FRAUNHOFER INSTITUTE FOR BUILDINGS PHYSICS IBP

PRESS RELEASE

A Design Tool for Passive Houses of the Future

Adoption of Passive House building principles is accelerating worldwide. The climate of the various countries where Passive Houses are being built has to be considered carefully for this unique type of design. Fraunhofer-Institute for Building Physics (IBP) has developed, in cooperation with the Passive House Institute US (PHIUS), the WUFI® Passive design software for Passive Houses in North America. The Fraunhofer IBP's hygrothermal analysis software WUFI® Plus was the basis for this new modeling tool.

Passive Houses are characterized by extremely low energy consumption. Rigorous certification criteria govern boundary conditions for primary energy or air-tightness of the thermal envelope. In times of decreasing fossil fuel resources, such criteria for efficiency and renewable resources are becoming more important than ever. Passive Houses have proven that such a solution has a reliable future. Compared to the average energy consumption of the existing building stock in the US of 215 kWh/(m²a) Passive House technology offers impressive savings of 65 to 85 per cent site energy intensity depending on which fuel sources are used – and for the small remainder of site energy there are multiple economically feasible and renewable options.

WUFI® Passive – a design tool for the USA

The diffusion of Passive House technology, originally developed in the US, and having taken off in the last decade in German-speaking countries and Scandinavia, has now reached many other nations. Designers in the US have experienced recent concerns with using the tools developed in Germany for analysis of buildings in the warm-humid climate conditions that are prevalent in large parts of the country. "Dynamic models, often using hourly data, are necessary to accurately model the hygrothermal behavior of Passive Houses in climates where cooling and dehumidification of the ventilation air are playing an important role", explains Dr. Hartwig Künzel from the Fraunhofer IBP.

The WUFI® software family has become well known in the US in recent years due to Fraunhofer's longstanding involvement in North American hygrothermal assessments. PHIUS approached Fraunhofer on the basis of that expertise to help address the climate specificity issues in the Passive House modeling process. The goal was to develop a new modeling tool using the WUFI® Plus building simulation tool; a tool that was designed to meet the needs of the North American Passive House community. This tool can be learned quickly and notifies the user in real-time of possible mistakes during data entry. "The first training session with WUFI Passive has already happened and received very

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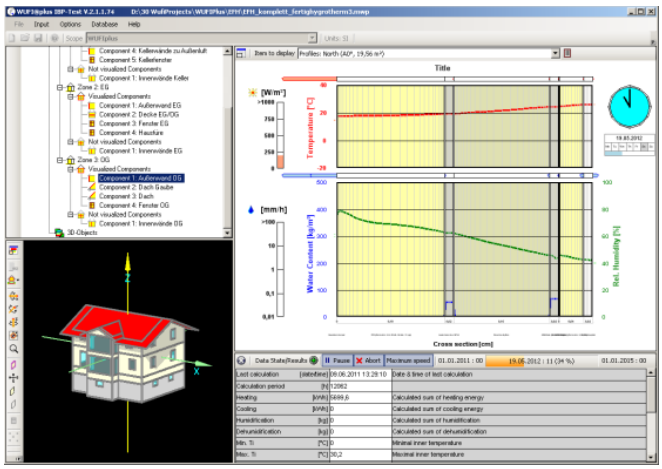
positive feedback“, says Katrin Klingenberg, Executive Director of PHIUS. At the end of September, Florian Antretter, the leader of the software development team of WUFI® Plus, will introduce the new WUFI Passive software at the 7th Annual North American Passive House Conference in Denver, Colorado.

Creating International Standards

As a next step, together with PHIUS, the researchers at the Fraunhofer IBP would like to further develop existing models with partners from different countries to reach an international consensus in regards to the definition of climate-specific requirements for passive houses. The goal is to provide designers worldwide with an all-encompassing design and certification tool. In addition, local energy generation systems should be integrated into the tool. “Then PlusEnergy Houses will be easy to design with this software and this really is the building model of the future“, emphasizes Prof. Gerd Hauser, chairman of the Fraunhofer IBP and founder of the German Energy Pass.

Pictures:



Picture 1: User interface of the design tool WUFI® Passive.
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Picture 2: Corehaus - US-Passiv house.
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Building physics is one of the keys to a successful building project. The **Fraunhofer Institute for Building Physics IBP** focuses its work on research, development, testing, demonstration and consulting in the various fields of building physics. These include noise control and sound insulation in buildings, the optimization of auditoria acoustics and solutions for improving energy efficiency and optimizing lighting technology. Fraunhofer IBP's work also covers issues of climate control and the indoor environment, hygiene and health protection, building material emissions, weatherproofing and protection against heat and moisture, preservation of building structures and the conservation of historic monuments.

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