

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

## WORKSHOP

Location: Holiday Inn – DFW Airport West  
3005 Airport Freeway, Bedford, TX 76021

Date: Wednesday, November 6, 2013

Time: 8:00 AM to 4:45 PM



Convened by the:  
**American Ground Water Trust**  
Concord, NH  
501(c)(3) Education Organization



## SPONSORS



Preferred Pump

### In cooperation with:



ASHRAE – Dallas Chapter  
International Ground Source Heat Pump Association  
Southern Methodist University Geothermal Laboratory  
Texas Ground Water Association



### Continuing Education Credit

ARCHITECT CREDITS – 7.25 LUs (FOR HSW) THRU THE AMERICAN INST. OF ARCHITECTS (PROVIDER #G521)(COURSE #1310)

TEXAS ENGINEERS – 7.25 CEUs (SELF CERTIFICATION PER THE TX BOARD OF PROFESSIONAL ENGINEERS)

TEXAS GEOLOGISTS – 7.25 CEUs (SELF CERTIFICATION PER THE TX BOARD OF PROFESSIONAL GEOSCIENTISTS)

TEXAS WATER WELL CONTRACTORS – 7.0 CE HOURS APPROVED THROUGH THE TEXAS DEPT. OF LICENSING & REGULATION

IGSHA 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, maintain, 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 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

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

- 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
- Legislative Efforts to Grow the Industry

## 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 versus Thermal Purchase Agreements – What’s the difference?
- How does the financing-entity method work to increase GHP HVAC system sales?
- How does monitoring enhance system support and warranty?
- Can this model be retrofitted to existing installations?

## 10:10am – 10:25 Networking Break

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

**Benito Gonzalez**, Account Representative, Baroid IDP, Fort Worth, TX

- 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 – 11:55 GHP HVAC Design with Variable Frequency Drive Compressor Geothermal Heat Pumps  
– Special Considerations**

**Mike Springer**, Texas Territory Sales Manager, WaterFurnace International, Southlake, TX

- How does a VFD compressor GHP work?
- Loop design- Turbulent Flow- Is it still necessary?
- Can VFD GHPs reduce the size of a loop field?
- Duct Sizing and Layout Considerations- The old rules apply, but with new options
- How does the VFD GHP help to balance air flow?
- VFD GHP Application

**11:55am – 12:45 Lunch** (Provided on-site)

**12:45pm – 1:35 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

**1:35pm – 2:15 LEED Gold Design: A Path to Net Zero Energy Building-  
Considerations in Going the Distance to Net Zero**

**Susan Smith, AIA, LEED AP**, Vice President, Corgan Associates, Dallas, TX

- Net zero energy definitions and overview
- What design decisions and operating outcomes control attainment of both LEED and NZEB?
- Contributing systems and factors in achieving Net Zero
- Why do LEED and NZEB sometimes reach different outcomes?
- Case Study: Lady Bird Johnson Middle School

**2:15pm – 2:55 Designing Geothermal HVAC Systems -  
Pump Energy Optimization Using Variable Frequency Drives**

**Steve Hamstra, PE**, Chief Technology Officer, Greensleeves, LLC, Zeeland, MI

- 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

**2:55pm – 3:10 Networking Break**

**3:10pm – 3:50 Monitoring Geothermal Systems**

**Steve Hamstra, PE**, Chief Technology Officer, Greensleeves, LLC, Zeeland, MI

- 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?
- Actual operating cost vs. projected
- Value for trending of key performance values – End User
- Value for trending of key performance values – GSHP Industry

**3:50pm – 4:35 Commissioning GHP Systems – Achieving Anticipated Performance**

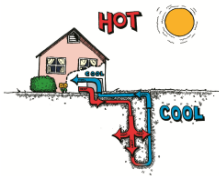
**Don Penn, PE, CGD**, Principal, Image Engineering Group, Grapevine, TX

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

**4:35pm – 4:45 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, November 6, 2013 ~ Holiday Inn – DFW Airport West  
 3005 Airport Freeway, Bedford, TX

- ☞ VFD GHP COMPRESSER INNOVATIONS
- ☞ GEOTHERMAL COMMISSIONING METHODS
- ☞ NET-ZERO BUILDINGS - HOW TO GET THERE
- ☞ THERMAL PURCHASE AGREEMENTS & LOOP LEASING
- ☞ SYSTEM MONITORING & PERFORMANCE INTEGRATION

## GEOTHERMAL PROGRAM -- REGISTRATION FORM

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<b>Registration</b> (General)[All walk-in registrations on event day \$225]	<b>\$195</b>	<input type="checkbox"/>
<b>Registration</b> (AGWT Members)	<b>\$165</b>	<input type="checkbox"/>
<b>Registration</b> (Government- federal, state, county, local)	<b>\$165</b>	<input type="checkbox"/>
<b>Registration</b> (Official Representatives of 501(c)(3) Organizations)	<b>\$165</b>	<input type="checkbox"/>
<b>Registration</b> (Members of Dallas Chapter of ASHRAE)	<b>\$165</b>	<input type="checkbox"/>
<b>Registration</b> (Members of IGSHPA)	<b>\$165</b>	<input type="checkbox"/>
<b>Registration</b> (Members of Texas Ground Water Association)	<b>\$165</b>	<input type="checkbox"/>
<b>Registration</b> (Full-time Student) (ID required)	<b>\$ 90</b>	<input type="checkbox"/>
<b>CD of Presentations</b> (\$50 for non-Registrants)	<b>\$ 20</b>	<input type="checkbox"/>
<b>Exhibit Table</b> (does not include registration)	<b>\$200</b>	<input type="checkbox"/>

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

**PAYMENT:**  Check [payable to: American Ground Water Trust]  
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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

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 Call 800 423-7748 or visit web-site

The **Holiday Inn** is holding a limited number of rooms at a **special room rate of \$79** for attendees through October 25 under the "American Ground Water Trust" event. Call: Tel: 817-684-6300.

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/events>