

Press Release

30 November 2016

Pioneer project upgraded to Passive House Plus

World's first Passive House in Darmstadt produces renewable energy

Darmstadt, Germany The world's first Passive House building has increased its already high energy efficiency level and now relies on renewable energy. About a year ago, a photovoltaic system was installed on the roof of a row house built in 1991 in Darmstadt. Since then, this pioneering Passive House project has been producing its own electricity, thus fulfilling the criteria of a **Passive House Plus building**. The official certificate was recently issued.



The world's first Passive House building in Darmstadt-Kranichstein has just received Passive House Plus certification. The certificate was accepted by Dr. Wolfgang Feist and his wife Witta Ebel (left). Photos: Passive House Institute

"Passive House buildings are perfectly equipped to utilise renewable energy. With their extremely low heating energy demand, it is even possible to derive as much energy from the sun on-site as is consumed in the house over a year", explains Dr. Wolfgang Feist. Together with his wife Witta Ebel he recently accepted the Passive House Plus certificate.

Photovoltaik system for the anniversary

Twenty-five years ago, building physicist Dr. Wolfgang Feist built the world's first Passive House, thereby establishing this energy efficient construction Standard. Since that time, the founder and director of the Passive House Institute and his family have lived in the terraced

housing complex in the Darmstadt city district of Kranichstein. In the year of its 25th anniversary, the Feist family installed a photovoltaic system on the roof of their house with a surface of 26 m² in order to utilise the sun's energy.



The building's two-part solar photovoltaic system covers 26 square metres and is mounted on the terrace as well as on the roof.

Efficiency plus renewable energy

With the Passive House Plus Standard, Passive House has contributed to the second step of the energy revolution. In addition to being highly energy efficient, it also generates on-site renewable energy. What matters here is that the energy demand of a building is considered and optimised separately from the energy generation..

Good basis for Passive House Plus

In a Passive House Plus building, the upper limit for the total demand for renewable primary energy is 45 kWh/(m²a). At the same time, at least 60 kWh/(m²a) of renewable energy must be generated based on the projected building footprint. From the very beginning, the Feist family equipped their house, which has a living area of 156 m², with extremely

efficient devices. The electricity consumption is therefore very low, even with the operation of the ventilation system.

Heatpump with reduced energy use

The same also applies for the air-to-air heat pump that was recently installed for test purposes this past autumn, which is used for heating as well as ventilation in the Passive House. This electrically operated heat pump should use approximately 30 Percent of the energy consumption that was previously required with natural gas for the gas heating system.

Electricity surplus into the grid

In the summer the surplus electricity produced by the photovoltaic system in Darmstadt-Kranichstein is fed into the public grid. In theory, the produced amount would suffice for supplying the whole house for one year, and the surplus electricity in summer could be stored for the winter.

Saving in network is useful

"For a single household, this kind of seasonal storage is not a reasonable option, but in the network this "gap" becomes smaller and storage becomes much more cost-effective. This is what needs to be done in future", explains Dr. Wolfgang Feist.

Zertifikat

Zertifiziertes Passivhaus Plus



Dr. Wolfgang Feist
64283 Darmstadt
Deutschland

Passivhaus-Endhaus Kranichstein

Carsonweg 82, 64289 Darmstadt, Deutschland



Bauherrschaft	Bauherrengemeinschaft Passivhaus Carsonweg 82 64289 Darmstadt, Deutschland
Architektur	Prof. Bolt/Ridsen/Weiersmeyer Jahnstr. 8 64283 Darmstadt, Deutschland
Haustechnik Services	Üeb Dipl.-Ing. Nurbert Stürz Bahnhofstr. 49 64319 Pfungedahl, Deutschland
Energie- beratung	Passivhaus Institut Darmstadt Rheinstr. 44/46 64283 Darmstadt, Deutschland

Passivhäuser bieten ganzjährig eine ausgezeichnete Behaglichkeit und sehr gute Luftqualität. Die hohe Energieeffizienz führt zu äußerst niedrigen Energiekosten und leistet einen wichtigen Beitrag zum Klimaschutz.

Die Planung des oben genannten Gebäudes erfüllt die vom Passivhaus Institut definierten Kriterien für den "Passivhaus Plus"-Standard:

Gebäudekennwerte		Dieses Gebäude	Kriterien	Alternative Kriterien
Heizen	Heizwärmebedarf [kWh/(m²a)]	12	≤ 15	-
	Heizlast [W/m²]	11	≤ -	10
Kühlen	Kühl- + Entfeuchtungsbedarf [kWh/(m²a)]	0,5	≤ 15	15
	Kühllast [W/m²]	9	≤ -	10
Luftdichtheit	Drucktest-Luftwechsel (n ₅₀) [1/h]	0,2	≤ 0,6	-
Erneuerbare Primärenergie (PER)	PER-Bedarf [kWh/(m²a)]	36	≤ 45	36
	Erzeugung (Bezug auf überbaute Fläche) [kWh/(m²a)]	43	≥ 60	43

Weitere Kennwerte für dieses Gebäude finden sich im Zertifikatsbeihelt.

Darmstadt, 04. November 2016

Zertifizierer: Esther Gollwitzer, Passivhaus Institut Darmstadt



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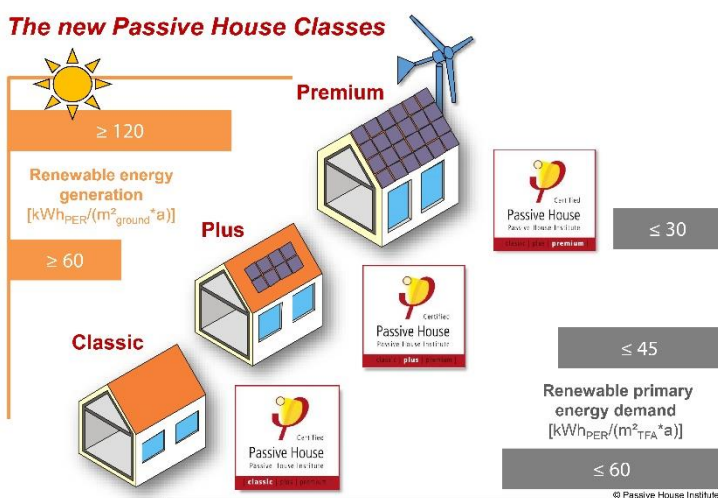
The certificate confirms that the world's first Passive House building in Darmstadt-Kranichstein successfully produces and uses renewable energy as required by the Passive House Plus certification class.

Background

In 2015 the Passive House Institute introduced the Passive House Plus and Passive House Premium building classes which combine the classic Passive House Standard with renewable energy. Both classes provide building owners with reliable orientation for combining energy efficiency and renewable energy. However, energy generation and energy demand are balanced separately.

Direct accounting of the electricity generated by a photovoltaic system in the summer to the heating energy required in winter falls short of the reality since seasonal storage is always associated with losses. The PER (Primary Energy Renewable) concept therefore forms the basis of this calculation: PER factors are specified for the individual energy applications. These state the number of kilowatt hours of renewable primary energy that are required to generate one kilowatt hour of energy.

In a Passive House Plus, the upper limit for the total demand for renewable primary energy is 45 kWh/(m²a). At the same time, at least 60 kWh/(m²a) of renewable energy must be generated based on the projected building footprint. In a Passive House Premium the energy demand is limited to 30 kWh/(m²a) while the energy generated must amount to at least 120 kWh/(m²a).



General information

Passive House

A Passive House is a building that due to its excellent design and construction, stays at a comfortable temperature year round with minimal energy inputs, no matter the climate or geographical region. Passive House buildings make efficient use of "passive" sources, such as sun and heat recovery to cover remaining needs, and use similar techniques such as shading to keep them comfortably cool. A Passive House therefore consumes around 90 percent less heating energy than existing buildings and about 75 percent less than an average new build.

Passive House and renewable energy

The Passive House Standard can be well combined with on-site renewable energy production. Since April 2015, the new building classes "Passive House Plus" and "Passive House Premium" have been available for this supply concept. The first buildings in these two categories have already been certified including both private houses and office buildings.

Pioneer project

The first Passive House was built 25 years ago in Darmstadt-Kranichstein, Germany. Since the first families moved in in 1991, it has stood as the global pioneer project for the Passive House Standard. In the spring of 2016, building physicists undertook intensive studies on this first building to find the building was still performing as designed and that the low heating energy demand remained.

Passive Houses worldwide

Meanwhile, there are Passive Houses buildings of all types. In addition to residential - and office buildings there are also kindergartens and schools, hospitals, sports halls, swimming pools and factories as Passive House buildings. Worldwide, since 1991 over 60,000 Passive House projects have been built. The interest in Passive House is increasing. Considering the resource consumption of the industrialized countries and the need to reduce greenhouse gas emissions, a new building or retrofit to the Passive House Standard appears increasingly as an attractive alternative for municipalities, businesses and private individuals.

Passive House Institute

The Passive House Institute is an independent research institute that has played an especially crucial role in the development of the Passive House concept - the only internationally recognised, performance-based energy standard in construction. The Passive House Institute is the organizer of the International Passive House Conference and the related exhibition.
der Internationalen Passivhaustagung sowie der angeschlossenen Passivhaus-Fachausstellung.

Photos for editorial use: www.flickr.com/photos/passive-house-institute

You may also request to receive photos via email.

Latest updates relating to Passive House: www.twitter.com/the_iPHA

Press Contact:

Katrin Krämer
Spokesperson

Passive House Institute Dr. Wolfgang Feist | Rheinstraße 44/46 | D- 64238 Darmstadt

Phone: +49 (0) 6151/82699-0 | E-Mail: presse@passiv.de | Internet: www.passiv.de