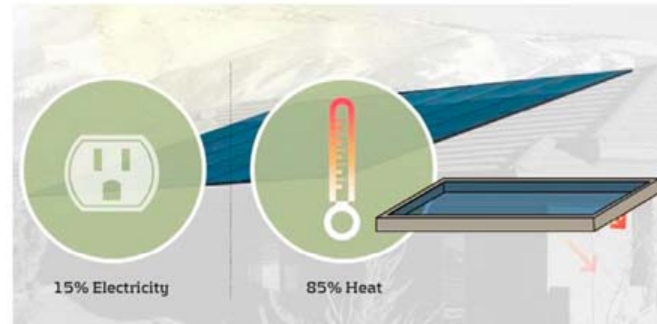
	Standard Home	Solar & Geothermal
Construction Highlights	Built to 2006 IECC code Standard efficiency appliances & HVAC	Energy Star® Certified Echo™ Solar System Electricity Hot Water Home Heating
HERS Rating	100	38
Modeled Annual Energy Costs	\$3,600 (\$300 per month utilities (Gas & Power))	\$600 (\$50 per month Gas & Power) 80% more efficient.
Estimated Annual CO <sub>2</sub> Emissions	10 Tons	5 Tons 50% less than Standard

# Web-based performance interface

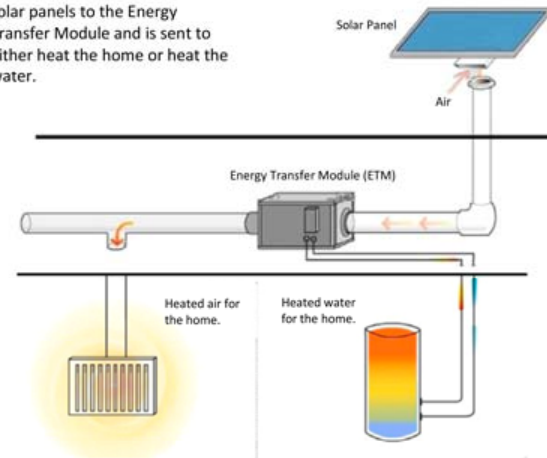
The interface displays the following information:

- Header:** echo logo, "Good afternoon Guest User", "October 11, 2009 12:02 pm", "Logout", and navigation links: Home, Energy Production, Temperature Profiles, Settings.
- TEMPERATURES:** OUTSIDE 56°, HOME 72°, WATER 75°.
- ENERGY PRODUCTION AT 11:50 AM:** 5.6 kW total, consisting of 3.2 kW HEATING and 2.4 kW ELECTRICITY.
- ALERTS:** There are no alerts at this time.
- ENERGY PRODUCTION SUNDAY, OCTOBER 11:** A line graph showing production in kW over a 24-hour period. The x-axis is labeled "HOUR" with markers at 1, 3, 6, 9, 12, 3, 6, 9, 12 am. The y-axis is labeled "kW" with markers from 0 to 10. A peak production of approximately 6.3 kW is shown around 11:50 AM.
- SYSTEM BENEFITS:** 12,592 MILES NOT DRIVEN (with car icon) and 18 TREES PLANTED (with tree icon).
- WEATHER:** Mostly Sunny, Low 50°, High 59°, Sunrise 6:36, Sunset 7:42.
- Summary Metrics:** TOTAL kWh 10.1, ELECTRICITY 6.3, HEATING 3.8, COOLING 0.0.
- Visuals:** A 3D cutaway diagram of a house with solar panels on the roof and energy flow lines. A smartphone in the bottom left shows a mobile version of the interface.
- Footer:** PVT INC. APP logo.

# Solar-Thermal

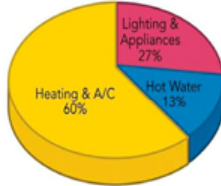


Heated air travels under the solar panels to the Energy Transfer Module and is sent to either heat the home or heat the water.



# Geothermal

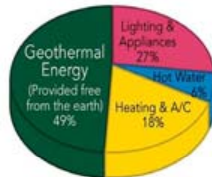
## Residential Site Energy Conventional System



Over 70% of the energy consumed by a typical single-family home is used to meet thermal loads

## Residential Site Energy Geothermal Heat Pump System

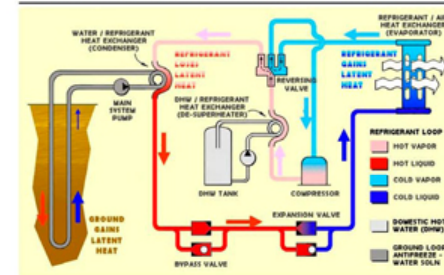
Total site energy consumption is cut in half



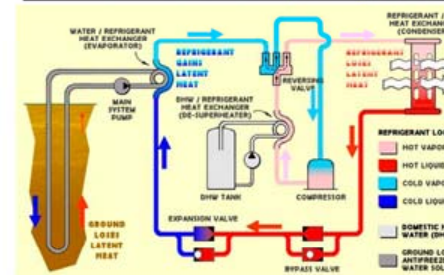
Geothermal provides all of the heating and cooling as well as supplementary hot water by utilizing the stored solar energy in the ground with a ground source heat pump (GSHP) which circulates water in a pipe buried in the ground and is delivered to the home like a standard forced air or radiant system. For every unit of energy, we are able to exchange 2-4 units of "free energy" giving us 300-500% efficiency over a conventional system that is 80-95%. In Utah, it can lower the operating costs of a home from 30-70% depending on the construction, climate and utility costs.



## How the earth works to save you energy! Cooling



## How the earth works to save you energy! Heating











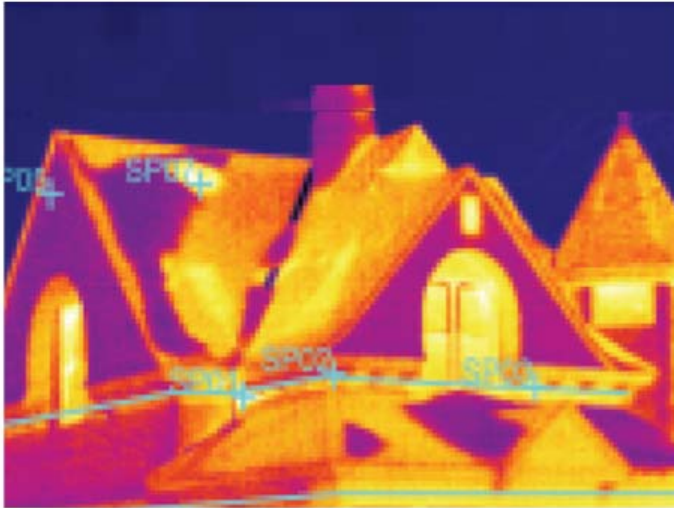




# Heat loss comparison

HERS (Home Energy Rating System)

**Standard Home (HERS Score: 100+)**



**Energy Star 3.0 (HERS Score: 38)**



# What else are we doing?



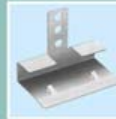
RENEWABLE, BIO-BASED  
RESOURCE-EFFICIENT  
ENGINEERED WOOD -  
LEAVING OLD GROWTH  
FORESTS UNTOUCHED



SOFTWARE DRIVEN SAW  
CUTS FLOORING JOISTS  
TO EXACT CAD SPECS -  
ELIMINATING 100 FT OF  
WASTE PER HOME



BLOWN-IN INSULATION  
(2X6 WALLS R-23 RATED)  
ARE 20% MORE EFFI-  
CIENT THAN STANDARD  
INSULATION BATTS



PREST-ON® DRYWALL  
FASTENERS ELIMINATE  
OVER 100 STUDS PER  
HOME & IMPROVE INSU-  
LATION BY 57 CUBIC FT



LOCAL SUPPLIERS AND  
LABOR ARE USED TO  
COMPLETE EACH HOME  
KEEPING THE ENVIRON-  
MENTAL IMPACT LOW



ALL OUR HOMES  
MEET OR EXCEED  
100% ENERGY STAR  
CERTIFICATION  
GUIDELINES



CONSTRUCTION  
WASTE IS RECYCLED  
AT A LOCAL UTAH  
FACILITY USING A  
LOCAL WORKFORCE



LOW-E WINDOWS  
KEEP HEAT OUT  
IN THE SUMMER  
AND INSIDE IN THE  
WINTER MONTHS

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