- Education Forum -

USING THE EARTH'S RENEWABLE ENERGY

Ground Source Heating & Cooling for Residential and Commercial Properties

Latest Technologies, Economic Advantages, Environmental Impacts and Regulations

Presented by

American Ground Water Trust

16 Centre Street, Concord, NH

Ground Water Information, Awareness & Education Since 1986

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In Cooperation with:

Geothermal Heat Pump Consortium
International Ground Source Heat Pump Association

Forum Date:

Tuesday, June 24, 2008 - 8:00 am - 4:45 pm

Forum Hotel:

Holiday Inn Somerset, 195 Davidson Avenue, Somerset, NJ 08873
Tel: 732-356-1700 (Just west of New Brunswick, NJ)

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What's It All About?

Today's ground source heating and cooling (GSHC) technology provides a proven method for saving significant amounts of energy for heating, cooling and hot water generation for ANY application. Thousands of homes, businesses and manufacturing plants across the nation are already taking advantage of these energy-efficient conditioning systems. GSHC systems operate at significantly lower costs than traditional gas, oil or electric-based installations. National benefits from geoexchange installations include less demand for energy generation capacity, reduction in green-house gas emissions and a reduced dependence on imports of oil and other fossil fuels.

By definition, installation of ground source systems involves accessing the sub-surface by either excavation or by drilling vertical bores. Because the sub-surface heat-exchange process occurs near or beneath the ground water table, environmental and water resource regulatory questions about design and installation have been raised in some states.

This one-day program will:

- ➔ Define the "state of the art" in terms of design options and economic pay-back
- ➔ Demonstrate the environmental and strategic benefits of the technology
- ➔ Dispel common myths about the effectiveness, reliability and safety of ground source systems
- ➔ Explain industry-accepted installation, operation and maintenance practices
- ➔ Provide an update on state, local and regulatory oversight recommendations

Questions to be considered include:

- ➔ Are there any environmental or economic risks associated with this technology?
- ➔ Are there data that clearly demonstrate risk cause and effect?
- ➔ Do design and installation standards provide adequate environmental protection?
- ➔ Should specific professional training be required for the below-ground system installation?
- ➔ Which agencies should, or do, have, regulatory oversight for heat exchange installations?
- ➔ What are the barriers to widespread adoption of the technology for new buildings or for homeowner retrofit? What can be done to eliminate these barriers?

The Forum program draws on the experience & expertise of industry and agency professionals and will provide a unique opportunity for exchange of information among policy makers involved in energy issues and specialists involved with the design, construction and permitting of ground source geoexchange systems for cooling and heating.

Who Should Attend?

This program will be of interest to professionals who design, install, inspect, approve, recommend or regulate these systems. This technology has the potential to become the technology of choice among those considering "green energy" alternatives for commercial or residential installations.

Energy company engineers, architects, planners and conservation commissioners, building code inspectors, environmental health professionals, home inspectors, water well contractors, HVAC professionals, real estate agents, home builders and developers, town officials (Conservation, Zoning, Planning), water testing specialists should not miss this opportunity to get up to speed with this technology. It will be coming to a building near you!

American Ground Water Trust

The American Ground Water Trust is a national not-for-profit public education organization. The Trust's mission:

- ♦ Promoting efficient and effective ground water management
- ♦ Communicating the environmental and economic value of ground water
- ♦ Showcasing ground water science and technology solutions
- ♦ Increasing citizen, community and decision-maker awareness
- ♦ Facilitating stakeholder participation in water resource decisions

Forum Program

8:00 – 8:15 am **INTRODUCTION**

Garret W. Graaskamp, P.G., Hydrogeologist, American Ground Water Trust, Concord, NH

- Concept of Resource Sustainability
- Geologic Considerations

8:15 – 8:40 am **NEW JERSEY'S ENERGY INITIATIVE - GROUND SOURCE ENERGY OVERVIEW**

Joseph Sullivan, Ombudsman, Office of Clean Energy, NJ Board of Public Utilities, Newark, NJ

- Overview of New Jersey's Energy Initiatives
- New Jersey's economic perspective of reducing electrical energy demands and the need for infrastructure investment
- Potential impact of geoexchange technology on New Jersey's energy security
- Ground Source technology impact on New Jersey's efforts to reduce CO2 emissions

8:40 – 9:40 am **THE STATUS OF THE "GEOTHERMAL" INDUSTRY**

Daniel Ellis, President, ClimateMaster, Oklahoma City, OK

- Geographic distribution of geothermal installations, nationally and in New Jersey
- Trends in the growth of geothermal applications
- Market potential and market predictions for the geothermal industry
- How the Geothermal industry is organized nationally, regionally and locally
- What appear to be the barriers to greater acceptance of geothermal installations?

9:40 – 9:55 am **NETWORKING BREAK**

9:55 – 10:45 am **GROUND SOURCE EARTH COUPLING DESIGN PRINCIPLES**

Mike Kapps, Vice President, Loop Systems, WaterFurnace International Inc., Indianapolis, IN)

- Explanation of the methods:
  - Closed loop – vertical, horizontal (slinky)
  - Open system – to surface, to diffusion
  - Heat exchanger systems for surface water (ponds and lakes)
- Weighing positives and negative aspects of each earth coupling method
- Design considerations for geothermal wells in bedrock vs. shallow sand & gravel wells
- What makes one well more efficient than another for thermal transfer?
- Common misconceptions about the geothermal earth coupling

Forum Program (continued)

10:45 – 11:35 am GROUND SOURCE HEAT PUMPS - THE FUNDAMENTALS

John Sima, III, P.E., Hydro Dynamic Engineering, LLC, Southington, CT

- Understanding the basic physics of the heat transfer process
- Explanation of terminology (geoexchange, geothermal, ground source, BTUs, tons etc.)
- How the heat exchange process works for heating and cooling
- What happens to the heat transferred underground – are there any risks?
- How to measure the efficiency of geothermal systems
- Primary differences between geothermal and traditional HVAC applications
- What should a home inspector, Realtor or prospective purchaser look for?
- Application of ground source heating and cooling systems in New Jersey

11:35 am – 12:15 pm GEOEXCHANGE WELL CONSTRUCTION for THERMAL EFFICIENCY and ENVIRONMENTAL PROTECTION

Jim Moench, Certified IGSHPA Installer, Geothermal Services, Inc, Mays Landing, NJ

- Review of typical New Jersey installations. Is there a "good, better or best" type?
- The basis for selecting installation materials (well casing, grout, propylene glycol, methyl alcohol. etc/)
- Use of an existing well for a geothermal application. Can it be done?
- How does a ground source heat pump well differ from a drinking water well?
- Common problems that can result from installation errors
- What to do if a closed loop develops a problem, etc.

12:15 – 1:15 pm LUNCH (Provided on site)

1:15 – 2:15 pm ECONOMIC SUCCESS STORIES – THE PAYBACK - Residential, Commercial and Industrial

Jack DiEnna, Executive Director, Geothermal National & International Initiative, Washington, DC

- How to do the short-term and long-term math on energy saving vs. installation cost?
- What is the typical payback period and Return on investment (ROI)?
- How do geothermal installations add equity value to a property?
- What are the typical servicing and maintenance needs and costs for a geothermal system?
- What is the relationship among architect, system designer and installer? (Who is selling to whom?)
- Case studies of installation and operation in New Jersey (homes, churches, schools, offices etc.)

2:15 pm – 2:55 pm GEOEXCHANGE SYSTEM INSTALLATIONS The LEED PERSPECTIVE

Raymond Johnson, Principal, Concord Engineering Group, Voorhees, NJ;

- What is Leadership in Energy and Environmental Design (LEED)?
- Overview of the various Green Building rating systems:
  - United States Green Building Council (USGBC)
- Overview of the LEED rating systems - Commercial vs. Residential
- How is a building's heating and cooling system (energy-use) evaluated in the LEED rating system?
- How do Ground Source Heating and Cooling systems achieve LEED rating points?

Forum Program (continued)

2:55 pm – 3:10 pm **Networking Break**

3:10 pm – 3:50 pm **LARGE-SCALE GEOTHERMAL INSTALLATIONS: PROSPECTS FOR GROWTH**

Phil Rawlings, CGD, TRC Energy Services, Greenfield, TX

- Regulatory and permitting issues
- System Aesthetics – Less means more
- Design criteria for large heating and/or cooling demands
- How ground/site conditions impact ground heat exchanger design and application
- Ground source heat pump system economics
- Environmental considerations: Installation and Operation
- The Economics of Efficiency
- System Performance

3:50 pm – 4:30 pm **GEOEXCHANGE INSTALLATIONS STATE and LOCAL RULES and REGULATIONS**

Fred Sickels, Assistant Director, of the Water Supply Element,
New Jersey Department of Environmental Protection, Trenton, NJ

- Health concerns from installation and/ or operation of geothermal systems
- Environmental & water resources concerns from drilling, heat exchange or well failure
- Current regulatory requirements in New Jersey
- "Paperwork" burden for installation of a geothermal system
- Perception of "risks" to the integrity of ground water or aquatic environments
- In what instances do drinking water regulations apply to geothermal wells?
- Licensing requirements for geothermal well and heat-exchange equipment installers

4:30 – 4:45 pm **Wrap-up and Adjourn**

- Further Questions and CEU sign-out