Acitve Energy Harvesting Systems

Solar Photovoltaic

http://southface.org/solar/solar-roadmap/solar_how-to/solar-how_solar_works.htm

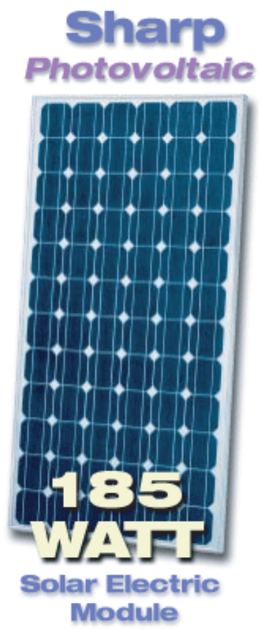
Solar I: Residential Index		
This Price Index is based upon a standard 2 kilowatt peak system, roof retrofit mounted. It is connected to the electricity grid and has battery back up to allow it to operate during times of electricity downtime. It is therefore also suitable as an Index for off grid Residential uses. The Price Index includes full system integration and installation costs.		

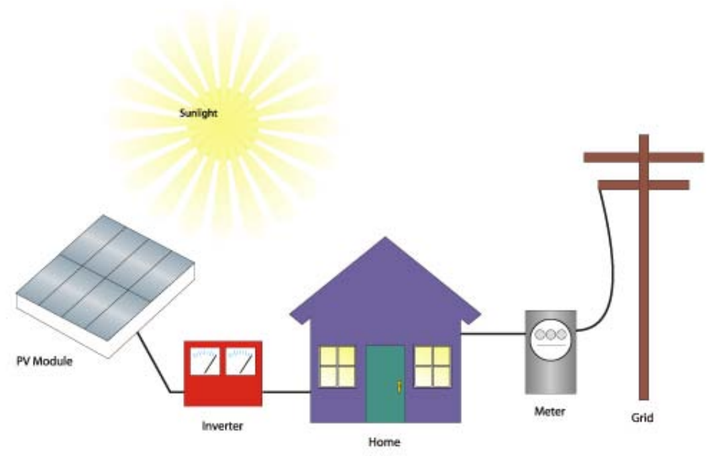
Solar I Installed Home System		
On Grid or Off Grid (2 Kilowatts)		change from prior month
Customer Price	$17,615	down $22
Sunny climate	37.24 cents kWh	down 0.06 cents kWh
Cloudy climate	81.93 cents kWh	down 0.12 cents kWh

http://www.solarbuzz.com/SolarIndices.htm

Price for "Sharp Photovoltaic" shown is $925.00 each.

http://shop.solardirect.com/product_info.php?cPath=23_161_165&products_id=416





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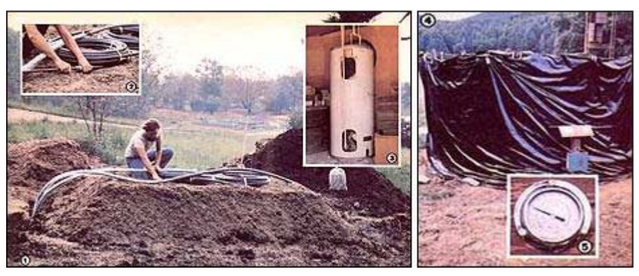
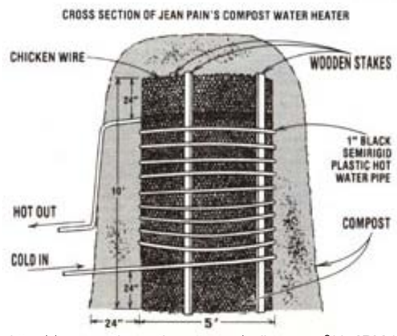
Solar Photovoltaic panels are an efficient source for renewable energy in Indiana. The panels convert energy from the sun into electricity that can be used to power the LandLab building. The solar panels have a payback time of approximately 10 years and greatly reduce the ecological footprint of the LandLab on the environment.

Composting Water Heater



http://www.motherearthnews.com/gallery.aspx?id=67932



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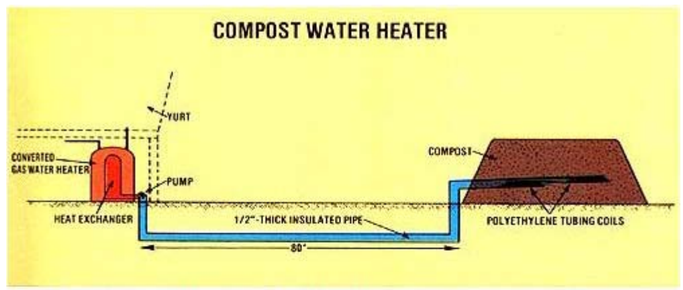
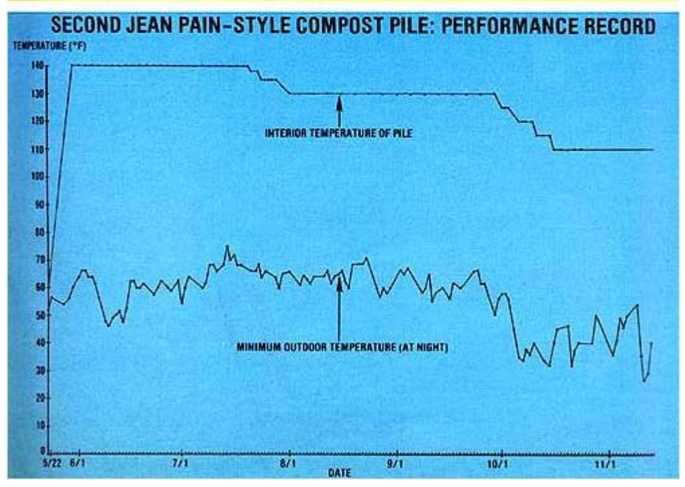




http://www.motherearthnews.com/gallery.aspx?id=67932

Compost water heating utilizes the rising temperatures created by bacteria to heat water. Various methods and materials are currently being experimented with. The compost mixture consists of three parts wood chips to one part manure and is tightly compacted. The most efficient shape has proven to be a rectangular-shaped heap sloping sides. Coils are them placed on top of the base, connecting to separate lengths of half-inch tubing, which carry water into and out of the pile's interior. After this another layer the woodchip/manure mixture is placed on top of the coils and then covered by black plastic to trap moisture and increase heat absorption. Results have varied, with the most recent results measuring a temperature of 155 degrees F for four and a half months.

Geothermal

Synergy3 Geothermal Comfort System

A Furnace, Air Conditioner, and Boiler – All in One System
A single Synergy3 system can provide forced air heating and cooling, while supplying hot water for Infloor radiant floor zones.

A Unique Feature to Produce Hot Water On-Demand
Normal geothermal systems produce hot water only when the unit is running in heating or cooling mode. On-demand hot water will command the unit to produce hot water as a separate function of the normal forced-air heating and cooling cycle.

Reliable
Sophisticated microprocessor controls and state-of-the-art components allow for years of maintenance-free service with smooth operation. GeoComfort system life spans can reach and exceed 20 years.

Economical
By moving the energy stored in the Earth instead of creating it through combustion, the Synergy3 system can save you up to 70% on your monthly utility bills over ordinary heating and cooling systems.

Safe & Clean
Geothermal systems do not burn fossil fuels. Therefore, you have no flames, no fumes, no odors, and no threat of carbon monoxide.

Best Warranty Options in the Industry
Homeowners can choose from a wide range of warranty options to suit their needs and preferences. Options range from a standard 1 year parts only and extend to 10 year parts, labor, and parts mark-up coverage. Extended warranties are covered by Equiguard.

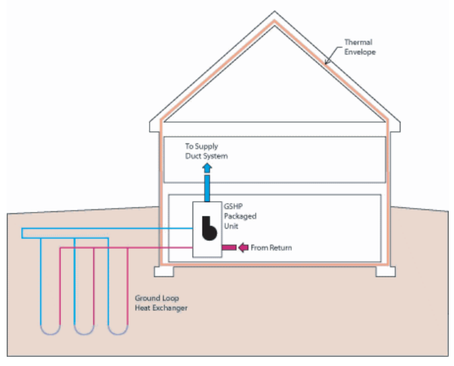
Features:

- R-22 refrigeration
- High efficiency scroll compressors operate quietly
- Cupro-nickel coaxial heat exchangers supply added protection against the damaging effects of hard water.
- Variable speed ECM2 blower motors
- Standard E-coated air coils resist corrosion and leaks for longer equipment life.
- Plastic drain pan for rust protection.
- Microprocessor controls with external LED display.

Zoom in

Specification Manual (2.1 Mb)
Consumer Brochure (0.4 Mb)
Watch Video (256 kbps)

http://www.geocomfort.com/?page=Products/Residential_Products/Synergy3



http://www.buildingscience.com/bsc/designsthatwork/verycold/section3/images/figure24.gif

System Type	Heating	Cooling	Hot Water	Annual Cost
GeoComfort Geothermal System	$302	$131	$188	$621
High Efficiency Air Source Heat Pump				$1,118
Estimated annual savings by using a GeoComfort System:				**$497***

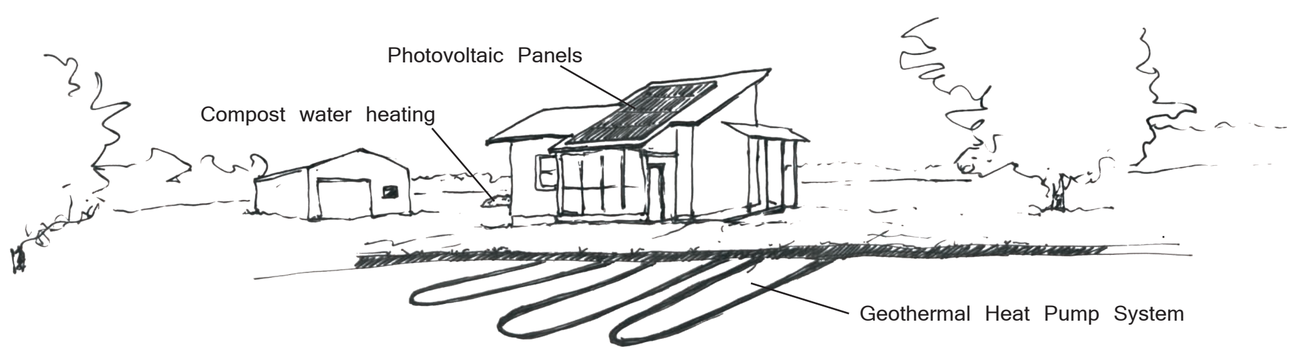
System Type	Heating	Cooling	Hot Water	Annual Cost
GeoComfort Geothermal System	$302	$131	$188	$621
High Efficiency Natural Gas & A/C				$1,089
Estimated annual savings by using a GeoComfort System:				**$468***

System Type	Heating	Cooling	Hot Water	Annual Cost
GeoComfort Geothermal System	$302	$131	$188	$621
High Efficiency Propane & A/C				$1,554
Estimated annual savings by using a GeoComfort System:				**$933***

Based on fuel costs of: $0.08/kwh for Electricity, $1.40/gal. for Propane.
Based on fuel costs of: $0.08/kwh for Electricity, $1.00/ccf for Natural Gas.

A geothermal heat pump system costs about $2,500 per ton of capacity. A typical home would use a three-ton unit costing roughly $7,500, nearly twice the price of a regular heat pump system. The size and use of the LandLab demonstration building calls for a system about half the size of the typical home, which would cost about $9,000 to install.A geothermal heat pump system costs about $2,500 per ton of capacity. A typical home would use a three-ton unit costing roughly $7,500, nearly twice the price of a regular heat pump system. The size and use of the LandLab demonstration building calls for a system about half the size of the typical home, which would cost about $9,000 to install.

BSU Landlab Active Energy Harvesting Systems



Utilizing a combination of the systems described above, the LandLab proposes a combination of the three in order to demonstrate the various technologies available, allowing for experimentation. Solar Photovoltaic panels can be installed on the roof to produce electricity for the LandLab. The system that has been envisioned is a 1 kilowatt system that would cost about $7,000-$10,000 and should be able to sufficiently power the building. A geothermal heating system can be installed for about $2,000-$2,500. And, for hot water, a composting water heating system offers many learning opportunities at a price of $500-$1,000.

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