15TH INTERNATIONAL PASSIVE HOUSE CONFERENCE 2011

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Worldwide success of the Passive House

15th International Passive House Conference initiates a global energy-efficiency turnabout

The 15th International Passive House Conference can rightly be called the world's largest conference on energy-efficient construction as a result of its awesome agenda. Half of the 1200 Conference participants from 50 countries came from non-German-speaking countries. The most comprehensive conference programme that has ever been presented at a Passive House Conference was offered this time. Over 80 international "Passive House Beginners" attended an English-language Passive House Basics Seminar on 25th May, which took place at the Faculty of Civil Engineering at the University of Innsbruck. On 26th and 29th May, a total of 9 Passive House Excursions were organised for about 450 participants, so that all the information gathered during the many presentations could also be actually experienced by them, in the true sense of the word. This also included some special excursions, like the visit to Passive House public buildings that was organised for the local government representatives of the City of Oslo, and the visit to the world's largest Passive House residential complexes, the Lodenareal and O3 Olympia Village in Innsbruck that was organised for a group of Korean conference participants and a Russian delegation, including members of the State Duma.

The actual convention took place from 27th to 28th May, with 80 conference papers and poster contributions from all over the world. An Exhibition with free admission for all visitors took place parallel to the Conference, where almost 100 exhibitors exclusively presented Passive House products and systems. There were another 38 presentations about Passive House components at the Manufacturers' Forum during the exhibition. 10 of the 27 Leading Passive House Regions also introduced themselves at the Conference, including Brussels, Oslo, Alta Valtellina in Italy, Frankfurt, Hannover, Nuremberg, Vorarlberg, Lower Austria, Vienna and Wels. In the context of a Passive House declaration, they demonstrated the successful policy implementation within their own sphere of influence in their regions. A freely accessible Forum for Craftsmen also offered craft trades the opportunity to obtain information regarding the demands for high quality and detail formation. In order to successfully handle the large-scale event, 50 Passive House Institute staff members were continuously available during the Conference.

Plenary session during the Conference (Photo: PHI)

The world is facing major challenges

According to the new report by the International Energy Agency (IEA), in 2010 the global emission of CO2 increased by 1.6 gigatons to 30.6 gigatons worldwide. This is the highest increase since the start of measurements. The restriction of global warming to 2 degrees is just “a nice utopia” said Fatih Birol, chief economist of the IEA, at the end of May in London. "It will be an exceptional challenge if we are to achieve the goal and keep global warming below 2 degrees." According to projections of the UNO Panel on Climate Change (IPCC), this means a 50% chance of a rise in the average global temperature of more than 4 degrees by 2100. “The results would be dire”, warned the British economist Nicholas Stern. “Such warming would disrupt the lives of hundreds of millions of people across the world, leading to widespread mass migration and conflicts. Any sane person would seek to drastically reduce such a risk”.

At the same time, the logical consequence after the devastating nuclear catastrophe in Fukushima was the phasing-out of nuclear energy by 2021 in Germany, and by 2034 in Switzerland. Focussing on coal or gas power plants instead would be a step towards collective self- destruction.

Energy efficiency is the key to the energy revolution

Right at the beginning of his opening speech at the 15th Passive House Conference, Anton Steixner, Deputy Governor of the Austrian State of Tyrol (ÖVP), made it clear that “the Passive House is the future. The Passive House is well-established in Tyrol”. Theodor Zillner of the Ministry for Transport, Innovation and Technology summed it up thus: “The concept developed by Professor Dr. Wolfgang Feist 20 years ago was revolutionary. He recognised 18 years before the IEA did that energy efficiency represents the solution for our future energy problems“.

Clemens Haury of the EU Commission (Directorate General for Energy) also confirmed this: “Energy efficiency is ‘top of the agenda’ in Brussels. The share of renewable energy can be doubled to 35 percent in the next ten years, but what is most important is the improvement of efficiency. This can save more than 50 percent of the energy consumption without any

inconvenience. As the building sector is responsible for 40 percent of the energy consumption in the EU, the Passive House Standard represents the best and most cost-efficient solution for this“. On the basis of the Energy Efficiency Action Plan and the EPBD 2010 (Energy Performance of Buildings Directive) with the ”Nearly zero energy building“ coming into effect from 2021, the EU Commission has set the course for a rapid implementation of the highest energy efficiency standards. “If individual countries fail to implement these, the EU will not hesitate to impose sanctions against these countries after evaluation of the implementation measures in 2013. After all, it is in the strategic interests of Europe to become independent of energy imports as quickly as possible”, concludes Clemens Haury.

Wolfgang Feist and Clemens Haury after the plenary session at the Conference (Photo: PHI/LANG consulting)

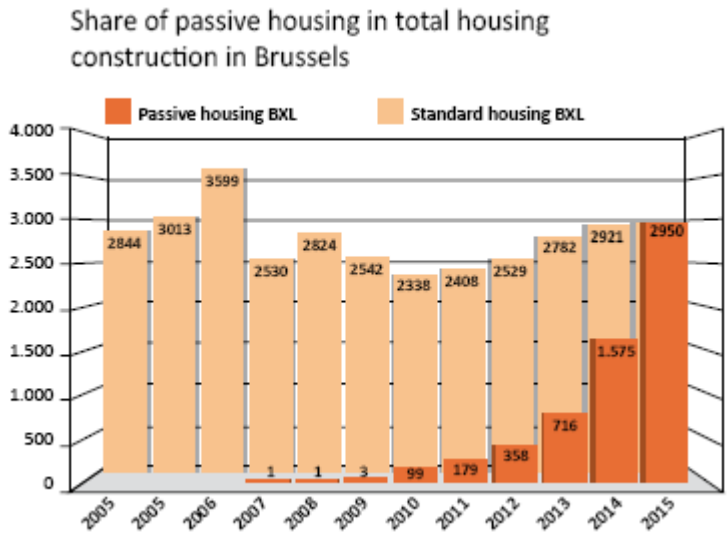
Passive House compulsory by 2012
As the Regional Minister for Housing and Environment, it is unequivocal for Hannes Gschwentner, Deputy Governor of the State of Tyrol (SPÖ): “There is no way around the Passive House any more. It is an important contribution, not only towards energy conservation, but also for achieving the climate protection goals. Tyrol is fast becoming a Passive House Mecca. The Passive House has experienced rapid progress in Tyrol after a long period of decline, thanks also to the professorship of Dr. Feist in Innsbruck. In 2009, only 2% of all newly constructed buildings offered the comforts of a Passive House, this number rose to 10% in 2010, and in 2011 this will become 50%. The subsidies for housing construction are an important regulatory element for this, which is why only Passive Houses will be subsidised in Tyrol from 2012 onwards”. This will make Tyrol the second Austrian state that has committed itself to the Passive House Standard, after Vorarlberg which has successfully implemented it for all subsidised multi-family houses since 2007.

“Anything else wouldn’t make sense at all. If the extra costs for construction amount to 3 percent, and the lifelong savings in energy costs amount to more than 50%, this speaks clearly in favour of the Passive House, “ adds Dr. Klaus Lugger, director of the Neue Heimat Tirol (NHT), the largest non-commercial property developer and president of the European Association of Non-commercial Property Developers. Not only has the NHT built two of the the world’s largest Passive House residential complexes, but is currently also building a further 1000 accommodation units besides the existing 1400 units, in a total of 15 residential

complexes in the Passive House Standard. Hannes Gschwentner has announced that Tyrol will strive to become the 28th Leading Passive House Region in Europe.

Wolfgang Feist at the Brussels Capital Region info point during the press tour at the Components Exhibition (Photo: PHI/LANG consulting)

Tyrol will thus joins the ranks of the 27 other Leading Passive house Regions in Europe, with a total of 25 million inhabitants. The capital of Brussels deserves particular attention in this respect, which made the decision as early as 21.12.2007 to apply the Passive House Standard for the construction of all public buildings from 2010 onwards, and for all other new buildings in the Brussels Region from 2015. The Brussels Capital Region is thus consistently implementing the minimum standard specified by the EU Buildings Directive, 6 years before it comes into effect. Within three years, 117 Passive House objects with a total floor area of 265.000 m², from multi-family houses and schools and kindergartens to office buildings could be initiated through the "Call for Proposals for Exemplary Buildings", thus effectively kick-starting this development.



Source: "BRUSSELS - from eco-building to sustainable city" brochure / Evelyne Huytebroeck, Minister of the

In Britain, the "Zero CO_2-Emission building" will become compulsory by 2016. In her documentary based on interviews with various planners and construction companies, Henrietta Lynch from South Wales highlighted the fact that Passive House suitable components are hardly available in Britain at the moment and that products as well as specialists have to be brought in from Germany and Austria. Nevertheless, this should now revive the flagging construction industry in the UK, so that the opportunity offered by the economic recovery can be availed of through innovations relating to the Passive House. Bill Butcher from West Yorkshire demonstrated how the Passive House Standard can be implemented using the traditional double skin masonry work used in 75% of the new constructions. In his contribution, he presented special approaches to solving the problems relating to air tightness of the building as well as the prevention of thermal bridging.

The biggest group of Conference participants, after Germany and Austria, came from Norway with 74 members, which is not surprising, considering that the City of Oslo has also decided to construct all public buildings according to the Passive House Standard by 2014 – and where possible, to apply it in the refurbishment of existing buildings too.

"Think globally, act locally"
Angela Espenberger (on the right at the Photo) and Sarah Mekjian (on the left) of the International Passive House Association (iPHA) made it clear that the same Passive House principles apply all over the world. "Only the details need to be adapted to the regional climatic and structural conditions." The iPHA has gained more than 1,000 members from 38 countries within a year, connecting Passive House activities and stakeholders throughout the world.

Accordingly, the motto of the Conference was also "Passive House Regions". Professor Dr. Wolfgang Feist of the Passive House Institute defined 8 climate zones throughout the world with different general requirements:
1) heating only
2) cooling only
3) dehumidification only

4) heating and cooling
5) heating and dehumidification
6) cooling and dehumidification
7) heating, cooling and dehumidification
8) “lucky climates“: fully passive operation possible

There are Passive House examples and solutions available for these regions today – and participants from all these regions were also present. Participants from the USA were the second largest non-German-speaking delegation, after the Norwegians.

The US Army counts on the Passive House for energy-independence
In his study based on different army installations in various climatic conditions, Dr. Alexander Zhivov of the US Army Corps of Engineers found that the Passive House represents the most cost-efficient standard which can also be applied for the modernisation of the army’s existing building stock. Independence from energy thanks to the Passive House has an enormous strategic significance for the US Army.

In Santiago de Chile, a bank building was successfully realised as a Passive House, as reported by Dr.-Ing. Marcelo Huenchunir. Strong solar radiation necessitates an effective method of shading in the summertime. Temperatures are high during the day and low at night, thus enabling passive cooling of the building through thermal storage mass and night-time ventilation. In this way it is even possible to remove the heat dissipating from the servers and cash terminals.

In South Korea there is already an advanced technical building standard, but many parameters are still very basic when it comes to the implementation of Passive Houses. By creating a Korean-German Memorandum of Understanding Partnership like that formed by the architects’ group HUDIGM with ArchitekturWerkstatt Vallentin, a win-win situation is created for all those involved, leading to the propagation of the Passive House standard. Lead by the architect Yoon-Boom Cho, this partnership will only handle Passive House projects. Some Passive Houses have already been built and are currently being certified by the PHI. For Korea, this means that the Passive House Standard can be implemented reliably and appropriately and that Korea remains up-to-date on the latest technology in the field of energy-efficient construction. South Korea relies to 100% on energy imports, and wishes to reduce its fossil fuels/nuclear energy use to just 10% by 2050.

With her contribution **“Passive houses between the 55th and the 69th parallel”,** Simone Kreutzer from Växjö dispensed with the common misunderstanding that Passive Houses cannot be built in Sweden. The great difference in calculations between Sweden’s national passive house definition and the international Passive House Standard according to the PHPP were accounted for using 100 realised objects in this study. As is usual in many other countries, the national standardised calculation methods lead to excessively favourable results in theory, which unfortunately turn out to be much lower than the actual consumptions. In contrast with this, the calculation according to the PHPP gives the actual consumption quite accurately. The first internationally certified Passive House in Sweden, a kindergarten in Åkersberga with a heating demand of 14.6kWh/m²a according to the PHPP , and a terraced house built as a Passive House in Kiruna, the northernmost town in Sweden, together prove that “it is quite possible to build real Passive Houses in the far north”.

The similarity of **Latvia** and Austria with regard to their climates, construction methods and building substance dating from the 60s and 70s was pointed out by Agris Kamender of the Technical University of Riga. The lifecycle costs over a period of 35 years for different energy-efficient modernisation variants were analysed using the example of a refurbishment

of an administrative building erected in the 70s, that was carried out using EnerPHit components, for example for a timber curtain wall facade with a 40cm build-up and integrated ventilation ducts. The most cost-effective overall solution turned out to be the refurbishment to the Passive House Standard.

"Keep the Passive House in mind for - memorials!"
Twenty conference papers dealt with the Passive House Standard refurbishment of various existing buildings, without restriction. Five examples impressively demonstrated the modernisation of historical buildings to the Passive House Standard or at least with Passive House components.

The oldest building that was presented was the **brewery inn "Niedere Schloss" built in the 15th Century**, which was converted into a 4-star wellness hotel using Passive House components. In consultation with the building preservation authority, the historical moulding was removed, restored, thermally decoupled and shifted in front of the 16cm thick mineral exterior insulation. The high-quality energy-efficient triple glazed oak wood windows and restored compound windows were also used in agreement with the authority. The damp exterior walls were underpinned section by section, and placed on a 10cm strip of foam glass as a "warm base". The whole building was equipped with a highly-efficient comfort ventilation system by the architect Martin Endhardt, for the well-being of the hotel guests, not only in terms of the wellness facilities.

The **refurbishment of a historically preserved building into a Passive House office** was no less ambitious: that is the historical country house of the Count of Erbach-Schönberg in Rimbach built in the year 1733. The architect Peter Hinz could achieve a U-value of 0.06W/m²K for the roof of this building by means of insulation on the rafters, as well as under the rafters. The exterior walls were protected by 20cm thick mineral exterior insulation, and just like the sandstone mouldings, all decorative elements were reapplied using a scaling factor. The existing windows were replaced with single casement wooden windows (U_w-value 0.72W/m²K) which were moved forward 20cm, with artificial window bars as in the former building. The former stud farmhouse now offers the comforts of a modern office building with controlled ventilation with heat recovery as well as a bus system which also allows monitoring over 2 years. The heating demand could be reduced to the Passive House level!

In Wels, a **preserved factory area that was built in 1870, with historical brickwork and** cast-iron factory windows was converted into the new headquarters of the company Fronius. Under the supervision of PAUAT architects, in a 20,000m² large area, 12cm of interior insulation, Passive House windows, 60cm roof insulation and 30cm of glass foam granulate on the ground reduced the energy consumption of this historical structure from 225kWh/m²a to 24kWh/m²a. The CO_2 emissions were decreased by 95%.

Over a dozen other examples of Passive House refurbishments demonstrated the saving potentials of 80-95% under extremely economical conditions. The results of studies relating to the dynamic capital value calculations by Dr. Berthold Kaufmann and Dr. Witta Ebel of the PHI also made it clear, using the examples of several refurbishment projects, that it is **economically ideal to carry out modernisation measures for achieving the Passive House Standard**. The costs for a single kilowatt hour are less than € 0.06/kWh for the PHiB project in Schlesierstrasse, for example, and thus are considerably much less than the current costs for final energy. .

The exhibitors at the Passive House Manufacturers' Forum also proved that after 20 years of the Passive House Standard, a wide range of certified Passive House products is now available for every kind of application. These companies have realised again and again that

investing in the consistent marketing of Passive House products and innovations is worthwhile.

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Visits to Passive Houses of every size were part of the excursions at the 15th International Passivhe House Conference in Innsbruck, such as the residential complex Lodenareal with 354 apartments by the Neue Heimat Tirol. (Photo: PHI/LANG consulting)

Elmar Draxl of Neuen Heimat Tirol presented some impressive results for the first year of operation of what is currently the **world's largest Passive House residential estate** during the excursions to the **Lodenareal** complex. "For the 354 apartments with a total floor area of 26,00m², we needed only 246m³ of wood pellets for heating. That's the average annual consumption of six single family houses!" The percentage of satisfied occupants is a sensational 95%. It therefore no wonder that the NHT receives applications for Passive House apartments that are 7 times the number of apartments available. Neither is it any wonder that the NHT is putting its full focus on the construction of Passive Houses.

The world's biggest Conference for energy-efficient construction has impressively proved that "the Passive House Standard, with its wide range of application in new construction and in modernisations, makes a key contribution to the global reduction of CO_2 emissions and the energy consumption. Above all, the energy that is not consumed is the safest form of energy and constitutes the path to independence", summarises Günter Lang, who is the press spokesman for the 15th International Passive House Conference. The 14 million square metres of living space in Europe that have been built to the Passive House Standard so far will save at least 10 billion Euros in energy costs and 8 million tonnes of CO_2 emissions within the next 40 years. This allows the risks to be reduced drastically and on a permanent basis.

The 16th International Passive House Conference will take place in Hanover in Germany from 4th -5th May 2012.

Review of the 15th International Passive House Conference

PM 2011-06-09: 15th International Passive House Conference was a complete success
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The 15th International Passive House Conference was organised by the Passive House Institute, the Province of Tyrol and the University of Innsbruck.

Other important links: www.passiv.de, www.passivehouse-international.org, passipedia.passiv.de, www.passivhausplaner.eu

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