

## "Building efficiency is key to a sustainable energy future"

### Review of the 19th International Passive House Conference 2015 in Leipzig

*Leipzig, Germany.* Energy efficient construction has never been so easy – and this is due to the increasing availability of suitable components. The key focus at the International Passive House Conference 2015 in Leipzig was on the latest developments in this area. Experts from around the world presented the enormous savings potential of certified windows, insulation systems and ventilation systems among other things, and at the same time demonstrated their practical implementation. The lectures held on 17 and 18 April demonstrated the importance of well-conceived and consistent action in the building sector for a successful transition to a sustainable energy future.



Dr. Feist explains the fundamental importance of certified Passive House components. *Picture: Passive House Institute*

"Today the investment costs for improved efficiency of building components are exceptionally low; the cost difference is more than compensated through the saved energy costs," said Dr. Wolfgang Feist, Director of the Passive House Institute. The use of Passive House components is therefore profitable for the user also from an economic perspective. And thanks to an ever-growing range of products on the market, there are hardly any limitations to planning and architectural implementation. "The products that are required for the construction of highly

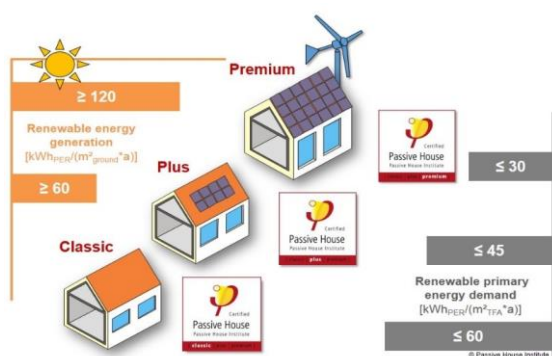
energy efficient buildings provide a variety of solutions with reference to the type of building, range of functions, area of application and design," said Feist.

Over a hundred speakers in total reported on the potentials of intelligent architecture for climate protection and cost savings. More than one thousand experts visited the Conference or one of the specialist events offered within its framework programme. This year, guests from almost 50 countries attended the event, with particularly large delegations from China and North America. The international character of the audience clearly demonstrates the versatility of the Passive House Standard, which works in all climate zones.

The German Federal Minister for Economic Affairs and Energy, Sigmar Gabriel, was the patron of the conference. "The 'Energiewende' is one of Germany's main projects for the future. However, it will only succeed if, in addition to the development of renewable energy, we also attach importance to the subject of energy efficiency," explained the Minister in the foreword to the Conference Proceedings. Energy efficiency, in particular for heating and cooling or for the supply of hot water and lighting in the building sector, constitutes the second pillar of the energy transition, following renewables.

For advancing this combination of efficiency and renewable energy, the Passive House Institute has developed new classes for certification: in addition to Passive House Classic, the classes Passive House Plus and Passive House Premium are now also available. Through these new classes, energy gains on or near the building, for example through photovoltaic systems on the roof, can be taken into account according to clearly defined criteria.

The heating demand of a Passive House may not exceed 15 kWh/(m<sup>2</sup>a). This will continue to apply, but with the introduction of the new categories, the overall demand for renewable primary energy (PER / Primary Energy Renewable) will be used instead of the primary energy demand, which was previously used. In the case of the Passive House Classic category, this value will be 60 kWh/(m<sup>2</sup>a) at the most. A building built to Passive House Plus is more efficient as it may not consume more than 45 kWh/(m<sup>2</sup>a) of renewable primary energy. It must also generate at least 60 kWh/(m<sup>2</sup>a) of energy in relation to the area covered by the building. In the case of Passive House Premium, the energy demand is limited to just 30 kWh/(m<sup>2</sup>a), with at least 120 kWh/(m<sup>2</sup>a) of energy being generated.



The main specific values of the new Passive House classes which also take into account the generation of energy.  
*Illustration: Passive House Institute*



Dr. Benjamin Krick describes the implications of the new Passive House classes for certification in practice.  
*Picture: Passive House Institute*

"Storage capacities are necessary for transferring surplus energy to time periods with lower energy gains. These supply secondary electricity as required, but this is associated with losses," explained Dr. Benjamin Krick of the Passive House Institute in a lecture. Depending on the type of energy application, the proportion of primary and secondary electricity varies, as do the losses for providing energy. "These specific energy losses of an energy application are described by the respective PER factor. This makes the PER value suitable for characterising the overall efficiency of the system," Krick explained further. Dr. Wolfgang Feist emphasised

that it was possible to describe this type of effort for the supply of renewable energy in this way and ultimately, the extent of the area used for wind power and solar energy facilities. At the same time, for each individual case, this approach shows that a completely renewable energy supply is possible in future – and also how this is possible, using the existing infrastructure for energy distribution.

The Passive House classes and the new PER evaluation system will be introduced with the coming version of the planning tool PHPP (Passive House Planning Package). Prior to the International Passive House Conference, workshops were offered for introductory training relating to the details of PHPP 9. The numbers of people registering for this was so high that several courses had to be held in parallel. "The PHPP already makes it possible to reliably plan tomorrow's buildings today. The overwhelming interest in these courses has shown that a huge demand for this evidently exists in many countries", said Jan Steiger, who is in charge of ongoing development of the PHPP at the Passive House Institute. The possibility of evaluating and comparing different design options or refurbishment steps, with reference to energy as well as cost-efficiency, was very well-received by the course participants and Passive House community in general.



Background information on PHPP 9 and the 3D tool designPH could be seen at the specialists' exhibition. *Picture: Passive House Institute*

The use of the 3D tool designPH also constituted a part of the PHPP workshops. The SketchUp plugin ascertains the relevant energy data from the architectural design and thus facilitates the planning of Passive Houses. Preliminary planning using the designPH tool can be exported into the PHPP with just a few clicks. At the Passive House Institute's booth, a team of developers demonstrated how this works and what options are available for optimising the energy efficiency of a building with the aid of the designPH tool.

At the specialists' exhibition taking place in parallel to the lecture programme, leading manufacturers of Passive House components exhibited their latest products. Dr. Wolfgang Feist presented new certificates to some of the exhibitors. In addition to the established components which have been available on the market for many years, such as triple-glazed Passive House windows and ventilation systems with heat recovery, innovative products were also available this year including the first Passive House attic staircase and a system for heat recovery from shower water.

The winners of the Component Award 2015 were also presented at the Passive House exhibition. This year the competition recognised energy-efficient solutions for windows for building refurbishment. The main challenge in the Component Award 2015 was that the product had to show a degree of flexibility since refurbishments are often carried out in a step-

by-step manner. Ideal windows had to deliver excellent results during the transitional period as well as after the completion of all refurbishment measures. The cost effectiveness of the windows was assessed first and foremost, with a comparison of purchase costs with potential savings. However, the jury also considered practicability, innovation and aesthetics, with a 20 percent weighting for each of these aspects.



Presentation of the Component Award at the International Passive House Conference. *Picture: Passive House Institute*

The joint first prize of the Component Award 2015 went to System Connecta by Optiwin and to Smartwin Compact S by Lorber / Pro Passivhausfenster. In the assessment, the window Smartwin Compact S was commended for its connection details, among other things. The jury, which consisted of window specialists, architects and journalists, especially noted the functionality of the window System Connecta. The two third prizes went to Aluplast for the window Energeto 8000 view and Pural for their window Eco 90. Special acknowledgements

were given by the jury to Wiegand for their window DWplus Integral and to Fanzola for their window Null-Fenster. The Component Award is part of the EU-funded project [EuroPHit](#), which focuses on step-by-step energy-efficient retrofits.

The EU-funded project [PassREg](#) (Passive House Regions with Renewable Energies) also played an important role at the International Passive House Conference 2015. The focus of this project is on the opportunities for cities and municipalities for contribution to increased energy-efficiency and sustainable energy generation in the building sector, whether this is done through the specific implementation of the Passive House Standard for their own public buildings, or through targeted incentive programmes initiated by them. A Passive House compact course organised within the framework programme of the Conference provided clear guidelines for measures taken at the local level.

The various approaches adopted at the European level were discussed in several lecture sessions relating to the two EU projects EuroPHit and PassREg. Philippe Moseley of the European Commission's agency EASME emphasised the significance of the established Passive House Standard as a basis for Nearly Zero-Energy Buildings (NZEB) as stipulated in the EU's Energy Performance of Buildings Directive. "The new Horizon 2020 research and innovation programme has already featured a number of calls for proposals aiming to tackle these issues. These efforts are likely to continue in the future and Passive House principles are sure to remain in the picture as we move to the more stringent 2030 targets".



In the context of the PassREg project, an architecture prize was also announced last year: the Passive House Award. An exhibition showing the winners and finalists of this competition was organised in Leipzig. The publication of a book with all prizewinning projects was possible due to the support of the German Federal Ministry for Economic Affairs and Energy. The first copies were distributed in Leipzig, and an [online version of the book](#) is now available.

Another focal point of the conference programme were completed projects that exemplify the implementation possibilities. Besides many other buildings, there were presentations about a Passive House university laboratory in the US state of Michigan, a residential and commercial building with a floor area greater than 4000 square meters in the province of Xinjiang in China, and various new buildings and retrofits in the Mediterranean climate of Spain. Projects in Leipzig itself were also presented. Dorothee Dubrau, Councillor for Urban Development and Construction at the City of Leipzig, referred in her welcome address to several schools and kindergartens built to the Passive House Standard. Many Passive Houses in Leipzig and the surrounding region were also visited during excursions which took place after the Conference.

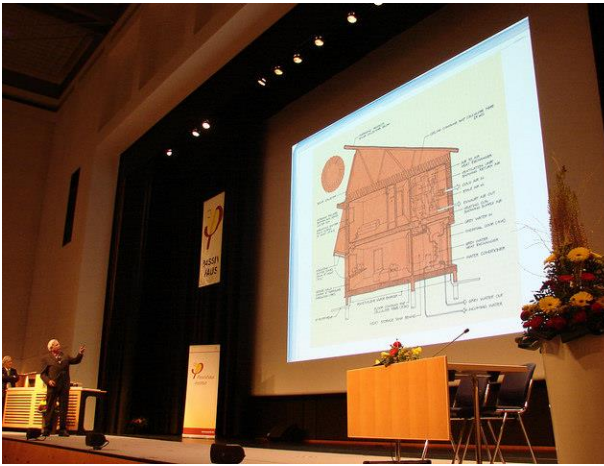


School in Leipzig built to the Passive House Standard, which was visited by conference participants within the framework of an excursion. *Picture: City of Leipzig*



Another excursion destination was a Passive House kindergarten in the town of Delitzsch near Leipzig. *Picture: Associate Architects Reiter + Rentzsch / Spitzner*

At the conclusion of the International Passive House Conference, yet another prize was awarded; Canadian Harold Orr received the Pioneer Award for his trailblazing work relating to energy efficient construction. In the late 1970s, in collaboration with a broad team of experts, the mechanical engineer experimented with many methods, which are now an established feature of tens of thousands of buildings. The Saskatchewan Conservation House in the town of Regina already had an excellent standard of thermal insulation, an airtight building envelope and, as one of the first in the world, a ventilation system with heat recovery. The mechanical engineer vividly described how, against the backdrop of the oil crisis at the time, he was looking for possibilities to significantly reduce the consumption of heating oil. The original idea of simply equipping a conventional building with a large actively operated solar heating system was discarded due to the climate which had very little solar radiation in winter. The studies carried out with the example building showed that it was mainly a question of thermal

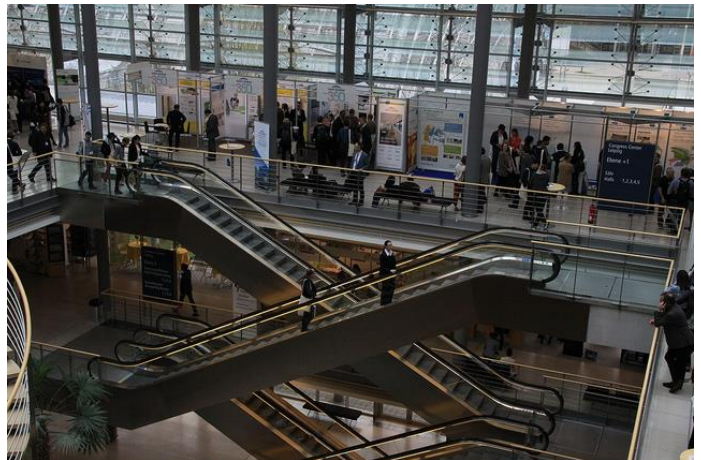


The winner of the Pioneer Award, the Canadian Harold Orr, while presenting the Saskatchewan Conservation House built in 1977. *Picture: Passive House Institute*

protection of the building envelope. Orr stressed that today, after almost 40 years, the thermal protection was still intact and functioning and there is no reason to suppose that it will not continue to serve its purpose in an environmentally friendly manner for another 40 years. The costs for the application of insulation were very low for 1976 – and are even less in relation to the insulation solutions available nowadays. Besides the huge savings in energy and operating costs, the better level of insulation also has a positive impact on building preservation, and provides for a long useful life and improved thermal comfort.

Over a third of the total energy consumed in industrialised countries is used for building operation, especially for heating. With Passive House technology, it is possible to reduce this consumption by up to 90 percent. The extra investment is paid off within a few years by the saved energy costs. Improving the efficiency of buildings is therefore not only an important contribution to a sustainable energy future, it also represents an attractive investment opportunity for building owners.

Since 1997, the International Passive House Conference has been held annually by the Passive House Institute in different locations. The City of Leipzig, the Saxony Chamber of Architects and the University of Innsbruck were co-organisers of the 2015 Conference. In 2016 several Passive House anniversaries will be celebrated, with Darmstadt (Germany) hosting next year's conference. This is the city where the world's first Passive House was built exactly 25 years ago in the city district of Kranichstein, and where the Passive House Institute was founded 20 years ago. The 20<sup>th</sup> International Passive House Conference will be held from 22 – 23 April 2016 at the venue "Darmstadtium", opposite the city's historical castle.



The exhibition area was a popular meeting point for exchange between professional conference visitors and manufacturers of Passive House components. *Picture: Passive House Institute*



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