

# Seminar Agenda

Presented by Peter J. Tavino, Jr., P.E.

## Geothermal Heat Pumps and Indoor Thermal Comfort

Introduction  
Understanding the refrigeration cycle  
The effect of air flow and insulation  
How comfort is measured  
Understanding efficiency

## Understanding Earth Loop Systems

Architecture of closed loop systems

- Horizontal ground loops
- Vertical ground loops

Open loop systems  
Evaluating topography  
Measuring soil conductivity  
Environments for ground-loop systems: beneath yards, fields, parking lots and buildings

## Designing Geothermal Systems

Determining loop type  
Making heat loss calculations  
Sizing the unit  
Sizing the loop

## Choosing System Components

Basic components of geothermal heat pump systems:  
pump, compressor, heat exchanger  
Forced air systems  
Hydronic systems  
Domestic hot water options

## Evaluating the Benefits of Geothermal Systems

Incentives to use geothermal  
Measuring performance  
Calculating savings and cost  
Environmental benefits

## Geothermal Case Studies

Geothermal Heating and Cooling  
Islandia, NY - Friday, March 18, 2016

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HalfMoon Education Inc.  
PO Box 278  
Altoona, WI 54720-0278



## Learning Objectives

**You'll be able to:**

**Understand** indoor thermal comfort and the effect of air flow and insulation.

**Review** the refrigeration cycle and its applications to geothermal heating and cooling.

**Consider** the architecture of closed loop systems, including horizontal and vertical ground loops.

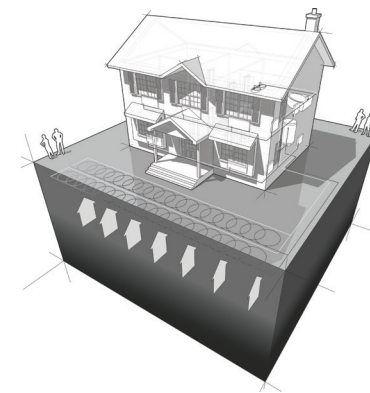
**Learn** how to determine loop type, make heat loss calculations, and size the unit and loop.

**Identify** the basic components of geothermal heat pump systems.

**Discuss** the benefits of geothermal systems.



# Geothermal Heating and Cooling



Islandia, NY  
Friday, March 18, 2016

**Learn** about geothermal heat pumps and indoor thermal comfort

**Understand** earth loop systems

**Discuss** geothermal system design

**Learn** how to choose system components

**Evaluate** the benefits of geothermal systems through real world case studies

## Continuing Education Credits

Architects

6.5 HSW Contact Hours

6.5 AIA HSW Learning Units

Professional Engineers

6.5 Contact Hours/PDHs

Building Performance Institute

3.25 CEUs

Contractors

Non-Mandatory Cont. Ed.



CONTINUING  
EDUCATION



HalfMoon Education Inc.  
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# Faculty

**Peter J. Tavino, Jr., P.E.**, *Owner of Litchfield Geothermal and President of Peter J. Tavino Jr. Professional Engineering Corp.*

Mr. Tavino is a licensed professional civil engineer in New York, Connecticut and Florida with a Master of Science degree in Engineering from Columbia University. He is an International Ground Source Heat Pump Association accredited installer, vertical loop installer, certified Geo Exchange designer and nationwide trainer. He is the owner of Litchfield Geothermal, designing and installing ground heat exchangers for residential and commercial projects in the northeast.

# About the Seminar

Islandia Marriott Long Island  
3635 Express Drive North  
Islandia, NY 11749  
(631) 232-3000

## Tuition

**\$269** for individual registration  
**\$249** for three or more simultaneous registrations. Each registration includes one copy of the seminar manual.

**Receive a reduced tuition rate of \$101** by registering to be our on-site coordinator for the day. For availability and a job description, go online to [www.halfmoonseminars.org](http://www.halfmoonseminars.org).

## Four Easy Ways to Register Today!

Register online at [www.halfmoonseminars.org](http://www.halfmoonseminars.org), mail in registration form to **HalfMoon Education Inc., PO Box 278 Altoona, WI 54720-0278**, fax the form to (715) 835-6066, or call a customer service representative 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. You may also send another person to take your place.

Registration  
8:00 - 8:30 am  
Morning Session  
8:30 am - 12:30 pm  
Lunch (On your own)  
12:30 - 1:30 pm  
Afternoon Session  
1:30 - 4:30 pm

## Continuing Education Credit Information

This seminar is open to the public and offers up to 6.5 HSW continuing education hours to architects and 6.5 PDHs to professional engineers in all states.

HalfMoon Education is deemed a New York-approved continuing education provider for architects via its affiliation with the American Institute of Architects. HalfMoon Education is an approved continuing education provider for New York engineers (NYSED Sponsor No. 35) and New Jersey engineers (Approval No. 24GP00000700).

The American Institute of Architects has approved this event for 6.5 HSW Learning Units (Sponsor No. J885). Courses approved by the AIA qualify for New Jersey and District of Columbia architects.

HalfMoon Education is an approved continuing education sponsor for architects in Florida. HalfMoon Education is an approved continuing education sponsor for engineers in Florida, Indiana, Louisiana, Maryland, North Carolina, and North Dakota.

The Building Performance Institute has awarded 3.25 CEUs for the completion of this seminar.

This event offers a continuing education opportunity to construction contractors, but it has not been approved by any state with a continuing education requirement for contractors.

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.

# Additional Learning

## Webinar Series

### Building Green with Concrete Webinar Series

- **Environmental Attributes of Concrete**  
Wed., January 20, 12:00 - 1:30 PM EST
- **Energy Performance of Concrete Building Systems**  
Wed., January 20, 2:00 - 3:30 PM EST
- **Prioritizing the Environment with Concrete**  
Thurs., January 21, 12:00 - 1:30 PM EST
- **Concrete's Contribution to LEEDv4**  
Thurs., January 21, 2:00 - 3:30 PM EST

### Residential Solar Introduction and Design

- **Design Your Solar Roof**  
Mon., February 8, 12:00 - 3:00 PM EST
- **Introduction to Residential Solar**  
Tues., February 9, 12:00 - 3:00 PM EST

### HVAC Energy Codes and Standards

- **Framework of HVAC and Energy Codes**  
Thurs., February 11, 12:00 - 1:00 PM EST
- **Applicable Provisions in Building Codes**  
Thurs., February 11, 1:30 - 3:30 PM EST
- **ASHRAE Standards**  
Fri., February 12, 12:00 - 1:00 PM EST
- **Mechanical Systems and Progressive Standards**  
Fri., February 12, 1:30 - 3:30 PM EST

### Commercial Electrical Installation

- **Introduction to Electrical Installation**  
Wed., February 24, 12:00 - 2:00 PM EST
- **Wiring and Circuits**  
Thurs., February 25, 12:00 - 2:00 PM EST
- **Unique Structures and Specialized Conditions**  
Thurs., February 25, 2:30 - 3:30 PM EST

For more information visit:  
[www.halfmoonseminars.org/webinars/](http://www.halfmoonseminars.org/webinars/)

# Registration

## Geothermal Heating and Cooling

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### How to Register

**Online:**  
[www.halfmoonseminars.org](http://www.halfmoonseminars.org)

**Phone:**  
715-835-5900

**Fax:**  
715-835-6066

Key Code

**Mail:**  
HalfMoon Education Inc.  
PO Box 278, Altoona, WI  
54720-0278

**Complete the entire form.**  
Attach duplicates if necessary.


### Registrant Information

Name: \_\_\_\_\_  
Company/Firm: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Occupation: \_\_\_\_\_  
Email: \_\_\_\_\_  
Phone: \_\_\_\_\_

### Additional Registrants:

Name: \_\_\_\_\_  
Occupation: \_\_\_\_\_  
Email: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Name: \_\_\_\_\_  
Occupation: \_\_\_\_\_  
Email: \_\_\_\_\_  
Phone: \_\_\_\_\_

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 - **\$269.00**. Three or more registrants from the same company registering at the same time - **\$249.00** each.

**Checks:** Make payable to HalfMoon Education Inc.

**Credit Card:** *Mastercard, Visa, American Express, or Discover*

Credit Card Number: \_\_\_\_\_  
Expiration Date: \_\_\_\_\_ CVV2 Code: \_\_\_\_\_  
Cardholder Name: \_\_\_\_\_  
Billing Address: \_\_\_\_\_  
City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_  
Signature: \_\_\_\_\_  
Email: \_\_\_\_\_