

GEOHERMAL HEATING AND COOLING INNOVATIONS: DESIGN, FINANCING AND REGULATION

WORKSHOP

Location: Holiday Inn Denver East – Stapleton
3333 East Quebec Street, Denver, CO 80207
Date: Thursday, May 23, 2013
Time: 8:00am to 4:45pm



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



Supporting Partnership with the:
Colorado Geo Energy & Heat Pump Association
Englewood, CO

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)
COLORADO ARCHITECTS – A Structured Report will be available at the end of the program for your DORA records.
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
- 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 – 8:10 Introduction and Welcome

Ben Northcutt, Executive Director, Colorado Geo Energy & Heat Pump Association, Englewood, CO
Garret Graaskamp, PG, AI, Hydrogeologist, American Ground Water Trust, Concord, NH

8:10am – 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 – 9:20 Status of the Geothermal Industry

John Kelly, Manager – Special Projects, Geothermal Exchange Organization, Washington DC

- What is GEO?
 - The Geothermal Exchange Organization
- Geothermal Heat Pump Market Perspectives
 - National Overview • Residential / Commercial • Potential Drivers
- Market Barriers and Incentives for Geothermal Heat Pumps
- Legislative Efforts to Grow the Industry
 - GEO's Work at the Federal and State Levels

9:20am – 10:00 Increasing Market Penetration of GHPs in Colorado through Legislative Policy

Joel Poppert, President of CoGEHPA & Principal of Alpine Geothermal Drilling, Denver, CO

- Colorado's Energy Portfolio: Where and How Does Colorado Consume Energy?
- Current Colorado Renewable Energy and Energy Efficiency Policies
- What Role Should GHPs Play in Colorado's Clean Energy Future?
- Should GHPs be Included in Colorado's Energy Policy, and if so, Where and How?
- Current and Future GHP Legislative Efforts at the Capital

10:00am – 10:15 Networking Break

10:15am – 10:55 More than a “hole in the ground”- Drilling techniques - Logistics and Grout

Dave Wilson, Field Services Representative, Baroid IDP, Arvada, CO

- 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

10:55am – 11:35 FINANCING INNOVATIONS FOR GEOTHERMAL INSTALLATIONS

Paul Bony, Director of Residential Market Development, ClimateMaster, Montrose, CO

- Best practices for implementation based on financing and geexchange programs.
- Consumer-friendly long term financing for “new” or “retrofit”
- How utilities can establish geexchange by leveraging federal tax credits
- On-Bill financing methods
- Utility loop ownership – own the loop and recover cost over time
- Payback calculations for geothermal
- Making space conditioning costs a fixed expense
- Thermal purchase agreements

11:35am – 12:15 Designing with Variable Frequency Drive Compressor Geothermal Heat Pumps – Special Considerations

Sean Dillon, Western Regional Sales Manager, WaterFurnace International, Seattle, WA

- How does a VFD compressor GHP work? VFD GHP Applications
- Loop design- Turbulent Flow- Is it still necessary?
- Can VFD GHPs reduce the size of a loop field
- Conditioned Space Zoning Options and System Control Requirements

12:15pm – 1:05 Lunch

1:05pm – 1:45 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

1:45pm – 2:25 Designing Ground Loop HVAC Systems - Pump Energy Optimization Using Variable Frequency Drives

Trey Austin III, PE, CGD, President/ CEO, Research Engineer, Geo-Energy Services, LLC, Centennial, CO

- 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

2:25pm – 3:05 Net-Zero Design Principles

Tom Hootman, LEED AP BD+C, Associate Principal, RNL Design, Denver, CO

- Net zero energy definitions and overview
- Applications and advantages for GSHPs in net zero energy buildings
- Campus and district geothermal concepts for net zero energy buildings

3:05pm – 3:20 Networking Break

3:20pm – 4:00 Commissioning GHP Systems – Achieving Anticipated Performance

Jarrell Wenger, PE, LEED AP, Principal, Engineering Economics Inc., Golden, CO

- The commissioning process from design through warranty
- GHP design issues and lessons learned
- GHP construction issues and lessons learned
- Retro-commissioning of existing systems

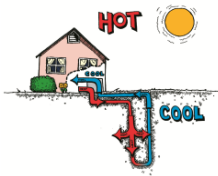
4:00pm – 4:40 Monitoring Geothermal Systems

Terry Proffer, CGD, Major Geothermal Inc, Wheat Ridge, CO

- 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

4:40pm – 4:50 Wrap-up and Adjourn

- Further Questions and CEU sign-out



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, May 23, 2013, Holiday Inn, 3333 East Quebec Street, Denver, CO

- ☞ 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

Thursday, May 23, 2013 -- Holiday Inn -- Denver East- Stapleton, 3333 East Quebec Street, Denver, CO

- | | | |
|---|--------------|--------------------------|
| Registration (General) | \$195 | <input type="checkbox"/> |
| Registration (AGWT & CoGEHPA 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 (\$50 for non-Registrants) | \$ 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]*
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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 Denver East** is holding a limited number of rooms at a **special room rate of \$92 (single)** for attendees through May 9 under the "American Ground Water Trust" event. Call: 303-321-3500.

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)