

Agenda

Understanding the Energy Efficiency of Conventional Construction

C. Farmer

Facts and figures on residential energy use
History of energy-conserving residential construction
Building code requirements
Energy conservation incentives

Passive House Standard:

T. Collins, A. Michler

Purpose, Principles and Development

History of certifying agencies in US: PHI and PHIUS
Passive House Standard: voluntary performance-based building envelope energy standard
Energy calculations: how and when to perform them
Energy calculation tools: an introduction to tools and their functionality
Assembling a team to ensure quality and performance
Examining common design features of Passive Houses

Architectural Elements of Passive Houses

L. Farmer

Siting, sizing and orientation
Super-insulated envelope with minimized thermal bridging
Efficient ventilation
Air tightness

Mechanical Systems in Passive Houses

H. Preiss

Optimizing heat gains
• Passive solar heat gains
• Indoor environmental heat gains
Heat exchanger
Supplemental heating
Renewable energy system integration
Energy-efficient appliances

Evaluating Passive House Case Studies

A. Michler

Case studies: in the planning process, under construction and finished projects

Passive House: Planning and Design
Denver, CO - Friday, July 27, 2018



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Learning Objectives

You'll be able to:

Receive an overview of the history of energy-conserving residential construction.

Explore the Passive House standard and identify common and useful energy calculation tools.

Create super-insulated envelopes and implement seasonal heating and cooling strategies.

Learn how to optimize heat gains and integrate renewable energy systems.

Review case studies of completed passive house projects.



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Review building code requirements and energy conservation incentives for residential construction

Explore the purpose, principles and development of the Passive House standard

Evaluate architectural elements of passive houses

Examine mechanical systems in passive houses

Discuss case studies of completed passive house projects

Continuing Education Credits

Architects

6.5 HSW CEHS
6.5 AIA HSW Learning Units

Professional Engineers

6.5 PDHs

Contractors

Non-Credit Continuing Ed.



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Faculty

Cody Farmer *MainStream Corporation*

Before there was green building for Cody Farmer, there was vision of the American dream and the freedom to work with and build with family and friends. Co-founding MainStream Corporation in September 2007, the door opened to that dream. Building some of the nation's tightest and best known Passive Houses, MainStream has since become a local go-to Passive House and performance building boutique with laser-like focus on the deployment of integrated design results, advanced building envelopes, air tight detailing, ventilation and indoor air quality, energy modeling and contractor training. With roots in real estate investing, he has successfully brought Passive House principles to tiny homes, "McMansions," Mighty Arrow Passive House, Gilcrest Library, Pelican Lake Ranch maintenance building, City of Lafayette building, City of Fort Collins, Passivista, Traveler's Rest and many custom "McPassive Houses," "Almosta" Passive Houses, and the pinnacle passive solar houses. A business marketing graduate of the University of Northern Colorado's Monfort College of Business 2001, he spent several years prior serving as the director of marketing for a high-tech R&D firm helping bring new government-funded projects into the marketplace. In 2007 he served as a member of Colorado's Air Force National Guard unit at Greeley's 137th Space Warning Squadron working with remote living conditions. He then obtained an M.S. degree in Construction Management and Sustainable Building at Colorado State University 2011.

Todd Collins *AE Building Systems*

Mr. Collins is Passive House trained and the founder of AE Building Systems. AE Building Systems supplies architects, builders and building owners with the products necessary to achieve high performance building objectives including Passive House, Zero Energy, LEED,

RESNET/HERS, Energy Star, etc. AE's passion is fueled by the desire to provide home and building owners with comfortable, healthy, durable and highly energy efficient places to live, work and play. Having had an interest in passive solar design and high performance buildings since the late 80's, his passion centers around energy efficiency. Climate change, sustainability and the rapid consumption of our energy resources further fuel Mr. Collins objectives in helping make buildings more energy efficient. His biggest driver is related to the energy crisis we are setting our children up for in the future. His background includes a bachelor's degree in Computer Science and an MBA degree with a focus in Marketing and Entrepreneurship.

Lisa Farmer *MainStream Corporation*

Navy veteran Lisa Farmer returned home to Colorado in 2001 after serving six years. She continued her training from the military to include a Civil Engineering degree from Colorado State University in 2004, later obtaining her professional engineers license in 2007. Beginning in the water resources sector, she became an excellent project engineer for water systems and reservoirs. She managed project schedules and budgets, and sub-contractors from design through construction. Taking those skills further into the built environment, she joined her husband Cody at MainStream Corporation in 2012 to design buildings that are healthier and can exist off-grid. She obtained her Certified Passive House Consultant designation in 2012 and is intimately familiar with both PHPP and WUFI-Passive. She runs energy models and coaches architects, owners and builders on how given building envelopes change in order to meet Passive House Standards. Together, the Farmers have succeeded in designing some of the healthiest and most comfortable buildings using the Passive House design strategies. With project owners who need and desire interior

health and comfort, their principles bring value ten-fold. Their specialty in air-tightness and fresh air ventilation provide significant energy savings on all their projects, while two have managed to achieve the third party Passive House certification. The buildings' electrical use will significantly be reduced from today's code-built construction. Ms. Farmer has lead marketing efforts at MainStream to provide these resources not only to custom residential, but also to tiny homes, maintenance buildings, town halls and libraries.

Hans Joachim Preiss *BrightSense LLC*

Mr. Preiss is based in Boulder, Colorado, where he is working to simplify the approach to net-zero energy buildings to the point where it becomes affordable and mainstream. He always considers all the components that make up the system we call "building," but his main focus is on rightsizing the best suited HVAC equipment for a project. Mr. Preiss previously held engineering positions at the Thermotechnology division of Robert Bosch North America, and brought high efficiency boilers, water heaters, and solar thermal equipment to the North American market. He has a degree in Engineering Physics with specialization in Environmental Science from the University of Applied Sciences in Munich, Germany.

Andrew Michler *CPHC*

Mr. Michler is the designer of MARTaK, the award winning first-certified, International Passive House in Colorado. His work includes building design, environmental architecture writing and theory, bespoke projects, and multi-media. He is the author of the book Hyperlocalization of Architecture and has presented globally on Passive House and the future of sustainable building design. He is the chair of Passive House Rocky Mountains, part of the North American Passive House Network.

Additional Learning

Webinar Series

Pedestrians and Bicycle Transport Planning

- **Introduction to Current Conditions and Trends in Biking and Walking**

Thurs., June 21, 2018, 11:00 AM - 12:30 PM CDT

- **Engineering and Infrastructure: Design for Walkability and Bikeability**

Thurs., June 21, 2018, 1:00 - 2:30 PM CDT

- **Developing a Walking and Biking Plan, Part I**

Fri., June 22, 2018, 11:00 AM - 12:30 PM CDT

- **Developing a Walking and Biking Plan, Part II**

Fri., June 22, 2018, 1:00 - 2:30 PM CDT

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Registration

Passive House: *Planning and Design*

Denver, CO - Friday, July 27, 2018

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