



Facts about geothermal heat pumps

According to the Environmental Protection Agency, geothermal heat pump technology is the most energy-efficient, environmentally clean and cost-effective space conditioning system available.

Energy costs with geothermal heat pump technology typically are 25 to 50 percent less than other HVAC systems.

The use of geothermal heat pump technology lowers electricity demand by nearly 1 kilowatt (kw) per ton of capacity.

Today, more than half a million geothermal heat pump units are installed in the U.S., resulting in an annual savings of 4 billion kilowatt-hour (kwh) of electricity, eliminating the need for 20 trillion British Thermal Units (BTUs) of fossil fuels, cutting peak electrical demand by 1.3 million kw and slashing greenhouse gas emissions by 3 million tons of carbon dioxide (CO₂).

Those 500,000 installations are equivalent to:

- converting 650,000 cars to zero-emission vehicles,
- planting 190 million trees,
- reducing U.S. reliance on imported fuels by 11 million barrels of crude-oil per year or,
- eliminating the need for one 1,300 MW power plant.

Because they burn no fossil fuels on site, geothermal heat pumps generate virtually no CO₂ emissions.

Geothermal heat pump systems have a lower life cycle cost than conventional systems, even in hot, humid regions where the demand for air conditioning is high. Geothermal heat pump systems also have long equipment life (20 plus years).

If every school district that needed to replace heating and cooling systems over the next 10 years installed geothermal heat pump systems, the total energy savings during that time would exceed \$11 billion.

The electricity required to power one million homes for one year would be saved, if every school that could use geothermal heat pump technology did so.

— Illinois Currents —

How to save money from the ground up — geothermal heat-pump basics

A geothermal heat pump is probably the most efficient heating and air-conditioning system available for any home today.

Throughout its life, installing a geothermal heat pump usually makes economic sense for the average home, but always have your contractor do a payback analysis for you. If your house is extremely energy efficient and already has low utility bills, even cutting them in half with a geothermal heat pump may not justify its higher cost.

A geothermal heat pump both heats and cools your home like a common air-type heat pump, but that is where the similarities end. In the heating mode, a geothermal heat pump pulls free heat from a ground loop, well water or lake water for superhigh efficiencies.

During the summer, the energy savings can be as much as 60 percent. Some geothermal models have efficiencies as high as a seasonal energy efficiency rating (SEER) of 22 as compared to an old central air conditioner at about 8, (the higher the rating the more efficient.)

When operating in the air-conditioning mode, most geothermal heat pumps offer the option of using a desuperheater device. This device takes the waste heat from your house that is normally exhausted outdoors and diverts it to your water heater for free hot water during the summer.

Geothermal heat pumps are so energy efficient because they use the earth as the source of heat during the winter; and during the summer they exhaust indoor heat to the earth. Since the ground temperature several feet below the surface stays relatively constant year-round, a geothermal heat pump uses less electricity to heat and cool your house. Using constant-temperature water from a deep well also provides the same efficiency benefits.

During the winter, even though it feels cold outdoors, there is still heat energy in the air that a standard heat pump can "pump" into your house. At the same time, the ground temperature may be 55 degrees. It makes sense that it is easier to pull heat from the ground at 55 degrees than from the air at 30 degrees. The colder it gets outdoors, the greater the benefit.

To install a typical ground-loop system, a series of small pipes is placed in deep narrow trenches dug in your yard with a back hoe. Drilling deep vertical holes can be used as well. The pipes are connected to a heat exchanger inside the heat

An energy-efficient ground source system delivers comfort year-round while greatly reducing your energy costs. There are many other benefits that a ground source heat pump provides:

• Year-round comfort system. A ground source heat pump replaces both furnace and central air units AND can provide a substantial amount of your hot water. Owners report a higher level of comfort in their homes. In fact, 95% of GSHP owners would recommend the system to a friend.

• Cleaner air in your home. Because the system doesn't rely on outside air, a ground-source system keeps the air inside buildings cleaner and free from pollen, outdoor pollutants, mold spores, and other allergens.

• More use of space in your home. GSHPs can be installed in areas unsuitable for fossil fuel furnaces — almost anywhere inside your home — because there is no combustion and thus no need to vent exhaust fumes. It allows you to rearrange your floor plan and increase the living space.



pump. An antifreeze solution runs through the pipes to capture heat during the winter or exhaust heat during the summer.

Since a noisy outdoor condenser fan is not needed, most geothermal units are located entirely inside your house. There are designs to fit utility rooms, basements or attics. This makes servicing them easier. If you have a gas or oil furnace that still works, new outdoor geothermal heat pump units are also available so you can still use the existing furnace.

For ultimate comfort and efficiency, select a two stage model with a variable speed blower. This allows it to constantly fine tune the heating and cooling (and electricity use) to the varying needs throughout the day.

— James Dalley, www.dalley.com
James Dalley is a nationally-syndicated columnist who specializes in energy conservation by providing sensible, cost-effective tips for home energy savings.

***Safeguard your investment, always deal with a reputable contractor and be sure to check references.**