

Session Descriptions—Tuesday, February 22

Asbestos – Yes, It's Still Around!

Our interactive display involves establishing a bedroom cut-away, the latest on where asbestos is (still) encountered in residential remodeling and how to handle it. In this session we utilize our interactive display that provides the class with a bedroom cut-away within which we will show several locations and applications where asbestos can be found in residential remodeling and reconstruction. We will also cover the update to the MDH rules that became effective in the later half of 2021 that has critical implications to the residential contracting industry. **Bob Rogalla, Todd Lewis, Lake States Environmental, Ltd.**

Hydronics for Low Energy & Net Zero Homes, Part 1

For decades, hydronic systems have been used for space heating and domestic hot water. Most existing hydronic systems are supplied by fossil fuel boilers. When properly designed and installed they deliver superior comfort and energy efficiency. The growing availability of heat pumps now presents an unprecedented opportunity for use of modern hydronics technology, one that could significantly increase market share and better meet consumer expectations. This session describes details for crafting hydronic systems for modern low energy and net zero buildings. It stresses simple repeatable approaches that deliver comfort without complexity. Several system templates will be shown. **John Siegenthaler, Appropriate Designs**

Improving Residential HVAC Performance and Energy Efficiency

In this session, Bruce Stahlberg and Bill Graber will be discussing the importance of establishing proper air flow in optimizing energy efficiency and system performance. They will also demonstrate the use of the TrueFlow Flow Grid to measure flow, diagnose system performance and highlight the appropriate actions to reduce energy usage and deliver comfort. **Jake McAlpine, The Energy Conservatory, and Bruce Stahlberg, Affordable Energy Solutions, Inc.**

Hydronics for Low Energy & Net Zero Homes, Part 2

Continued from Part 1. You must attend each part of this course in order to receive CEUs; partial credit cannot be given. **John Siegenthaler, Appropriate Designs**

Air Management for High-Performance, Low-Load Homes

The formula is very simple: high-performance (comfortable, efficient, durable, resilient, and healthy) homes are all about air management. An airtight building enclosure controls the unwanted movement of energy, moisture, and pollutants. Then you must have a thoughtfully designed and properly installed mechanical system(s) to take care of the air inside the home. This session will define each type of air and explore best practices that fit the occupants with emphasis on best practices for high-performance, low-load, and airtight buildings. **Patrick Huelman, University of Minnesota**

4-Part Heat Pump Design Process, Part 1 of 2

Minnesota, along with 23 other states, is preparing to reduce its greenhouse gas emissions by transitioning to heat pumps for building space conditioning and domestic hot water heating. In order to ensure homeowners have a successful transition to heat pumps, contractors are encouraged to use a reliable method for design. Our speaker is an expert in heat pump contracting and has created a simple 4-part design process for contractors to follow, and

Cold Climate Air Source Heat Pumps: A Primer and Launch Pad

This session will provide an overview of cold climate air source heat pumps, their potential for growth in Minnesota, and then dive deeper into specifics of how different applications of this equipment perform and compare with conventional heating and cooling solutions in Minnesota's climate. The presenters will discuss how to identify scenarios for each installation application. The presentation team will conclude with an overview of various resources to find rebates and financing options for customers, free training, best practices, and field research. **Rabi Vandergon and Peter Gephart, MN ASHP Collaborative**

Energy Efficiency, Sustainability, and Climate Action in the City of Duluth

The City of Duluth is working to reduce greenhouse gas emissions and prepare for climate change. This session will give a brief overview of the City's goal for climate protection, including work on city infrastructure, buildings, fleet, policy, and more. An overview of the City's first Climate Action Work Plan will be given, along with examples of partnerships on community-level sustainability work. **Melinda Granley, Mike LeBeau and Alex Jackson, City of Duluth**

EEBA: High Performance Mechanical Systems for Houses That Work, Part 1

High Performance Mechanical Systems for Houses That Work is a mid-level, full day seminar geared towards Builders, Designers, Code Officials, and Trade Allies that focuses on HVAC, Ventilation, Hot Water, Indoor Air Quality and Electronic Home Controls in high performance housing. In the past several years, residential mechanical systems have grown in complexity and scope as energy codes have mandated higher insulation levels, better windows and tighter construction. There is now a great opportunity to rethink and redesign HVAC, hot water heating and electronic home control systems as they are major contributors to energy efficiency goals. **Andrew Oding, EEBA**

it includes: Performing a load calculation, evaluating ductwork to identify limitations, looking for simple low-cost building envelope improvements and selecting the right heat pump for the home. **Jonathan Moscatello, Daikin**

EEBA: High Performance Mechanical Systems for Houses That Work, Part 2

Continued from Part 1. You must attend each part of this course in order to receive CEUs; partial credit cannot be given. **Andrew Oding, EEBA**

Session Descriptions—Tuesday, February 22

Hydronics for Low Energy & Net Zero Homes, Part 3

Continued from Part 2. You must attend each part of this course in order to receive CEUs; partial credit cannot be given. **John Siegenthaler, Appropriate Designs**

Observing Building Enclosures Leaking; Heat, Air and Water Using Infrared Thermography

The enclosure of buildings provide protection/reduction of the controlling elements of the physical, chemical and biological reactions that are heat, air and moisture. Barriers of these elements are used in the design materials used for construction of the envelope. Infrared thermography has been around for decades as a means to visualize heat, air and moisture flow by detecting the infrared energy from the surfaces of the enclosure. Infrared detection devices are gaining traction for envelope inspections but many fail to fully understand the science of this technology. This presentation will explain the benefits, limitations and physics behind the use of infrared thermography/science. **Scott Wood, VaproShield**

Electric Vehicles and Charging Infrastructure: Why and How?

Electric Vehicles (EVs) provide a new opportunity for cleaner and more efficient transportation. Current surveys show that about 30% of people would consider an EV as their next vehicle, and auto manufacturers are bringing new, exciting options to the market at a rapid pace. Most EV charging happens overnight at home, so all residential properties including apartment buildings and condominiums will need to get EV ready. We will also need charging at hotels, grocery stores, shopping centers, parks and by highways. Different locations will require different solutions and we will talk about all that at this workshop. **Jukka Kukkonen, Shift2Electric**

Healthy Air in Every Home We Build: Managing Humidity, Air Purity and Ventilation

Control of Indoor Air Quality requires more than just code-driven ventilation. The IAQ system must manage humidity levels, air purification, and a host of variables related to fresh air delivery. The scientific and medical communities have provided excellent guidelines on what makes air "healthy." Learn how a system-based approach that integrates existing products and technologies for IAQ can create environments that truly are safer and healthier for all occupants, year-round. High-performance builders and indoor air quality product manufacturers are at the forefront of making the right critical recommendations to the public to best ensure healthy air in every home. **Joseph Hillenmeyer and Christopher Howell, Aprilaire**

4-Part Heat Pump Design Process, Part 2 of 2

Continued from Part 1. You must attend each part of this course in order to receive CEUs; partial credit cannot be given. **Jonathan Moscatello, Daikin**

EEBA: High Performance Mechanical Systems for Houses That Work, Part 3

Continued from Part 2. You must attend each part of this course in order to receive CEUs; partial credit cannot be given. **Andrew Oding, EEBA**

Heat Pumps: Tips for Operational Readiness

To ensure great profitability and a smooth operation, contractors who are new to selling heat pumps should get prepared. Our speaker has operated a heat pump only contracting business since 2007, and has prepared a series of tips to help contractors quickly achieve mastery. The goal is to excel in heat pump installation with the same or better labor efficacy and profitability experienced in the installation of furnaces, boilers and ACs. Topics include: Roadmap toward achieving technical expertise, fails that impact labor efficiency, and winning with after-sales support. **Jonathan Moscatello, Daikin**

EEBA: High Performance Mechanical Systems for Houses That Work, Part 4

Continued from Part 3. You must attend each part of this course in order to receive CEUs; partial credit cannot be given. **Andrew Oding, EEBA**

7:00 – 8:15 am

8:30 – 10:00 am

10:30 – 12:00 pm

1:00 – 2:30 pm

3:00 – 4:30 pm

Session Descriptions—Wednesday, February 23

Lead-Safe Methods for Remodeling, Repair and Painting Activities

The Minnesota Department of Health is nearing adoption of their own Lead-Safe standards and requirements in Minnesota. This session will overview the rules that have been developed and the implementation schedule of the MDH. In this session we will also demonstrate methods to establish a Lead-Safe work area per the EPA, Wisconsin and newest Minnesota Lead rules applying to remodeling, repair and/or painting in dwellings and child occupied facilities built before 1978. Compliance with the Lead-Safe standards is required in structures built prior to 1978. This session will cover what you need to know to stay legal and make money doing your work Lead-Safe.

Bob Rogalla, and Nate Cox, Lake States Environmental, Ltd.

Solar + Energy Storage - Don't Miss the Clean Energy Wave!

The revolution in electrical energy is just in time to take on the challenges we face today. Whether you are a home or business owner, a utility administrator, or an investor you will benefit by catching the Solar + Storage wave. This basic presentation will orient you to the technology innovations that are changing the face of electrical generation and usage. The costs have never been so competitive and the technology has matured so much nearly everyone will benefit by being a part of this paradigm shift.

Christopher LaForge, Great Northern Solar

From Control Layers to Robust, High-Performance Enclosures

High-performance enclosure systems are fundamental to efficient, durable, healthy, sustainable, and resilient homes. The focus of this session will be on how continuous exterior insulation when matched with the proper water, air and vapor control layers can deliver superior energy efficiency, moisture management, and long-term durability. This enclosure strategy will play a critical role in delivering high-performance, moisture-managed enclosures for Net Zero Energy Ready Homes. Robust and efficient slab, foundation, wall, and roof applications and assemblies using continuous exterior insulation (CEI) will be highlighted.

Patrick Huelman, University of Minnesota

Passive House & Code, ASHRAE and other Green Building Standards

Confused on which building standard to use when going above and beyond Code? You are not alone. This session will illustrate and summarize what the Passive House building energy standard is, and how it relates to Code, ASHRAE requirements, as well as many of the popular green building standards in the market place.

Tim Eian, TE Studio, Ltd.

High Performance Window Installation

This hands-on demonstration will feature a mock-up construction wall with a rough opening, along with an attached weather-resistive barrier. The instructors will use these materials to illustrate presentation content regarding installation concerns, noting level, plumb, square, and true, and to explain the barrier system. The demo materials will also be used to present methods of installation, and to discuss substrates and material choices for sealants and flashings and how they interface with the wall. Different high performance wall conditions will be addressed.

Erick Filby and Eric Klein, Marvin Windows and Doors

Designing Foam-Free Passive House Assemblies in Climate Zone 6 & 7

This presentation is a practical guide to achieving the highest levels of resilient and sustainable building enclosures. The performance demands of the Passive House standard are examined. Foam insulation, dominant in today's high-performance marketplace, is increasingly reconsidered as practitioners search for new solutions that reduce reliance on foam while improving performance. Hygrothermal modeling will be compared to data captured in real world projects located in climate zones 6 & 7 to show the value of such modeling over the dewpoint to estimate the dynamic relationship occurring over time between the assembly and the internal and external environments, over different seasons.

Shaun St. Amour and Enrico Boniauri, 475 High Performance Building Supply

Top 10 Cold Climate Heat Pump Installation Fails

In cold climates other than Minnesota, heat pumps are regularly used to provide heating. Thanks to utility research and contractor interviews, our speaker has identified 10 common installation mistakes or oversights that can result in homeowner dissatisfaction and/or excessive energy use. This session will help attendees avoid the same mistakes in their heat pump installations.

Jonathan Moscatello, Daikin

EEBA: Houses That Work, Part 1

Participants will learn that many complex changes in new homes and expectations make every job more demanding. We will cover the basics of building science and how it is applied to create high performance homes. We will address critical home performance elements that exist as a system and are part of energy efficient homes. The fundamentals of building science will be outlined and applied to help participants make better choices. Participants will also learn important information about indoor air quality, including the basics of mold and other pollutant sources, and cost-effective strategies to be able to offer healthier indoor environments.

Andrew Oding, EEBA

Strategies for Heat Pump Adoption at the Time of Air Conditioning Replacement

This session will cover an overview of research projects conducted by CEE that explore the market characteristics and cost effectiveness of using heat pumps as an alternative to AC replacement. This session will present results related to equipment performance, operational costs, and practical applications in heating dominant climates fueled by natural gas and other fuels. This will include a closer look at operational nuances of these applications such as the importance of choosing an economic switchover temperature and the sensitivities surrounding variable fuel prices. Lastly, this session will review results from customer and contractor surveys regarding the AC replacement opportunity.

Rabi Vandergon, Emily McPherson and Ben Schoenbauer, MN ASHP Collaborative

EEBA: Houses That Work, Part 2

Continued from Part 1. You must attend each part of this course in order to receive CEUs; partial credit cannot be given.

Andrew Oding, EEBA

Session Descriptions—Wednesday, February 23

The 2000-Watt Society and Passive House

This session illustrates the importance and impact of the vision of the 2000-Watt Society and the action of the Passive House building energy standard to curb carbon emissions in the building sector and enable a sustainable, green, clean grid infrastructure. Learn the importance of energy efficiency of buildings for the success of a clean energy infrastructure.

Tim Eian, TE Studio, Ltd.

The Benefits of Rainscreen Design

This live presentation investigates the current research and field practices on vapor open (permeable), vented rain screen cladding wall assemblies and their impact to mitigate water long-term intrusion and enhance the drying capacity of the building envelope assembly for the life of the building. We will examine: the building and wall assembly; evolution of the wall assembly; the importance of vented rainscreen; vapor open vs. non-permeable membranes; scientific drying capacity study, and components for building a rain screen cavity.

Scott Wood, VaproShield

Is it Really All About Energy?

Let's back up from the house viewed as materials and workmanship and think about what a dwelling is by what it does. A house is a containment system separating outside from inside by controlling energy (where it is, how it flows), and controlling water and air--which carry energy. What would happen if somehow utilities were part of the mortgage like taxes and insurance often are? How would that affect what and how we build? What happens if (when?) houses become serious producers and storers of electric? With battery packs, EVs and more? Is it time to get even more energy-focused?

Brian Wimmer, Franklin Energy, LLC

An Update on Project Overcoat: Wall Insulation Upgrade Testing at CRRF

This session will describe research at the Cloquet Residential Research Facility to study wall insulation upgrade strategies. The research is funded by Pacific Northwest National Laboratory. It is aimed at identifying cost-effective strategies that maximize thermal performance while minimizing risk to the existing building components. During the study, fourteen upgrade approaches were studied, with each approach tested on the north and south. Approaches ranged from common (e.g. cellulose drill-and-fill) to more exotic experimental treatments. This presentation will present the strategies, updated monitoring and modeling results, and cost effectiveness calculations.

Garrett Mosiman, University of Minnesota

Connecting with Air Source Heat Pump Customers

Some customers are quite savvy about their heating options, while others still have a lot of questions. Educational resources on cold climate air source heat pumps (ccASHPs) and stories of homeowners adopting them have been developed to help engage customers. This session will highlight the points of confusion for customers, along with many of their perspectives about this emerging technology like what's concerning and appealing. This session will also delve into how some customers might be looking to live an "electrified lifestyle" and how community partners can be allies to spur ccASHP adoption.

Alexis Troschinetz, Clean Energy Resource Teams

EEBA: Houses That Work, Part 3

Continued from Part 2. You must attend each part of this course in order to receive CEUs; partial credit cannot be given.

Andrew Oding, EEBA

Decarbonizing Fuel-Fired Equipment in Buildings

How can we decarbonize buildings with natural gas? Advances in technologies that quickly decarbonize buildings are possible with new natural gas end use technologies such as gas-fired air source heat pumps, micro combined heat and power systems, and integrated hybrid HVAC systems. This session will include a technology survey to explore products that are available today or coming within one year that will significantly reduce natural gas consumption in buildings, yet leverage the benefits of this affordable energy system that provides underground infrastructure and resilience. New product categories will be introduced, sharing measured performance from field research in cold climates.

Jason LaFleur, GTI Energy

EEBA: Houses That Work, Part 4

Continued from Part 3. You must attend each part of this course in order to receive CEUs; partial credit cannot be given.

Andrew Oding, EEBA

7:00–8:15 am

8:30–10:00 am

10:30–12:00 pm

1:00–2:30 pm

3:00–4:30 pm