

# Geothermal Heating and Cooling Systems: Fascinating Facts\*

- Geothermal (GeoExchange) systems are the most energy-efficient, environmentally clean, and cost-effective space conditioning systems available, according to the Environmental Protection Agency<sup>1</sup>.
- The EPA found that Geothermal heating and cooling systems can reduce energy consumption-and corresponding emissions-by over 40% compared to air source heat pumps and over 70% compared to electric resistance heating with standard air-conditioning equipment.
- Geothermal systems use the Earth's energy storage capability to heat and cool buildings, and to provide hot water. The earth is a huge energy storage device that absorbs 47% of the sun's energy-more than 500 times more energy than humans need every year-in the form of clean, renewable energy. Geo systems take this heat during the heating season at an efficiency approaching or exceeding 400%, and return it during the cooling season.
- EPA found that, even on a source fuel basis – accounting for all losses in the fuel cycle including electricity generation at power plants – Geothermal systems are much more efficient than competing fuel technologies. They are an average of 48% more efficient than the best gas furnaces on a source fuel basis, and over 75% more efficient than oil furnaces. In fact, today's best Geothermal systems outperform the best gas technology, gas heat pumps, by an average of 36% in heating mode and 43% in cooling mode!
- The US GAO estimates that if Geothermal systems were installed nationwide, they could save several billion dollars annually in energy costs and substantially reduce pollution<sup>2</sup>.
- Surveys by utilities indicate a higher level of consumer satisfaction with Geothermal systems than conventional systems. Polls consistently show that more than 95% of all Geothermal customers would recommend Geothermal systems to a family member or friend.
- Geothermal systems represent savings to homeowners of 30 to 70% in heating mode, and 20 to 50% in cooling mode compared to conventional systems.
- According to the Geothermal Heat Pump Consortium's (GHPC) 400,000 annual geothermal installations by 2001 will reduce US greenhouse emissions by over 1 million metric tons of carbon dioxide each year relative to base case market projections. This reduction in carbon emissions is equivalent to taking over half a million cars off the road, or planting over a million acres of trees. A self-sustaining Geothermal industry will cause US carbon emissions to decrease by an additional 450,000 tons every year! That translates into a total annual carbon reduction of at least 5 million metric tons by the year 2010.



1. Environmental Protection Agency. Space Conditioning: The Next Frontier. Office of Air and Radiation, 430-R-93-004 (4/93)

2. General Accounting Office. Geothermal Energy. Outlook Limited for Some Uses but Promising for Geothermal. (6/94)