

# Program Outline

## 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

50 Pleasant Street, Suite 2, Concord, NH 03301-4073  
Ground Water Information, Awareness & Education Since 1986



*In Cooperation with:*

Geothermal Heat Pump Consortium  
International Ground Source Heat Pump Association



*Forum Time:*  
**8:00 am - 4:45 pm**

### Continuing Education Credits Available

We are pre-approved for:

ARCHITECT CREDITS - 7.25 LUS (FOR HSW AND SUSTAINABLE DEVELOPMENT) THROUGH THE AIA  
AMERICAN SOCIETY OF HOME INSPECTORS - 7.0 ASHI® CE CREDITS

Other CEUs pending. Call for details 800-423-7748

## Forum Program

#### 8:00 – 8:20 am INTRODUCTION

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

- Concept of Resource Sustainability
- Ground Water and Geologic Considerations

#### 8:20 – 8:50 ENERGY INITIATIVE - GROUND SOURCE ENERGY OVERVIEW SPEAKER TO BE ANNOUNCED

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

**8:50 – 9:40 THE STATUS OF THE “GEOHERMAL” INDUSTRY  
SPEAKER TO BE ANNOUNCED**

- Geographic distribution of geothermal installations, nationally and in Washington
- 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 – 10:30 GROUND SOURCE EARTH COUPLING DESIGN PRINCIPLES  
SPEAKER TO BE ANNOUNCED**

- Explanation of the methods:
  - Closed loop – vertical, horizontal (slinky)
  - Open Loop - release to surface or second well
  - Heat exchanger systems for surface water (ponds and lakes)
- Which work in the State - 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

**10:30 – 10:45 NETWORKING BREAK**

**10:45 – 11:35 GROUND SOURCE HEAT PUMPS - THE FUNDAMENTALS  
SPEAKER TO BE ANNOUNCED**

- 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 the State

**11:35 – 12:15 GEOEXCHANGE WELL CONSTRUCTION for THERMAL EFFICIENCY and  
ENVIRONMENTAL PROTECTION  
SPEAKER TO BE ANNOUNCED**

- Review of typical installations in the State. Is there a “good, better or best” type?
- The basis for selecting installation materials (well casing, grout, optional antifreeze, 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 LUNCH (Provided on site)**

**1:15 – 1:30 THERMAL GROUTS - TYPES and PROPERTIES  
SPEAKER TO BE ANNOUNCED**

- Why grout a ground source heat pump boring?
  - Energy (heat) transfer media efficiency
  - Ground water protection
- What are the properties of an efficient and effective thermal grout?

**1:30 – 2:15 ECONOMIC SUCCESS STORIES – THE PAYBACK - Residential, Commercial and Industrial  
SPEAKER TO BE ANNOUNCED**

- 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?)

**2:15 – 2:55 GEOEXCHANGE SYSTEM INSTALLATIONS: The LEED Perspective  
SPEAKER TO BE ANNOUNCED**

- 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?

**2:55 – 3:10 NETWORKING BREAK**

**3:10 – 3:50 CASE STUDIES GEOEXCHANGE INSTALLATIONS - INNOVATION AND PROSPECTS FOR  
GROWTH  
SPEAKER TO BE ANNOUNCED**

- 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 – 4:30 GEOEXCHANGE INSTALLATIONS: STATE and LOCAL RULES and REGULATIONS  
SPEAKER TO BE ANNOUNCED**

- 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 the State
- "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 Wrap-up and Adjourn**

- Further Questions and CEU sign-out

We will be updating this program as new information becomes available.  
Please check back or contact us if you have any questions about the program.  
Call 800-423-7748 or send an email to [trustinfo@agwt.org](mailto:trustinfo@agwt.org).