

# GEOHERMAL HEATING AND COOLING INNOVATIONS: DESIGN, FINANCING AND REGULATION

## WORKSHOP

**Location:** The Doubletree Hotel - Richmond Airport  
5501 Eubank Road, Sandston, VA 23150

**Date:** Wednesday, June 5, 2013

**Time:** 8:00am to 4:45pm

Convened by the:

**American Ground Water Trust**

Concord, NH

501(c)(3) Education Organization



## SPONSORS



**In cooperation with:**

International Ground Source Heat Pump Association

### Continuing Education Credit

Architect Credits – 7.25 LUs (FOR HSW), AMERICAN INSTITUTE OF ARCHITECTS (PROVIDER G521)(COURSE # GS1305)

Virginia Architects, Engineers and Geologists (Pre-Approval not required)

Virginia Well Contractors - CONTACT HOURS THROUGH VA DPOR (PROVIDER # 2730000252) (PENDING)

Maryland Architects – 7.25 CEUs, MARYLAND BOARD OF ARCHITECTS,

Maryland Water Well Contractors – 7.25 CE Hrs, MD DEPT OF ENVIRONMENT; BRD OF WELL DRILLERS (PENDING)

IGSHPA Accredited Installers – 0.75 CEU's

Call for details about other professions - 800-423-7748

### WHO SHOULD ATTEND?

This program is geared to potential end-users and to professionals who design, install, inspect, approve, recommend or regulate geothermal systems. Geothermal is the technology of choice among those considering "green energy" options for commercial or residential installations.

Energy company engineers, architects, planners & 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 etc. should not miss this opportunity to get up to speed with this technology.

## WHAT IT IS ALL ABOUT

Geothermal heating and cooling technology is advancing rapidly as implementation becomes more wide-spread and accepted in the HVAC market. These systems are appropriate to virtually all types of space-conditioning applications, including, office buildings, schools, historic structures, low income housing, hospitals, and ice rinks to name a few examples. This workshop covers new innovations in system design, financing options and regulation that are lowering initial costs and increasing savings during operation.

### Workshop Objectives:

- Define the “state of the art” in terms of design options and economic payback
- Explain financing-entity ownership , tax-breaks, incentives and subsidies available for installing geothermal
- Demonstrate the environmental and strategic benefits of the technology
- Explain industry-accepted installation, operation and maintenance practices.
- Explain the importance of proper ground loop installation and groundwater protection
- Explain Net-Zero design and system integration principles
- Illustrate the environmental scalability of GHP HVAC systems to continuously reduce carbon footprint.
- Demonstrate the essential connection between subsurface conditions and system design and operation and how to get the right information
- Describe the special steps and importance of geothermal system commissioning
- Provide an update on state, local and federal regulatory oversight

The 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 geothermal systems for cooling and heating. Geothermal has the potential to become the technology of choice among those considering “green energy” options for commercial or residential installations. This one-day program is an incredible opportunity to learn from experienced professionals who are on the forefront of geothermal innovation. Geothermal will be coming to buildings near you!

# Program

**7:30am – 8:00 Registration (Coffee and Donuts)**

**8:00am – 8:40 Resource Sustainability and Geothermal Heating and Cooling Concepts**

**Garret Graaskamp, PG, AI**, Hydrogeologist, American Ground Water Trust, Concord, NH

- Water and Energy – The Sustainability Nexus
- Geothermal Heating and Cooling Fundamentals
- Installations to ensure Groundwater Protection

**8:40am – 9:25 Status of the Geothermal Industry**

**Scott Emery**, Director, Bowman Geothermal, Manassas, VA

- Geographic distribution of geothermal installations
- 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?

**9:25am – 10:10 Financing Innovations for Geothermal Installations**

**David Neale**, VP of Marketing and Business Development, EnergyWise Partners LLC. Rochester, NY

- What is a GHP HVAC system financing-entity ownership model?
- System Leasing verses Thermal Purchase Agreements
- What type of energy monitoring is needed to document BTU usage?
- How does monitoring enhance system support and warranty?
- Can this model be retrofitted to existing installations?
- How does the financing-entity method work to increase GHP HVAC system sales?

**10:10pm – 10:25 Networking Break**

**10:25am – 11:10 More than a “hole in the ground”- Drilling techniques - Logistics and Grout**

**Dennis Duty**, Senior Field Services Technical Representative, Baroid IDP, Buckingham, VA

- Criteria for selecting a drilling contractor for geothermal projects
- Matching the drilling equipment and drilling methods to the geological and site conditions
- Geothermal Design – What geologic data is needed – what is not?
- Installing the vertical loop into the drilled bore – Do’s and Don’ts that cost money
- Grouting material properties and options for geothermal projects
- Techniques of grout placement to meet geothermal design specifications

**11:10am – 11:50 Formation Thermal Conductivity Tests – How they Reduce Initial and Operational Costs**  
**Harrison Crecraft, Ph.D, CPG, CGD**, Geothermal Project Manager/ Geologist, Bowman Geothermal, Manassas, VA

- What is a Formation Thermal Conductivity test?
- Why should a FTC test be included in the Scope of Work?
- When should a FTC be completed?
- Who should conduct the FTC to avoid conflicts?
- Where should the FTC boring(s) be located?

**11:50am – 12:50 Lunch** (Provided on Site)

**12:50pm –1:30 Hybrid systems - Innovative GHP/GHEX System Design**  
**Gene Slavens**, Geothermal Development Manager, ClimateMaster, Oklahoma City, OK

- Advantages of hybrid for summer and winter demands
- Costs and life-cycle benefits
- Tax incentives and cost benefits of hybrid systems
- Case study example of a 750 ton installation
- Design Comparison of GHPs v. Variable Speed compressor Air-to-Air HPs

**1:30pm – 2:15 Net-Zero Design Principles**  
**Roger Frechette, III, PE, LEED AP**, Principal, Sr. Mechanical Engineer, Interface Engineering, Reston, VA

- Net zero energy definitions and overview
- Methodology for approaching "near-zero", "net-zero" and "positive energy" building designs
- Applications and advantages for GSHPs in net zero energy buildings
- Applications for both New and Renovation projects
- Design solutions and "bio-mimicry."
- Case Study: Burj Khalifa in Dubai (World's tallest building)

**2:15pm – 3:05 Designing Geothermal HVAC Systems - Pump Energy Optimization Using Variable Frequency Drives**

- John Manning, PE**, Principal, Earth Sensitive Solutions LLC, Auburn, NY
- System Piping Arrangements – Do's and Don'ts
  - System Balancing and Important Decisions
  - Equipment Selection – HVAC System Type and Integration
  - Calculating energy savings using VFD pumps
  - Energy Management System Controls - Interface and Operational Considerations

**3:05pm – 3:20 Networking Break**

**3:20pm – 4:05 Commissioning a GHP System – Missing the Last Step Costs Money**  
**JT Smith, PE, LEED AP BD+C**, Vice President, L + Smith ENGINEERS, PLLC, Glen Allen, VA

- How is a GHP HVAC system "Commissioned?"
- Design and Installation Mistakes – Where do they hide?
- What observations and measurements cannot be overlooked?

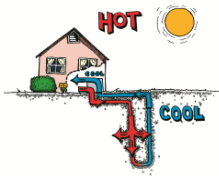
**4:05 – 4:45 Monitoring Geothermal Systems**  
**Dave Conrath, IDSA**, Director of Sustainable Innovation, Facilities Solutions Group LLC, Reston, VA

- The Geothermal HVAC system – The Value of System Assessment
- What's important, and to whom?
- What is the difference between Monitoring and Metering?
- Performance Metrics – What should be measured?
- Case Study: Alexandria City (VA) Public Schools Retrofit Project

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

- Further Questions and CEU sign-out

**"Best one-day program on GEOTHERMAL"**



Another Education Program from:  
**American Ground Water Trust**  
 50 Pleasant Street (Suite 2)  
 Concord, NH 03301



# GEO THERMAL

Get CEUs

## Innovations: Design, Financing and Regulation

**Wednesday, June 5, 2013 ~ The DoubleTree Hotel - Richmond Airport  
 5501 Eubank Road, Sandston, VA**

- ☞ GEO REDUCES THE CARBON FOOTPRINT
- ☞ GEOTHERMAL COMMISSIONING METHODS
- ☞ NET-ZERO BUILDINGS - HOW TO GET THERE
- ☞ FINANCIAL INCENTIVES & ALTERNATIVE FINANCING
- ☞ THERMAL PURCHASE AGREEMENTS & LOOP LEASING
- ☞ GEOTHERMAL HEATING AND COOLING - SAVES \$\$\$ and ENERGY

### GEOTHERMAL PROGRAM -- REGISTRATION FORM

Wednesday, June 5, 2013 ~ The DoubleTree Hotel - Richmond Airport, 5501 Eubank Road, Sandston, VA 23150

<b>Registration (General)</b>	<b>\$195</b>	<input type="checkbox"/>
<b>Registration (AGWT Members)</b>	<b>\$165</b>	<input type="checkbox"/>
<b>Registration (Government- fed, state, local)</b>	<b>\$165</b>	<input type="checkbox"/>
<b>Registration (Full-time Student) (ID required)</b>	<b>\$ 90</b>	<input type="checkbox"/>
<b>CD of Presentations (\$50 for non-Registrants)</b>	<b>\$ 20</b>	<input type="checkbox"/>
<b>Exhibit Table (does not include registration)</b>	<b>\$200</b>	<input type="checkbox"/>

[Walk-in registration (on day of event) \$225]

**TOTAL \$ \_\_\_\_\_**

**PAYMENT:**  Check [payable to: American Ground Water Trust]  
 AMEX  Visa  MasterCard  PO  
**Credit Card or PO No.** \_\_\_\_\_ **Expiration** \_\_\_\_\_

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#### CANCELLATION POLICY

- Cancellations received in the AGWT office by 5 pm EST 5 days prior to event will receive a full refund less \$25.
- For cancellation 4-2 days prior to the there is a 50 % refund.
- Cancellations one day prior to the start of the event or on the day of the event are considered "No Shows" and no refund will be made - (substitutions gladly accepted).
- The Trust will not cancel a program because of bad weather conditions. Except that, as the result of an event cancellation resulting from, (but not limited to) circumstances such as a state mandatory evacuation or a fire at the program facility, the Trust will reschedule the event and honor registrations as payment for the new event.

#### SPONSORSHIP & EXHIBITS

Showcase company achievements, expertise, projects, products & services  
 Call 800 423-7748 or visit web-site

The DoubleTree Hotel – Richmond Airport is holding a limited number of rooms at a **special room rate of \$99 (single)** for attendees through May 19 under the "American Ground Water Trust" event. Call: 804-226-6400.

**Return by mail: American Ground Water Trust, 50 Pleasant Street, Concord, NH 03301**

**Return by fax: (603) 228-6557 Call to register (800) 423-7748**

**Register on line <http://www.agwt.org> (Conferences/workshops)**