



Passive House AIA Luncheon

ABSTRACT:

The Passive House Approach
Net-zero today & on budget

The Passive House approach to architectural design is taking off in North America due to its consistent success at achieving upwards of 95% energy reduction through conservation. The typical heating system for most Passive Houses are no larger than hair dryers and they simultaneously boast the highest levels of comfort and in-door air quality. This presentation will provide an introduction to the Passive House Approach and the techniques for achieving economical net-zero construction in the southwest including review of the current Passive House project underway in the Santa Fe Rail Yard District.

WHO:

Jonah Stanford is the Principal of NEEDBASED Inc. and partner at the Net-Zero Collaborative together they provide architectural design and energy conservation consulting services to public and private clients who actively prioritize environmental efficiency. Jonah has managed projects for The National Trust of Historic Preservation, The Department of Energy, and many state and county municipalities. As a graduate of the first Passive House Consultant training in North America and current Board President of Passive House Institute US, Jonah is dedicated to the development of economically responsible Passive House Projects throughout the United States.

PASSIVE HOUSE INTRODUCTION:

For many of us the concept of an affordable very low-energy building has been a Holy Grail. The Passive House approach is quickly becoming recognized as a consistent means of achieving this ideal. In a nutshell, the Passive House approach is a reproducible method of creating very low-energy structures at an affordable cost—and the method does not dictate materials, forms, or any of the things that would prohibit its implementation within varied cultures or climate zones.

To become certified as a Passive House, a project must meet three criteria that are designed to address energy use and the occupants' health and comfort. But the implementation of the Passive House approach does not mandate that the project be certified. Of the over 22,000 Passive House projects completed in the world all have been modeled using the Passive House Planning Package (PHPP), a software tool developed in 1998 by Dr. Wolfgang Feist, the founder of the Passivhaus Institut (PHI). The PHPP was





developed for the CEPHEUS (Cost Efficient Passive Houses as European Standard) project, and has become the backbone of the Passive House approach.

Over the last decade the PHPP has been used to predict energy use in Passive Houses, and subsequent monitoring of a sample of Passive House buildings has confirmed the accuracy of this tool. These buildings demonstrate that an initial investment in energy efficiency—thoughtful design and construction of the thermal shell—allows for significant simplification of the mechanical systems that provide heating, cooling, and ventilation. The cost savings from downsizing these systems help to counterbalance the initial investment in efficiency. The simple, yet profound, concept that it is cheaper to conserve energy than to generate it is fundamental to the Passive House approach. This affordability element provides the critical tipping point toward mainstream accessibility that the Passive House approach is now experiencing.

This rising interest is reflected in the growing numbers of trained Passive House professionals and Passive House projects here in the United States. At the end of 2008 there were approximately 20 certified Passive House consultants in the United States.

Today there are more than 200 certified consultants. In 2008, there were five Passive Houses completed, with two more under construction. Two years later there are 16 completed, 15 more under construction, and another 40 currently under review for certification by the Passive House Institute US (PHIUS), the nonprofit whose mission is to provide technical support for Passive House projects. Fundamental to Passive House design is the understanding that the thermal dynamics in a structure can be different from what we have become accustomed to. Where typical construction relies on using a significant amount of energy to move heat quickly from one area of a structure to another before the heat is lost through a porous building envelope, in a Passive House the quality of the thermal envelope is improved to the point that a house can be kept comfortable primarily by relying on radiation and conduction. Energy does not need to move quickly around a house, because there is very little heat loss. In many Passive Houses, a single-point heat source can maintain comfortable temperatures throughout the house—a possibility that is difficult to accept for many in the construction and building science industries here. The current economic downturn has had a significant impact on construction and development in the United States. It has had a devastating impact on many communities and families. However, it also has inspired greater consideration of the value of long-term investment, stability, and happiness. The Passive House Approach represents a viable, tested method of developing low-energy structures that reflect the new trend toward financial and environmental sustainability. We now know how to do it; it only remains for us to implement it. To quote Dr. Wolfgang Feist, “There is no more trying, just doing.”



Photo credits: Top down

#1 Multi-family Passive House
Architects: Heiz Haus

#2 Kindergarden
Architect: Olaf Reiter

#3 Wall section
Agepan Industries

#4 Balance Project
Santa Fe Rail yard