Agenda

Presented by Bart Bales, PE MSME

Introduction to Residential Space Heating
- Applying the laws of thermodynamics to HVAC systems
- Calculating heating and cooling loads
- The effect of air flow and insulation
- Understanding efficiency
- Overview of systems to be covered

Combustion-Based Heating Systems
- Boiler fundamentals and operation
- How to optimize heating performance
- Different rules for different boiler technologies
- Right-sizing boiler stages for optimal operation
- Biomass boilers

Heat Pumps Overview
- How they work: heat pump process cycle, terminology, measures of performance
- COP (coefficient of performance)
- Performance in cold climates
- Air-source and ground-source heat pumps
- Water to air, and water to water systems

Utilizing Air-Source Heat Pumps for Space Heating
- Split systems, mini-splits, and ducted systems
- Products and manufacturers
- Examples and case studies
- Proposed improvements to rating metrics for air-source heat pumps
- Regional cold climate system specifications
- New construction and retrofit case studies
- Lessons learned

Utilizing Ground-Source Heat Pumps for Space Heating
- Ground-source and ground water heat pump configurations
- Closed loop, open loop, and standing column heat pump systems
- High-performance equipment options and recent developments
- Water to air and water to water heat pumps
- Residential case studies
- The importance of controls and control strategies on optimized energy performance
- Lessons learned

Solar-Assisted Space Heating
- New construction – residential solar thermal space heating systems
- Rooftop solar thermal panels and radiant floor heat delivery systems

Determining Which Type of System is Best for Your Project

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Recordings of this webinar are available for purchase. See course listing online 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.

Efficient Residential Space Heating
Live, Interactive Webinar - Wednesday, July 13, 2022

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Learning Objectives

You'll be able to:

Get tips on calculating heating and cooling loads.

Consider using combustion-based heating systems for space heating.

Right-size boiler stages for optimal operation.

Get an overview of the space heating potential of air-source and ground-source heat pumps.

Address concerns about using air-source heat pumps in cold climates.

Explore options for using ground-source heat pumps to do water-to-air space heating and water-to-water space heating.

Examine options for solar-assisted space heating using rooftop panels and radiant floor delivery systems.

HalfMoon Education Live Webinars

Efficient Residential Space Heating

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Explain the effect of air flow and insulating on space heating

Review combustion-based heating systems

Examine using air-source and ground-source heat pumps for space heating

Consider solar-assisted space heating

Discuss how to determine which type of system is best suited for your project

Explore case studies and lessons learned

Continuing Education Credits

Professional Engineers
6.5 PDHs

Architects
6.5 HSW CE Hours
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Faculty

Bart Bales, PE MSME is the principal and professional consulting engineer at Bales Energy Associates in Massachusetts. Bales Energy Associates provides energy analysis, design, and implementation of high-performance, energy-efficient and renewable energy systems for buildings and facilities with an emphasis on a "whole-systems," building science-based approach. Mr. Bales' studies include detailed investigations and recommendations for temperature controls and building automation system optimization and improvement.

Bales Energy Associates provides study services for whole building energy analyses; high-performance mechanical design; and solar energy and wind energy systems analysis and design services. Mr. Bales is the principal of Bales Energy Associates and has effectively delivered energy engineering and HVAC design services for 30 years.

In recognition of the critical importance of heating systems in high-performance, energy-efficient, green buildings, Mr. Bales developed the following workshops:

- High-Performance, Energy-Efficient 'Green Heating' Systems
- Cold-Climate Heat Pumps, Pellet Boilers, & Other Renewable Thermal Heating Systems
- Air-Source Heat Pumps, Mini-Splits and Heat Pump Water Heaters

Mr. Bales is a registered professional mechanical engineer in Massachusetts, Connecticut, New York, Rhode Island, and Vermont. His energy analysis experience and expertise includes comprehensive facility energy audits and feasibility studies for energy efficiency measures, combined heat and power (cogeneration) systems, solar electric, solar thermal, and windpower systems.

Additional Learning

Solar Photovoltaic Energy Systems 2022: New Developments for Residential and Small Commercial Systems
- Mon, June 27, 2022|11:30 am - 2:40 pm CDT
- Tues, June 28, 2022|11:30 am - 2:40 pm CDT

AIA Contract Document Workshop
- Wed, July 6, 2022|8:30 am - 4:30 pm CDT

Applying Passive Solar Design To Conventional Homes
- Mon, July 11, 2022|2:30 - 4:30 pm CDT

Construction Cost Estimating Workshop:
Estimating a Small Commercial Building
- Mon, July 11, 2022|8:30 - 4:00 pm CDT

Complying with Commercial Provisions of the 2021 International Energy Conservation Code
- Fri, July 15, 2022|8:30 am - 4:30 pm CDT

For more information
and other online learning opportunities visit:
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Webinar Information

Log into Webinar
7:30 - 8:00 am CDT

Break
11:15 - 11:45 am CDT

Morning Session
8:00 - 11:15 am CDT

Afternoon Session
11:45 am - 3:30 pm CDT

Tuition

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Continuing Education Credit Information

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HalfMoon Education is an approved continuing education sponsor for engineers in Florida (Provider No. 0004647), Indiana (License No. CE21700059), Maryland, New Jersey (Approval No. 24GP00000700) and North Carolina (S-0130). HalfMoon Education is deemed an approved continuing education sponsor for New York engineers and architects via its registration with the American Institute of Architects Continuing Education System (Regulations of the Commissioner §68.14(i)(2) and §69.6(i)(2)). Other states do not preapprove continuing education providers or courses.

The American Institute of Architects Continuing Education System has approved HalfMoon Education as a sponsor of continuing education (Sponsor No. J885). This course has been submitted for AIA CES approval and is currently pending. Only full participation is reportable to the AIA CES.

The International Code Council has approved HalfMoon Education as a Preferred Provider of continuing education (No. 1232). Course approval is pending in the specialty area of Energy.

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Completion certificates will be awarded to participants who complete this event and earn a passing score (80%) on the quiz that follows the presentation (multiple attempts allowed).

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Added Value:
Enhance your learning - a recording of this webinar will be available for attendees to stream online for two weeks after the program date.
(Must attend live webinar to earn live webinar credits)

Registration

Efficient Residential Space Heating

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How to Register

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Tuition

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