

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

## WORKSHOP

**Location:** Holiday Inn and Monroe Street Conference Center  
2725 Graves Road, Tallahassee, FL 32303

**Date:** Thursday, April 4, 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) THROUGH THE AMERICAN INST. OF ARCHITECTS (PROVIDER #G521)

FLORIDA ARCHITECTS – 7.25 CEUs BRD OF ARCHITECTURE AND INTERIOR DESIGN (PROVIDER #396)

FLORIDA ENGINEERS – 7.25 CE HRS, FLORIDA BD OF PROFESSIONAL ENGINEERS (PROVIDER #4323)

FLORIDA WATER WELL CONTRACTORS – 7.0 CE Hrs, FL WATER WELL CONTRACTOR CE PROGRAM (COURSE #124-0405013-101)

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 the importance of proper ground loop installation and groundwater protection
- 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 issues

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

**Mike Murphy**, Southeast Region Residential Manager, ClimateMaster, Saint Simon Island, GA (Invited)

- 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 and the Payback from for Geothermal Installations

**Keith Swilley**, Marketing Manager, Gulf Power Company, Pensacola, FL

- What is the typical payback period and Return on Investment (ROI)?
- What Financial Incentives are available to purchasers (tax credits, rebates and exemptions, subsidies,
- How do geothermal installations add equity value to a property?
- Alternative financing models to help customers over first-cost barriers and increase sales:
  - On-bill financing
  - Loans and Leasing
  - Energy Service Company (ESCO) / Micro-Utility
- What type of energy monitoring is needed to document BTU usage?

## 10:10am – 10:30 Networking Break

## 10:30am – 11:15 More than a “hole in the ground”- Drilling techniques - Logistics and Grout

**Doug Keller**, Field Services Technical Representative, Baroid IDP, Lake Helen, FL

- 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

**11:15am – 12:00 Formation Thermal Conductivity Tests – How they Reduce Initial and Operational Costs**

**Dave Henrich**, Vice President, Precision Geothermal, Inc. Maple Plain, MN

- What is a Formation Thermal Conductivity test?
- How do they work?
- 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?

**12:00pm – 12:50 Lunch**

**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 – 2:10 Designing Ground Loop Fields for HVAC Systems -  
Pump Energy Optimization Using Variable Frequency Drives**

**David Phillips, CGD**, Principal, Energy Design Corporation, Fort Walton Beach, FL

- Ground Loop Heat Exchanger System Software – Loop Sizing Considerations
- System Piping Arrangements – Do's and Don'ts
- System Balancing and Important Decisions
- Equipment Selection – HVAC System Type and Integration
- Planning for System Flushing and Purging

**2:10pm – 2:55 Aquifer Thermal Energy Storage – Open Loop Design Innovation**

**Chuck Hammock, PE, LEED AP, CGD**, Principal, Andrews, Hammock & Powell, Inc, Macon, GA

- How does Aquifer Thermal Energy Storage (ATES) work? - Fundamentals of design
- Borehole Thermal Energy Storage (BTES) – How does it compare to ATES?
- What are the advantages and disadvantages of ATES over a traditional open loop well design?
- Why are there so many ATES systems in operation in Europe, but uncommon in the United States?
- Case study from the Southeastern United States

**2:55pm – 3:15 Networking Break**

**3:15pm – 4:00 Commissioning of a Ground-Coupled and Open-Loop Hybrid Geothermal System**

**Steve Griffin, PE, LEED AP, CGD**, Principal, Indoor Environmental Solutions, Jacksonville, FL

- Hybrid Geothermal System (Ground coupled and Open-Loop)
- Sequence of Operations
- Commissioning Closed Loop and Ground Loop
- Commissioning of VFDs - well pumps and closed loop pumps
- Critical Items to Consider

**4:00pm – 4:45 Case Study – Geothermal System Expansion and Load Diversity Assessment**

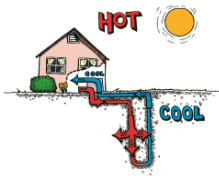
**Krishna Achath, PE, LEED AP, CGD**, Project Manager, Indoor Environmental Solutions, Jacksonville, FL

- Amelia Island Residence – 16,000 Sq Ft. gets a 5000 sq ft. addition
- Can a 50% increase in required capacity be accommodated with the existing geothermal system?
- Determine load diversity on the existing system
- Role of controls and monitoring requirements
- Upgrading pumps and other devices

**4:45pm – 4:50 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

Thursday, April 4th, 2013, Holiday Inn & Monroe Street Conference Center  
 2725 Graves Road, Tallahassee FL

- ☞ AQUIFER THERMAL ENERGY STORAGE- THE "NEW Pre-CHARGE" LOOP
- ☞ GEO REDUCES THE CARBON FOOTPRINT- SAVE \$\$\$
- ☞ GEOTHERMAL COMMISSIONING METHODS- SAVE \$\$\$
- ☞ FINANCIAL INCENTIVES & ALTERNATIVE FINANCING- Save \$\$\$
- ☞ GEOTHERMAL COOLING AND HEATING- SAVES \$\$\$ and ENERGY

## GEO THERMAL PROGRAM -- REGISTRATION FORM

Thursday, April 4, 2013 ~~ Holiday Inn & Monroe Street Conference Center 2725 Graves Road, Tallahassee FL

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

Cardholder Name \_\_\_\_\_

Registration Name \_\_\_\_\_

Title/Position \_\_\_\_\_

Company/ Organization \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_ Fax \_\_\_\_\_ E-Mail \_\_\_\_\_

### 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 **Holiday Inn and Suites** is holding a limited number of rooms at a **special room rate of \$139 (single)** for attendees through March 20 under the "American Ground Water Trust" event. Call: 850-536-2000.

**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)**