



Geothermal Heat Pumps in the Green Environment

Geothermal Resources Council
Geothermal Heat Pump Workshop

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Geothermal Heat Pumps Overview

- Industry
- Market
- Regulatory Issues
- Legislation
- References



GHP Terminology

- Heat Pump
- Conventional (Air-Source) Heat Pump
- Ground Source Heat Pump
- Geothermal Heat Pump
 - Water Source (except not boiler/cooling tower)
 - Direct Exchange
- GeoExchange[®]



GHP Industry

- Manufacturers
- Heating & Cooling Companies
- Ground Loop Installers
- Designers / Engineers / Architects
- Educational Organizations
- Utilities



GHP Industry

- Geothermal Resources Council
- International Ground Source Heat Pump Association
- National Ground Water Association
- American Ground Water Trust
- ASHRAE / AHRI / ACCA / AEE
- APPA / NRECA / EEI / EPRI
- Geothermal Heat Pump Consortium

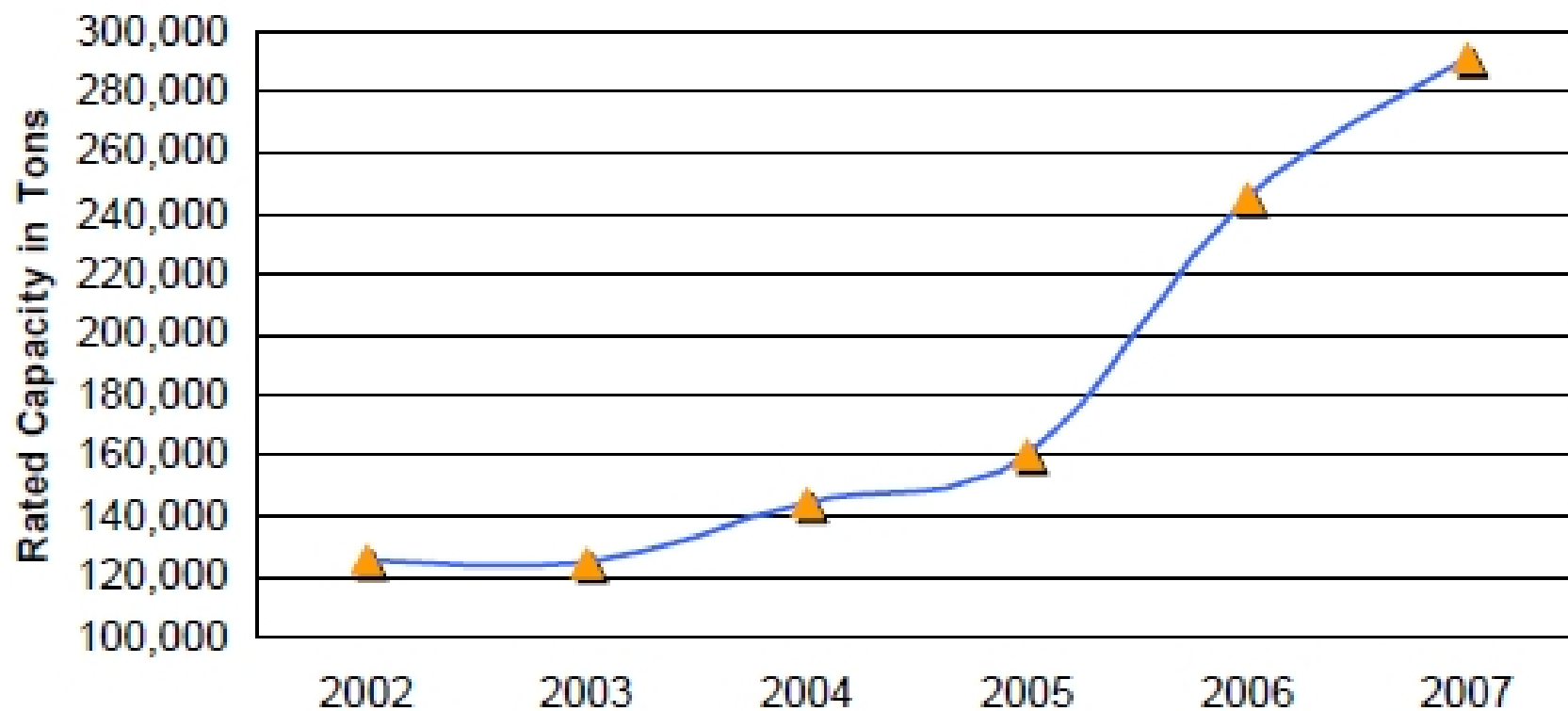


GHP Market

- Residential
- Commercial
- Institutional
 - Schools
 - Healthcare
 - Correctional
- Government: DOE, Military, GSA, USDA, etc.



GHP Market





GHP Regulation

- Refrigerants (R-22, R410a, etc.)
- Ground Water Regulation
 - Aquifer Protection
 - Anti-freeze
- Licensing
 - Ground Loop Design
 - Drilling



GHP Legislation

- Bailout Bill GHP Tax Incentives
- Stimulus Bill GHP Tax Incentives and Grants
- Renewable Electricity Standard
- Energy Efficiency Resource Standard
- Climate Change Carbon Provisions
- State RES, EERS and Incentives



GHP Resources

- U.S. Department of Agriculture
- Environmental Protection Agency
- U.S. Department of Defense
- U.S. Department of Energy
 - Federal Energy Management Program
 - National Renewable Energy Laboratory
 - Oak Ridge National Laboratory



GHP Resources

Oak Ridge National Laboratory - December 2008

Geothermal (Ground-Source) Heat Pumps:

Market Status, Barriers to Adoption, and

Actions to Overcome Barriers

http://www.zebralliance.com/docs/geothermal_report_12-08.pdf



ORNL GHP Conclusions

GHPs use the only renewable energy resource that is available at every building's point of use, on-demand, that cannot be depleted (assuming proper design), and is potentially affordable in all 50 states

Today's domestic GHP industry is better positioned for rapid growth than ever before.



ORNL GHP Conclusions

The most important trade allies to the GHP industry, electric utilities, today are better able to focus on peak load reduction and improved load factor than they were in the past when restructuring was looming.

GHPs have the potential to offset about 35 to 40 percent of the projected growth in building energy consumption between now and 2030.



ORNL GHP Conclusions

The primary GHP market failure is the expectation that building owners should finance the GHP infrastructure, or outside-the-building portion of the GHP system, such as the ground heat exchanger. GHP infrastructure will outlive the building and many generations of heat pumps, and is akin to utility infrastructure (poles and wires, underground natural gas piping).



ORNL GHP Recommendations

Assemble independent, statistically valid, hard data on the costs and benefits of GHPs

Streamline and deploy nationwide REC programs to provide GHP infrastructure

Develop and deploy programs to provide universal access to GHP infrastructure



ORNL GHP Recommendations

Ensure that GHP systems are not excluded from renewable portfolio standards and goals and related environmental initiatives



GHP Resources

- Geothermal Resources Council
<http://www.geothermal.org/>
- International Ground Source Heat Pump Association
<http://www.igshpa.okstate.edu/>
- National Ground Water Association
<http://www.ngwa.org/>
- American Ground Water Trust
<http://www.agwt.org/>
- Geothermal Heat Pump Consortium
<http://www.GeoExchange.org/>



Questions ?

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