

Agenda

Presented by Jay Egg

Applying the Laws of Thermodynamics to Geothermal Heat Pumps and Indoor Thermal Comfort

- Applying the laws of thermodynamics to HVAC systems
- Understanding the refrigeration cycle
- The effect of air flow and insulation
- Understanding efficiency
- Calculating heating and cooling loads
- How comfort is measured

Understanding Earth Loop Systems

- The hidden assets of geothermal technologies
- Solar Energy in the Earth
- Architecture of closed loop systems
 - Horizontal ground loops
 - Direct exchange systems
 - Mini-grids
 - Vertical ground loops
 - Thermal load sharing
- Applications for open loop (class V thermal exchange) systems
 - Single well
 - Two-well systems
- Evaluating topography
- Measuring soil conductivity
- Environments for ground-loop systems: beneath yards, fields, parking lots, and buildings

Designing Geothermal Systems

- Determining loop type
- Sizing the unit
- Writing a request for proposal (RFP)
- HS2 hydronic design software
- Making heat loss calculations
- Sizing the loop
- Writing a driller specification

Choosing System Type

- Distributed GHPs or chiller plants
- Basic components of geothermal heat pump (GHP) systems:
 - Pumps, condenser water piping, heat pump, heat exchanger
 - Forced air systems
 - Domestic hot water options
- Hydronic systems
- Geothermal swimming pool heaters

Evaluating the Benefits of Geothermal Systems

- Incentives to use geothermal
- Measuring performance
- Environmental benefits
- Property assessed clean energy (PACE)
- State based legislation
- Geothermal utilities
- Calculating savings and cost
- Tax credits, incentives and rebates

Maintaining Geothermal Systems

- Performing routine maintenance on GHPs
- Loop maintenance (automatic or periodic)
- Pump maintenance/monitoring

Geothermal Heating and Cooling: Technology and Applications

Columbia, MD - Thursday, November 21, 2019



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Learning Objectives

You'll be able to:

Describe thermal heat pump theory, including how the laws of thermodynamics apply to geothermal heat pumps.

Explore the refrigeration cycle, learn how comfort is measured, and calculate heating and cooling loads.

Explain the benefits of geothermal heat pump systems, including performance, cost savings, environmental advantages and available incentives.

Describe how site conditions impact geothermal heat pump design, including site topography, soil conductivity and site usage.

Differentiate closed loop and open loop systems, and determine the appropriate design for particular projects.

Get tips on pumps, condenser water piping, heat pumps, and heat exchangers.



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Understand earth loop systems
Identify the environmental and economic benefits of geothermal systems
Learn how to make heat loss calculations

Explore vertical and horizontal closed loop systems
Learn about designing forced air and hydronic systems
Discuss how to maintain geothermal systems

Continuing Education Credits

Professional Engineers
6.5 PDHs

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Architects
6.5 HSW LUs/CE Hours
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Faculty

Jay Egg *Founder and Consultant with EggGeothermal*

After serving in the US Navy nuclear power field, Mr. Egg began a career in mechanical design engineering & contracting in 1990, and founded EggGeothermal in Florida to provide HVAC solutions to the public. He currently focuses his professional efforts as a renewable energy expert on geothermal energy utility efforts, solar/geothermal exchange implementation, and aquifer-related environmental issues, including permitting, feasibility, and variances or special permitting for projects such as utility-scale geothermal exchange systems. Using down to earth learning patterns, Mr. Egg provides technical validation and insightful speaking and training engagements. Among his clients are international, federal, state and local governments, developers, associations, and private entities. Mr. Egg has written two books for McGraw-Hill Education.

EggGeothermal is a voting member on the IGHSPA Advocacy Committee, the Uniform Solar Energy & Hydronics Technical & the Uniform Mechanical Code Committee for the International Association of Plumbing and Mechanical Professionals (IAPMO); training and curriculum writer/facilitator for IGSHA and for the U.S. Department of Energy (DOE) and past technical adviser to the New York State Energy Research and Development Authority (NYSERDA) & the Province of Ontario, Canada on renewable heating and cooling.

Here's what past attendees had to say about the program and instructor Jay Egg:

“Very effective presenter with first hand knowledge of his subject.” – *Professional Engineer*

Seminar Information

Sheraton Columbia Town Center Hotel	Registration	Lunch (On your own)
10207 Wincopin Circle	8:00 - 8:30 am	12:30 - 1:30 pm
Columbia, MD 21044	Morning Session	Afternoon Session
(410) 730-3900	8:30 am - 12:30 pm	1:30 - 4:30 pm

Tuition

\$289 for individual registration

\$269 for three or more simultaneous registrations.

Included with your registration:

Complimentary continental breakfast and printed seminar manual.

Receive a reduced tuition rate of \$101 by registering to be our on-site coordinator for the day.

For availability and job description, please visit www.halfmoonseminars.org.

How to Register

- Visit us online at www.halfmoonseminars.org
- Mail-in or fax the attached form to 715-835-6066
- Call customer service at 715-835-5900

Cancellations: Cancel at least 48 hours before the start of the seminar, and receive a full tuition refund, minus a \$39 service charge for each registrant. Cancellations within 48 hours will receive a credit toward another seminar or the self-study package. You may also send another person to take your place.

Additional Learning

Webinar Series

Component Tolerance Analysis

- **Introduction to Component Tolerance Analysis**
Thurs., Oct. 17, 2019, 11:00 AM - 12:00 PM CDT
- **Dimensional Tolerance Analysis**
Thurs., Oct. 17, 2019, 12:30 - 3:00 PM CDT
- **Application of Dimensional Tolerance Analysis**
Fri., Oct. 18, 2019, 11:00 AM - 2:15 PM CDT

National Electrical Code

- **National Electrical Code, Part I**
Tues., Oct. 22, 2019, 11:00 AM - 3:30 PM CDT
- **National Electrical Code, Part II**
Wed., Oct. 23, 2019, 11:00 AM - 3:30 PM CDT
- **National Electrical Code, Part III**
Thurs., Oct. 24, 2019, 11:00 AM - 3:30 PM CDT

Slope Stability and Landslide Prevention

- **Slope Movement and Mechanisms**
Thurs., Oct. 24, 2019, 11:00 AM - 1:00 PM CDT
- **Slope Stabilization Methods**
Thurs., Oct. 24, 2019, 1:30 - 3:00 PM CDT
- **Landslide Hazard and Risk Assessment**
Fri., Oct. 25, 2019, 11:00 AM - 12:00 PM CDT
- **Slope Stabilization and Landslide Mitigation**
Fri., Oct. 25, 2019, 12:30 - 2:30 PM CDT

HEC-RAS Webinar Series

- **Hydraulic Principles and Applications**
Tues., Oct. 29, 2019, 11:00 AM - 1:00 PM CDT
- **Working with the HEC-RAS User Interface**
Tues., Oct. 29, 2019, 1:30 - 3:00 PM CDT
- **Water Surface Profiling**
Thurs., Oct. 31, 2019, 11:00 AM - 1:00 PM CDT
- **Steady Flow Surface Profile Demonstrations**
Thurs., Oct. 31, 2019, 1:30 - 3:30 PM CDT

For more information and other online learning opportunities visit: www.halfmoonseminars.org/webinars/

Continuing Education Credit Information

This seminar is open to the public and offers 6.5 PDHs to professional engineers in all states. HalfMoon Education is an approved continuing education provider for Maryland engineers.

This course offers 6.5 HSW LUs/continuing education hours to architects in all states. Courses approved by the American Institute of Architects are accepted in Maryland.

The American Institute of Architects Continuing Education System has approved this seminar for 6.5 LU|HSW (Sponsor number J885). Only full attendance is reportable to the AIA/CES. Visit www.halfmoonseminars.org to view complete AIA/CES information under this course listing.

HalfMoon Education is an approved continuing education sponsor for engineers in Florida, Indiana (License No. CE21700059), Maryland, New Jersey (Approval No. 24GP00000700), North Carolina, and North Dakota. HalfMoon Education is deemed an approved continuing education sponsor for New York engineers and architects.

This course offers a non-credit continuing education opportunity to construction contractors. It has not been approved by any state contractor licensing entity for continuing education credit.

Attendance will be monitored, and attendance certificates will be available after the seminar for most individuals who complete the entire event. Attendance certificates not available at the seminar will be mailed to participants within fifteen business days.

Can't Attend? Order the Manual and Audio from the Live Seminar as a Self-Study Package!

Audio recordings of this seminar are available for purchase starting at \$269. See registration panel for more information and please refer to specific state licensing rules or certification requirements to determine if this learning method is eligible for continuing education credit.

Registration

Geothermal Heating and Cooling: *Technology and Applications*

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How to Register	
Online: www.halfmoonseminars.org	
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Complete the entire form. Attach duplicates if necessary.	
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Email address is required for credit card receipt, program changes, and notification of upcoming seminars and products. Your email will not be sold or transferred.	
() I need special accommodations. Please contact me.	

Tuition

() **I will be attending the live seminar.** Single Registrant - **\$289.00**. Three or more registrants from the same company registering at the same time - **\$269.00** each.

() **I am not attending.** Please send me the self-study package:

- Downloadable MP3 Audio/PDF Manual for **\$269.00**.
- CD/Manual Package for **\$289.00**. USB/Manual Package **\$289.00**. (S&H included. Please allow five weeks from seminar date for delivery)

Checks: Make payable to HalfMoon Education Inc.

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