Session Descriptions—Tuesday, February 25

7:00–8:15 am

Living Net-Zero in an Advance Steel-Framed, Low-Toxin, Super-Insulated, High-Performance Home. *French River*
Have you ever wanted to know the ins and outs of a net-zero home? This session will provide an inside view into the construction process of an advanced steel-framed, low-toxin, high-performance, low-energy home. Learn about the materials and systems that make up this home, including the advanced insulation, air sealing, and controlled moisture migration materials; solar energy production; heat and moisture recovery; and advanced heating, cooling and domestic hot water production. You'll also hear about how the fire, mold, and insect resistance was mastered.
Lawrence Ponziano, Zehnder America

Introduction to Solar: Technology, Resources and Policies *Ballroom M*
This session will introduce solar technologies with a concentration on solar electric (photovoltaics). We will introduce the basics of various solar technologies and applications, the policies that are encouraging growth in the solar industry, and programs from around the region that are helping advance deployment of the technology. Current events and hot topics affecting markets will also be explored.
Mark Weber, Minnesota Renewable Energy Society

8:30–10:00 am

OPENING KEYNOTE

Are We There Yet? 30 Years Along the Path of Better Buildings. What Have We Accomplished? What is Left to Do? *Lake Superior Ballroom J*
The journey that the research of energy-efficient homes has taken since the mid-1970s has been fascinating and constantly evolving. It has spawned innovative products and processes, created jobs that never previously existed and improved the health, safety, comfort and durability of the homes our industry builds. Now as the early wave of researchers, builders and energy geeks contemplate retirement, we should take into account what we have learned and what is left to accomplish along the path of continual improvement. There is an urgency now to implement cost-effective practices as soon as possible, while recognizing and responding to the unique challenges inherent to our homebuilding industry.
We can't look into the future, without taking stock of where we've been. Let's look at what we've learned in the last 30 years and use this to identify a vision that is doable in the next 10 years. Together we can make the final push to Zero Energy and even Zero Carbon homes.
Gord Cooke, EEBA

10:30–12:00 pm

Houses That Work for Existing Homes, Remodeling for Energy Efficiency – Part 1: The Basics *Ballroom O*
In this first of three segments, participants learn how each change in an existing home over the years impacts other parts of a home and affects overall performance. These effects are very important as more and more houses will undergo significant energy efficiency improvements. This segment outlines the basic building science physics of air, heat and moisture flow that everyone involved in remodeling needs to know in order to avoid risks and take advantage of opportunities presented by energy efficient remodeling projects. The building science principles will be applied to examples of the most common remodel projects found in houses of various ages.
Gord Cooke, EEBA

Air to Water Heat Pump Systems *Gooseberry*
Air source heat pumps have been on the market for a number of years. As the technology has evolved, performance has improved with the equipment performing better at colder temperatures. Air to water heat pump systems have now become the new game changer in delivering high efficiencies at cold temperatures with unsurpassed comfort for radiant floor heating systems. Join us in this session to learn about this heat pump solution.
Dennis Schramel, Electro Industries

A Path to Green(er) Building *French River*
There are many reasons to build greener, but this presentation focuses on just one: the Next Generation Energy Act. This session offers an overview of goals, guiding principles, priorities and concrete steps to use in the pursuit of building greener homes in line to meet the emissions reduction target mandated by this 2007 state law. Beginning with a discussion of context, this session will progress down a path to an approach using both thought and action when building green for the next generation.
Rachel Wagner, through design

National Electrical Code and Minnesota Policy Changes for 2020 *Ballroom M*
Solar codes and policies are changing. The new National Electrical Code book will affect the designs of photovoltaic systems as we know it. Policy in Minnesota—and the Midwest as a whole¬— is a moving target. Learn what the NEC book says, and find out where policy is and where it is heading in this informative and enlightening session.
Christopher LaForge, Great Northern Solar

Session Descriptions—Tuesday, February 25

1:00–2:30 pm

Houses That Work for Existing Homes, Remodeling for Energy Efficiency – Part 2: Common Remodel Projects & Evaluating the Opportunities for Energy Efficiency Upgrades *Ballroom O*
Using additional examples of common specific remodel projects, the instructor will outline building science principles and important elements needed to ensure the project enhances safety, durability, health, comfort and efficiency of the home. Performance measures will be identified that can be applied to each project to ensure success. The instructor will identify technologies, products and strategies that are most appropriate for each remodel project and how they can be integrated into the process. Participants will learn the basics of how performance measures in energy efficiency audits can be used to evaluate and prioritize energy efficiency upgrades in individual homes.
Gord Cooke, EEBA

Are You Pumped Up? Achieving Widespread Quality Installations of Cold Climate Air Source Heat Pumps *Gooseberry*
This is a half-day session devoted to air source heat pumps (ASHPs). This session will cover the technology of ASHPs and their applicability to real life situations. You'll learn about the latest technological research findings (design optimization, quality installation, and integration with existing systems). Next, the conversation will focus on education, customer engagement and customer awareness. We will reveal a plan for super-charging the cold climate ASHP market and ensuring good customer experiences in Minnesota, along with sharing ways you can be a part of it. You'll hear real-world examples of multifamily and new construction ASHP installations to help dig into the design details. Finally, a moderated panel of contractors, already in the business of installing ASHPs, will be available to provide their real-world insights.
Alexis Troschinetz and Joel Haskard; Clean Energy Resource Teams; Phil Anderson, Alex Haynor, and Isaac Smith; Center for Energy and Environment
(This is a double session that runs until 4:30 pm)

If I Had a Hammer, I Would Build a Zero Energy Home! *French River*
For high-performance, zero energy homes, it is critical to get the building enclosure and mechanical systems right. While renewable energy can be added or acquired later, it is not as easy to change the efficiency of the building enclosure or the HVAC equipment. It is imperative to identify cost-effective approaches to get the loads low and efficiencies high. It all comes down to systems optimization—not spending too much in one area or too little in another—with the goal of keeping the cost of a renewable energy system more accessible and affordable today and in the future.
Patrick Huelman, University of Minnesota

Energy Storage Basics: Options, Equipment, and Requirements *Ballroom M*
Energy storage is a hot topic with a lot of potential in the renewable energy realm. This technology stands to shake up much of the energy industry as we know it. Find out how this technology works, what the components are that make up an energy storage system, and how the coupling of solar and storage is revolutionizing the energy field.
Christopher LaForge, Great Northern Solar

3:00–4:30 pm

Houses That Work for Existing Homes, Remodeling for Energy Efficiency – Part 3: Avoiding Risks and Pitfalls – Using Building Science and Energy Evaluations or Ratings *Ballroom O*
Participants will learn important risks to avoid when remodeling that could compromise health, safety or durability of buildings. The role of energy raters and building performance contractors and the tools they use, such as blower doors, IR cameras, duct leakage and HVAC performance, can be used to avoid risks and find new opportunities for improved performance. Participants will learn how energy efficiency upgrades offer an excellent return on investment. They will be given an example of remodel project showing the incremental cost of adding energy efficient upgrades. The process changes needed to implement energy efficient upgrades will also be discussed.
Gord Cooke, EEBA

From Control Layers to High-Performance Enclosures *French River*
High-performance enclosure systems are fundamental to efficient, durable, healthy, sustainable, and resilient homes—especially in a demanding climate. Once built, it is not easy to change the building enclosure, so it is imperative to find cost-effective approaches to get the efficiency high and the loads low. This session will dive into the critical functions and attributes of the four key control layers: thermal, water, air, and vapor. Then, using these principles, we will look at leading high-performance enclosure strategies along with specific applications for slab, foundation, wall, and roof assemblies.
Patrick Huelman, University of Minnesota

Electric Cars are Coming! What Should Real Estate Owners and Building Industry Professionals Know About Charging? *Ballroom M*
There are over 1.3 million electric vehicles on U.S. roads every day and according to a survey from the American Automobile Association, one in five Americans say they are likely to buy an electric car for their next new vehicle. EV charging infrastructure will be needed in more innovative ways than before. New areas of interest like corridor charging that enables long trips with EVs and destination charging that hotels, parks and other destinations can offer to attract more customers and visitors are increasing. Find out what you need to know about EV charging infrastructure to stay connected.
Jukka Kukkonen, PlugInConnect

Session Descriptions—Wednesday, February 26

7:00–8:15 am

Beneficial Electrification: Advancing Technologies, Efficiency and Comfort for the Future with ASHP *French River*
Electrifying historically fossil fuel-driven systems is where the beneficial electrification conversation is going, and it's going there fast. To many, air source heat pumps are the target technology to focus on when it comes to electrifying home heating and cooling. Learn about advancements in heat pump technology, how to communicate the efficiencies that heat pumps can provide, performance, sizing, application and more in this session. Help your customers save on heating and cooling costs with quiet, cost-effective products built to deliver, even in cold climates.
Greg Nahn, Slipstream

High-Performance Glazing *Ballroom M*
Windows are typically named the "weakest link" in the building envelope. How do we change that? Can we get to an R-40 glazing to make windows perform like walls? What about net energy gainers? This session will focus on current and future strategies for optimal window and door performance, including consideration for the frames, type of glass, glazing by orientation, and the newest glazing technologies (VIG and quad). Hear case studies of completed projects ranging from residential to light commercial.
Al Dueck, DUXTON Windows & Doors

8:30–10:00 am

The EEBA Path to Affordable Zero Energy Homes – Part 1: Context and Economic Issues *Ballroom O*
Zero energy homes (ZEHs) are a big part of the future of the home building business. While the materials and equipment to reach zero energy are available, designers and builders must create a bundle of energy-efficiency features that matches their climate, customers, and business constraints. The course series gives building professionals the knowledge to build ZEHs that are affordable, durable, safe, healthy, energy efficient, and comfortable to live in. Part 1 describes the regulatory and market forces that are driving greater operational efficiency in the residential sector as well as overarching factors that inform an affordable path to the creation of zero energy homes. While the technology for zero energy is well established, there is a widespread misconception that zero energy homes are not affordable. In reality, any consumer that can afford to build or buy a new home can afford a zero energy home. This view is supported using three different forms of financial analysis.
Bruce Sullivan, EEBA

Whole-House Ventilation Systems: Providing Healthy, Comfortable and Energy Efficient Indoor Solutions *Gooseberry*
Breathing is important, and not just for living beings like you or me. Ventilation systems are a crucial part of the evolution from leaky home to super-insulated, airtight, high-performance buildings. Attend this session to learn how filtered heat recovery benefits indoor air quality, occupant comfort, and energy efficiency in the home.
Lawrence Ponziano, Zehnder America

Building Science Fundamentals *French River*
Building science is the study of how heat, air, and moisture move in, on, through, and out of buildings. Understanding and applying building science principles to building enclosures and mechanical systems can increase building durability, indoor air quality, and energy performance, and reduce risk. This session focuses on the principles of building science and how they apply to foundation, above-grade wall, roof, and mechanical systems.
Peter Yost, Building-Wright

Renewable Energy Beyond Subsidies: How Incentives Have Grown the Industry that is Reshaping Our Energy Systems *Ballroom M*
Several of the supportive policies that grew the renewable energy (RE) industry are sunsetting after years of successful promotion. RE now stands ready to grow without additional incentives, which will affect how utilities and other companies approach energy generation and use into the future. Join us in this lively presentation and engaging discussion of the future of electricity for our nation and world.
Christopher LaForge, Great Northern Solar

10:30–12:00 pm

The EEBA Path to Affordable Zero Energy Homes – Part 2: Design and Building Envelope *Ballroom O*
Zero energy homes (ZEHs) are a big part of the future of the home building business. While the materials and equipment to reach zero energy are available, designers and builders must create a bundle of energy-efficiency features that matches their climate, customers, and business constraints. The course series gives building professionals the knowledge to build ZEHs that are affordable, durable, safe, healthy, energy efficient, and comfortable to live in. Part 2 explores the design and building envelope. Thoughtful design approaches can increase building efficiency while also reducing cost. A survey of these approaches offers many options for both production and custom homes. It's generally accepted that improvements to the thermal envelope are fundamental to cost-effective high-performance home construction. Different methods for advanced air sealing and high insulation levels are presented. Part 2 concludes with an overview of above-code wall insulation strategies, including a performance comparison of three effective wall configurations.
Bruce Sullivan, EEBA

Critical Layers in High-R Wall Assemblies *Gooseberry*
As designers, once we deviate from an R-21 cavity wall, we begin to see a lack of understanding of what any given wall assembly's critical layers are, and what they are supposed to do. This session will cover the framework of the four major layers of wall assemblies: weather resistive barrier, vapor retarder, air barrier, and thermal layer. We'll define the purpose of each and discuss options for their placement in any given wall assembly. We'll also touch on various "high-R" assembly options and how those critical layers are addressed in each.
Elden Lindamood, Wagner Zaun Architecture

Wingnut Testing: How PSA Tapes, Liquid Sealants, Basement Waterproofing Systems, and Roof Venting Really Work *French River*
Standardized testing for many building materials and even building systems are simply not useful in assessing actual performance experienced in the field. Peter Yost has done extensive "bench-top" lab and field testing of PSA tapes, sealants, basement waterproofing, and cathedral ceiling soffit-to-ridge vent testing. In this session, we will review the building science of each of these materials/systems and discover how Wingnut testing has contributed to better understanding the performance of each material/system.
Peter Yost, Building-Wright

Dehumidification in Minnesota's Single Family Homes *Ballroom M*
Characteristic surveys and site visits from a field study of standalone dehumidification in Minnesota homes showed significant dehumidification use across the state with 56 percent of single family homes owning a dehumidifier. Ninety-five percent of these units operate in basement spaces. The results of our field analysis show inefficient field performance—in some instances we see the reintroduction of more than 50 percent of removed moisture per dehumidification cycle. This session will delve into the characteristic data on dehumidification use and explore the causes for and solutions to underperformance of these units within our climate.
Josh Quinnell, Center for Energy and Environment

Session Descriptions—Wednesday, February 26

1:00–2:30 pm

The EEBA Path to Affordable Zero Energy Homes – Part 3: Indoor Air Quality and Mechanical Systems *Ballroom O*
Zero energy homes (ZEHs) are a big part of the future of the home building business. While the materials and equipment to reach zero energy are available, designers and builders must create a bundle of energy-efficiency features that matches their climate, customers, and business constraints. The course series gives building professionals the knowledge to build ZEHs that are affordable, durable, safe, healthy, energy efficient, and comfortable to live in. Part 3 builds on envelope design with a focus on indoor air quality and mechanical systems. With a high-performance building envelope, space heating and cooling requirements are extremely low and right-sizing equipment is essential. High levels of air tightness offer some of the highest performance benefits for the lowest cost. This level of tightness requires active, controlled fresh air ventilation to maintain healthy air quality and proper indoor humidity. Once space heating energy use is slashed, water heating becomes the dominant use. Water heating heat pumps reduce this energy use by as much as two-thirds, but require proper selection and application.
Bruce Sullivan, EEBA

Commercial New Construction: Lessons to Help You Make the Tough Decisions When Under Pressure *Gooseberry*
A new construction journey is riddled with highs, lows and pressure-filled decisions. As you navigate these situations, you should be constantly thinking about what decisions you need to make to positively impact your building's bottom line. Years of program experience condensed into a single session provide the participant with proven methods of prioritizing decisions that will have long-term financial benefit and enhance occupant comfort. The session will candidly speak on the impacts of making decisions related to energy efficiency, demand response, distributed energy, and renewables with tips on working with your contractor to get what you want and need.
Mark Francis, Franklin Energy

Building Science Puzzles: Gaming to Better Your Building Science *French River*
Building science is an art—many times the blueprint goes as planned, and many times something goes awry, all with the same planning and attention to detail as the next. In this interactive session, you will investigate case studies and learn how to identify, diagnose, and solve building science puzzles. Participants will also have an opportunity to present their own building science puzzles and add them to the mix!
Peter Yost, Building-Wright

Basics to Preparation and Installation for Scenic Doors *Ballroom M*
Attend this hands-on demonstration of rough opening preparation and the installation of large, unobstructed scenic door systems. Multi-slide, lift and slide, and bifold options will be discussed as well as the various sill types. Sill pan preparation will be covered. Learn what the words "plumb, level, square, and true" mean, along with verification tricks for installation in large openings.
Erick Filby and Eric Klein; Marvin Windows and Doors

3:00–4:30 pm

The EEBA Path to Affordable Zero Energy Homes – Part 4: Renewable Energy and Marketing/Sales *Ballroom O*
Zero energy homes (ZEHs) are a big part of the future of the home building business. While the materials and equipment to reach zero energy are available, designers and builders must create a bundle of energy-efficiency features that matches their climate, customers, and business constraints. The course series gives building professionals the knowledge to build ZEHs that are affordable, durable, safe, healthy, energy efficient, and comfortable to live in. The final segment of this series includes a brief description of lighting strategies and appliance selection. With a high-performance building envelope and efficient, right-sized mechanical equipment, a home has achieved a status known as "zero energy ready." It is poised to become a zero energy home with only the addition of on-site solar electric panels. To avoid solar mistakes, there are a handful of issues that should be considered. A few miscellaneous topics fall into Part 4 such as electric vehicle readiness, construction process concerns and marketing/selling concepts.
Bruce Sullivan, EEBA

Multifamily Air Leakage: Test Methods and Results *Gooseberry*
Air leakage testing in multifamily buildings can be hard to do, confusing to implement, and unclear when it comes to results. This session will cover the common standards used in air tightness testing of multifamily buildings. We will discuss the procedures for measuring the exterior and total leakage of individual units along with multi-fan procedures for whole building testing of exterior leakage. This will include a comparison of building preparation, equipment setup, and benefits of the results for the various test methods. We will present whole building and individual air leakage results from a recent research project of 25-plus new construction, low-rise multifamily buildings in six states.
Paul Morin, The Energy Conservatory
Jake Selstad, Center for Energy and Environment

Comparing Spray Foam, AeroBarrier and Other Air Sealing Applications in New and Existing Buildings *French River*
Airtightness is key to managing both energy and moisture in buildings. At our disposal are spray foam, PSA tapes, sealants, gaskets, and a new system called AeroBarrier to tighten up a space. In this session, we'll compare and contrast these options from the perspectives of performance, application conditions required, skill level required, and application to both new and existing buildings. We will work through the building science of air sealing and measuring air tightness.
Peter Yost, Building-Wright

Leverage the Marketability of High-Performance Homes: Capitalize on Consumer Demand for Healthy Air while Meeting Building Codes and Energy Goals *Ballroom M*
Homebuyers have a new main ask when it comes to searching for a forever home: healthy air is grabbing the top spot on homebuyer's checklists, and builders need to be able to deliver. Learn from a team with more than 60 years of experience helping the HVAC trade increase indoor air quality (IAQ) product sales by educating consumers on the benefits of a healthy home. This session explains the four attributes of IAQ and how they are managed. Additionally, learn how builders are successfully marketing healthy air to raise the value of their homes, differentiate from the competition and meet a growing homebuyer demand for healthier homes.
Joseph Hillenmeyer and Brandon Glancy; Aprilaire