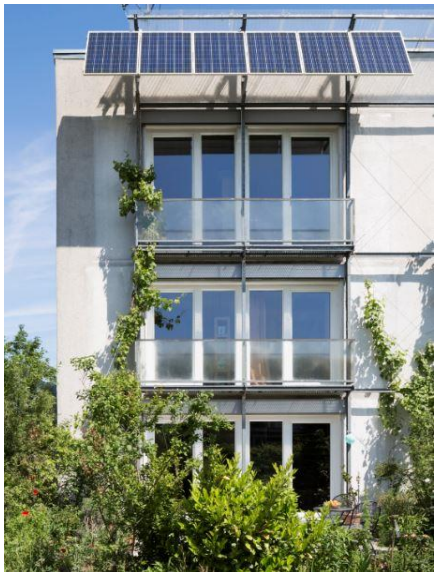
Press Release **(LONG VERSION)** **2 June 2021**

Many reasons for celebrating: Passive House has its 30th anniversary, the Passive House Institute is now 25 years old, and the International Passive House Conference is taking place for the 25th time. This year it will be held in September in Wuppertal, Germany. © Pixabay

Happy Birthday, Passive House!

Passive House now 30 years old – pioneering work paves the way for energy efficiency



Celebrating its 30th birthday: the world's first Passive House building in Darmstadt. This pilot project was equipped with a photovoltaics system in 2015, resulting in the certification as a Passive House Plus. © Peter Cook

***Darmstadt, Germany*. Passive House is celebrating its 30th birthday! Starting as an experiment in the German city of Darmstadt, this pioneering project by the building physicist Professor Wolfgang Feist had a great impact: at a time when climate protection was only on the agenda for very few people, it paved the way for energy efficiency in buildings worldwide. Today, the Passive House standard is realised throughout the world and shines brightly in beacon projects globally. There are even more reasons for celebration: the 25th anniversary of the Passive House Institute and the jubilee edition of the International Passive House Conference.**

”Of course, I’m happy about this development: seeing the progress from the first experimental residential building, which we built together with three other families, to the projects and districts worldwide that have been designed to the Passive House standard", explains Passive House pioneer Professor Wolfgang Feist. "However, without significantly greater commitment to the more energy efficient construction of buildings on the part of governments, there will very little progress.”

Protection of the Earth

At the global level, Feist further explains, very little was currently being done to protect the Earth for the future – also in terms of energy wastage in our buildings. However, with the construction of the first Passive House building in the world the physicist has demonstrated a practicable solution. The autumn of 1990 marked the beginning of a new era, when construction work started in Darmstadt.

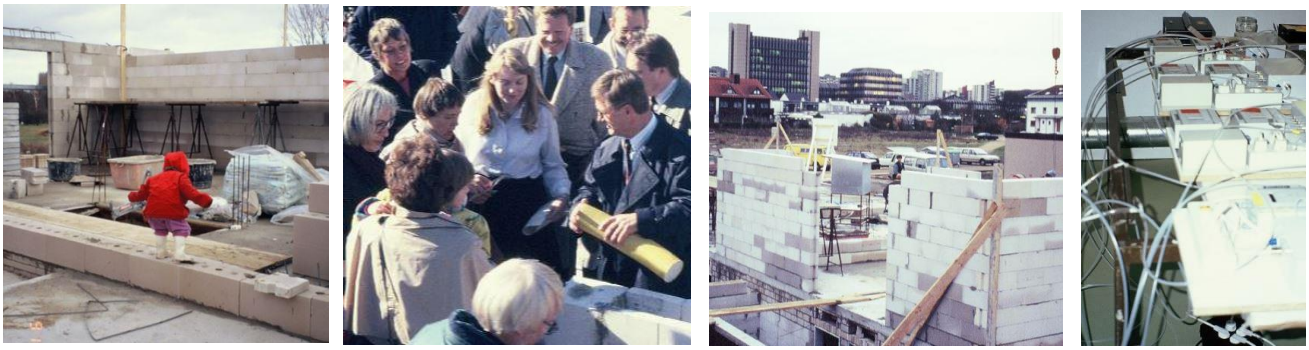
Professor Feist built the world's first Passive House building together with his family. He thus paved the way for efficient climate protection in the building sector. © P. Cook

Limited resources

According to Feist, in the seventies it was already clear that fossil based energy sources are limited. The production and utilisation of these energy source also leads to extremely high CO_2 emissions. As he explained in an **interview**, many relied on the replacement of fossil fuels by nuclear energy. Being a physicist, he considered the risk to be too high, though.

Priority climate protection

Together with the Swedish engineer Bo Adamson, he looked for solutions for implementing buildings without a traditional heating system even in the Central European climate with colder winters, says Feist. His main motivation was to protect the climate. "We found that heating of buildings accounts for the single largest share of energy consumption in modern times, that's over a third! It was clear that we could do this more efficiently. That was why we devoted ourselves to the practical issues relating to heating, heat transport, windows, roofs and ventilation systems."



From an experimental project to a matter of course: the construction work for the world's first Passive House building began in autumn 1990 (Pictures 1 and 3). Laying of the foundation stone took place amid great public interest (Picture 2). Extensive scientific research has been carried out in the building from the first day (Picture 4). © Private

Stopping heat losses

It was clear that, in order to keep buildings warm by passive measures, the typical but unnecessary heat losses had to be reduced: among other things, by means of excellent insulation of the walls, the roof as well as on the ground while adding another, third pane of glass to the windows. In addition, if the building was constructed in an almost completely airtight manner and if thermal bridges were avoided, the indoor space with support of passive measures like solar radiation would automatically stay pleasantly warm for a long period of time. In summer, Passive House buildings are pleasantly cool.

Theory and practice

Finally, Professor Wolfgang Feist clearly defined specific values for better construction: the Passive House standard was the outcome. He also specified that the Passive House standard should be freely available to everyone who was interested. The only thing that now remained was its practical implementation, so in the autumn of 1990, construction started. The building site had been allocated for "experimental construction" by the city of Darmstadt. The Feist family had decided to build the Passive House pilot project in partnership with three other families - as a complex consisting of four identically built terraced houses. The research project was funded by the German federal state of Hesse. Nevertheless, the project was initially ridiculed by many.


Wolfgang Feist 1991 in front of the world's first Passive House building (l.) and together with his wife Witta Ebel (r.). The German federal state of Hesse funded the research project. © Private; P. Cook

Research started on day one

The Feist family remained undeterred, though. The foundation stone for the pilot project was laid in October 1990. The general public also took great interest in the topping out ceremony that took place exactly 30 years ago, in spring 1991. "For research purposes we buried hundreds of sensors in the building components of the building, all of which had to be correctly wired and connected. Wireless didn't exist back then", remembers Wolfgang Feist. To this day, research in the world's first Passive House building continues unabated. Among others, a monitoring project by the International Energy Agency (IEA) is currently in progress. It examines the calculation models with which the energy-relevant characteristics of buildings can be predicted.



Beacon projects: the first certified hospital built to the Passive House standard is currently under construction in Frankfurt am Main, Germany (left). A lot of energy can also be saved in indoor swimming pools and retails stores. Municipalities and businesses increasingly follow the example set by the "Bambados" swimming pool in Bamberg (centre) and the supermarkets of MPREIS in Austria (right). © Passive House Institute (l & c); MPREIS, Lukas Schaller (r)

Standard today

Things that those involved in the construction of the first Passive House building did not have at the time were industrially manufactured components for energy efficient construction. The carpenter commissioned to create triple glazing window, which is standard in new builds and retrofits today, was so surprised, that he immediately refused to assume any liability for the windows.

Self-critically

What about the ventilation system? Four ventilation units for apartments were modified manually and equipped with newly developed, highly efficient ventilators using direct current motors. These systems are also taken for granted today. Building physicist Feist also actively participated in the installation of the airtight sheeting: he self-critically acknowledges that the sheeting applied by him was clearly identifiable due to many creases in the layer.

Perfect state: Wolfgang Feist (right) and a colleague examine the insulation of the first Passive House. The piece was removed from the wall of the building on the occasion of the 25th anniversary of its completion. © PHI

Great interest

In autumn 1991, the four families moved into their new homes. There was great interest in this energy efficient building already in those days. Almost 5000 visitors came during the building's first two years. Many people were convinced by the high level of living comfort with simultaneously low energy costs. They started building their own Passive House homes. These were usually single-family houses in the beginning; the spectrum quickly expanded to include multi-family buildings and later on to so-called non-residential buildings: offices, schools, kindergartens and gymnasiums - all built to the Passive House standard.

Climate protection and living comfort

Today, it is very well known that buildings built to the Passive House standard require very little energy for heating and cooling. And that they are an important prerequisite for effective climate protection, not to mention for social equality. The high standard of living comfort is the big plus. The Passive House experiment has turned into a globally recognised standard for climate protection and a healthy living environment. The durability of efficiency measures has also been proven scientifically, including the heating energy consumption. This is consistently low even after decades of use. Numerous investigations of the pilot project have shown this conclusively.

Variety of energy efficiency: the new office building of the Spanish shoe manufacturer Victoria, built to the Passive House standard; retrofit of the Hof Neuhäusl in Tyrol, Austria, using Passive House components. © Victoria; PHI

Energy efficiency is imperative

In addition, nowadays it is understood that every building *can* be built in an extremely energy efficient way, in all climate zones, from very hot to very cold. And in view of the climate crisis at hand, it is also clear that it is *imperative* to build in an energy efficient way. Just recently, the German Federal Constitutional Court has ruled that the German climate protection law is unconstitutional in parts: The law violates the civil liberties of future generations. The government must clarify the rules as to how emissions are to be reduced effectively after the year 2030.

Approaching tipping points

"Energy efficient buildings are an important part of the solution," says Professor Feist. For a long time he has been warning against the irrevocable destruction of our living environment: "There's no going back if the tipping point is reached, and no vaccination that can stop the horror. We must take action *now*, in order to keep life on our planet worth living. The building sector must make a larger contribution to climate protection. Many national construction standards still permit energy consumption that is much too high."

Two versions of the Bahnstadt: Europe's largest Passive House district, the Bahnstadt in Heidelberg (left), also served as the model for the Chinese Bahnstadt district in Gaobeidian (right) with ten high-rise buildings and more than 30 apartment blocks. © Passive House Institute

Clear criteria

The revised “Energy performance of buildings directive”, published by the European Union, stipulates that from beginning of the year 2021 **all** buildings, whether public or private, must be built as nearly-zero energy buildings (NZEB). The criteria for NZEBs have been individually specified by each member state. "With varying and often unsatisfactory results, though," criticises Feist. The Passive House standard, in contrast, offers clear and ambitious criteria which can be achieved in all climate zones. It is a fact that increasing numbers of cities and countries around the world are consistently stipulating the Passive House standard in their building regulations **(Passive House resolutions).** And: energy efficient buildings are the foundation for the widespread coverage with renewable energy.

Beacon projects

This is matched by the many completed projects: high-rise buildings, supermarkets, indoor swimming pools, museums, hotels, car dealerships, religious buildings - the Passive House standard is being implemented successfully in all climate zones. There are many beacon projects for energy efficient construction and retrofits. Entire districts are being built to the Passive House standard, including the two Bahnstadt districts in Heidelberg and in the Chinese city of Gaobeidian as well as a smaller district in the Prinz-Eugen-Park in Munich, Germany.

Hospital 2.0

Another of the beacon projects is the first certified Passive House hospital currently being built in Frankfurt am Main, Germany. The Passive House Institute carried out a **baseline study** on the implementation of the Passive House concept in hospitals. These energy efficient buildings guarantee low energy costs for operators and a high level of comfort for patients.

For its anniversary, a car dealership in the Canadian town of Alberta treated itself to a new showroom complete with a workshop, all built to the Passive House standard. © Garret Scott

Academic content

The content of academic and training education is also being adapted in part. After decades in which prospective architects and engineers were rarely confronted with the important topic of energy efficiency, universities are now incorporating this subject into their curriculums. The Technical University in Innsbruck, Austria, recognised the importance of this topic very early on: building physicist Wolfgang Feist taught energy efficient construction for over ten years there.

The Museum of Art in Ravensburg, Germany, built to the Passive House standard, delights not only lovers of art, but also experts in the field of energy efficiency. © PHI

Economic opportunities

Manufacturers and craftsmen have also recognised the opportunities presented by energy efficient construction and retrofitting. The number of highly efficient components, which was almost zero when the pilot project in Darmstadt started, has now risen to more than 1200 components. The Passive House Institute provides a **Component Database** for this purpose: windows, doors, ventilation systems and heat pumps are included in this, as well as floor slabs, balcony connections, attic stairs, roller shutters and mullion/transom façades. All products are certified and therefore quality assured. The number of specialists with expertise in the field of energy efficient construction and building modernisations has increased in parallel.

Three reasons for celebrating

Many of these experts come together each year at the **International Passive House Conference.** This year, it will take place for the 25th time, a jubilee event. In 1996, the Passive House Institute invited everyone to Darmstadt for its first conference. Ever since then, participants have been attending this annual event in different cities. In 2019 the conference was held in China. Just before the first International Passive House Conference in 1996, Passive House pioneer Wolfgang Feist had founded the Passive House Institute. It is celebrating its 25th anniversary this year and thus offers another reason to celebrate.

Social justice: due to their low energy demand, energy efficient buildings save residents from energy poverty. The Austrian housing association Neue Heimat Tirol, for example, builds all its social housing projects to the Passive House standard. © Neue Heimat Tirol

Progressing with science

Professor Wolfgang Feist was the scientific director of the Institute for a long time. He has now transferred the institute to his colleagues in order to concentrate on his research work. He says: "It is scientific insight that enables us to go further as humans. The findings must be applied with discernment, of course. I am happy that more and more people are prepared to get involved."

General information

International Passive House Conference

The 25th International Passive House Conference will take place in September 2021 as a hybrid event, in the Historic Town Hall in Wuppertal as well as online. More information: www.passivehouse-conference.org

Passive House buildings

With the Passive House concept the heat loss that typically takes place in buildings through the walls, roof and windows is drastically reduced due to high-quality thermal insulation, windows with triple glazing, an airtight building envelope, and a ventilation system with heat recovery among other things. The five basic principles altogether ensure that Passive House buildings can manage without *classic* building heating systems. Such buildings are called "passive houses" because a major part of their heating demand is met through "passive" sources such as solar radiation or the heat emitted by occupants and technical appliances.

Since the heat is retained for a long time in a Passive House building, active heating is needed only during extremely cold days. A very small amount of energy is required in total for providing this remaining heating. A Passive House building also offers an advantage in the summer: the excellent level of insulation ensures that the heat stays outside, therefore active cooling usually isn't necessary in residential buildings. Due to the low energy costs in Passive House buildings, the utility costs are predictable - a fundamental principle for affordable homes and social housing. A Passive House building thus consumes about 90 percent less heating energy than an existing building and 75 percent less energy than an average new construction.

Passive House & NZEB

The Passive House Standard already meets the EU requirements for Nearly Zero Energy Buildings. According to the European Buildings Directive *EPBD*, all member states must specify requirements for so-called NZEBs in their national building regulations. These came into effect in 2021 for all buildings.

Pioneer project

The first Passive House in the world was built in Darmstadt, Germany, 30 years ago by four private homeowners. Prof Wolfgang Feist was one of them. Ever since the homeowners moved in with their families in 1991, these terraced houses have been regarded as a pioneer project for the Passive House standard. With its newly installed photovoltaic system, this flagship Passive House now utilises renewable energy and received the Passive House Plus certificate for this reason.

Passive House and renewable energy

The Passive House Standard can be combined well with on-site renewable energy generation. Since April 2015, the new building classes "Passive House Plus" and "Passive House Premium" have been available for this supply concept.

Passive Houses worldwide

Passive Houses buildings for all types of uses now exist everywhere. In addition to residential and office buildings there are also kindergartens and schools, sports halls, swimming pools and factories built as Passive House buildings. The first Passive House hospital in the world is currently being built in Frankfurt am Main, Germany. In view of climate protection and the consumption of resources in industrialised countries, businesses and private people are increasingly implementing new constructions or retrofits to the Passive House standard.

Passive House Institute

The Passive House Institute with its headquarters in Darmstadt (Germany) is an independent research institute for highly efficient use of energy in buildings. The Institute founded by Prof Wolfgang Feist holds a leading position internationally with regard to research and development in the field of energy efficient construction. Among other things, Prof Wolfgang Feist was awarded the DBU Environmental Prize in 2001 for developing the Passive House concept.

Contact: Katrin Krämer / Press Officer / Passive House Institute / www.passiv.de
Mail: presse@passiv.de / Tel: +49 (0)6151 / 826 99-25