

Press Release

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Hospital 3.0: The new building of the Klinikum Frankfurt Höchst in Germany includes the latest medical equipment. The new building provides more than 660 beds and eleven operating theatres. At the same time, the building itself is exemplary in terms of energy efficiency. Pictures: Pediatric unit (left) and one room of the intensive care unit (right). © Passive House Institute

Hospital 3.0: modern and energy-efficient

Frankfurt hospital is the first clinic to be awarded a Passive House certificate

Darmstadt/Frankfurt, Germany. This modern and climate-friendly hospital in Germany truly is part of a new generation. The new building of the Klinikum Frankfurt Höchst has been successfully implemented to meet the Passive House standard. This makes it the first hospital in the world to receive a Passive House certificate. The Minister of Economic Affairs of the German state of Hesse, Tarek Al-Wazir, presented the certificate together with the Passive House Institute. He praised the building for its energy-efficient performance which far surpasses the statutory requirements. The Passive House Institute had previously prepared a baseline study for this pilot project on behalf of the state government of Hesse. The research institute accompanied the new build.



Minister of Economic Affairs Al-Wazir (2nd from left) presented the Passive House certificate together with Dr Jürgen Schnieders (left) of the Passive House Institute and city councillor Rosemarie Heilig (2nd from right) to management board chairman Martin Menger (right). © PHI

The goal has been achieved: the new building of the Klinikum Frankfurt Höchst is equipped with the latest medical technology, and at the same time, is exemplary in terms of energy efficiency. The Minister of Economic Affairs of the federal state of Hesse Tarek Al-Wazir, together with the Passive House Institute and Frankfurt city councillor Rosemarie Heilig, presented the first-ever Passive House certificate for a hospital to its management. "This hospital building shows how successful climate protection in the building sector can be. This is exactly what we need now", explained Al-Wazir during the certificate presentation.



The new hospital building provides more than 660 beds for patients and another 40 beds in an outpatient clinic in addition to eleven operating theatres. Over 1600 employees will be working in the new building. © Klinikum Frankfurt Höchst

Biggest consumers of energy

The minister further explained that the best kind of energy is the one not consumed in the first place. The state government of Hesse is therefore committed to saving energy, energy efficiency and renewable energy. The federal state was pleased to have promoted and supported this exemplary model of a climate-friendly building with an energy standard that far exceeds statutory requirements. Due to their intensive 24-hour operation, hospitals belong to one of the biggest energy consumers in buildings: a large number of technical devices are used in the emergency room and operating theatres with intensive care units as well as in the patients' rooms. "This precisely is why the energy-efficient concept is particularly worthwhile for hospitals with their high energy demand. This applies for efficiency measures for the building itself as well as for energy-efficient technical devices," explained Dr Jürgen Schnieders, a managing director of the Passive House Institute. The research institute was closely involved in the planning and construction phases of the new building.



Minister for Economic Affairs of Hesse Al-Wazir (right) views the hybrid OR with integrated imaging techniques in the new hospital building. © Passive House Institute



Heat recovery ventilation systems in the new building of the Klinikum Frankfurt Höchst. In addition, each operating theatre has a separate ventilation system. © Passive House Institute

Fresh air

The high energy-efficiency of the building makes it possible to achieve the appreciated elevated room temperatures in patients' rooms with less use of energy. Fresh air is supplied by the ventilation system, which helps to save heating energy with its heat recovery system. The baseline study on the **implementation of the Passive House concept in hospitals** was prepared in advance by the Passive House Institute. It shows that despite the higher room temperature and the higher air change rate of the controlled ventilation, the heating energy demand can be limited to 15 kWh/(m²TFA a) (kilowatt-hours per square metre of treated floor area per year) using coordinated measures.

Reduced operating costs

With the highly energy-efficient new building, operating costs of the hospital will be reduced significantly. More than 660 beds are available in the building which will start operations later this year. The outpatient clinic provides a further 40 beds. The first floor accommodates eleven operating theatres, including a hybrid operating room. The technical building systems are installed on the sixth floor, which only extends across parts of the building. Helicopters can land on the roof of the new construction. From there, all emergency units can be reached.

Better conditions

The new hospital building provides better overall conditions for its patients and the more than 1600 employees that will work there, according to Martin Menger, chairman of the managing board of the varisano hospital group. "The new hospital building brings with it a completely new atmosphere, and not just for patients. We offer exceptional modern work opportunities in the medical and health care sectors," said Menger when receiving the Passive House certificate.

Larger patient rooms

Menger described other advantages of the new building: the patient rooms are now slightly bigger, which makes the manoeuvring of beds and devices easier for all involved. Moreover, all patient beds are equipped with touch screens which can be used for medical supervision as well as entertainment for the patients. During the presentation of the Passive House certificate, Rosemarie Heilig, head of the Climate and Environment Department of the city of Frankfurt, described the new building as a "beacon project for all hospitals which will be built in the future".



The patient rooms in the new building of the Klinikum Frankfurt Höchst are larger. This facilitates manoeuvring of beds and devices for all those involved.
© Klinikum Frankfurt Höchst

Since the initial planning stages, Heilig had argued in favour of implementing the new building to a highly energy-efficient standard. "I am proud that we have been successful in achieving this milestone".

In a hospital, the electricity consumption is generally three to four times higher than in a residential building. In the baseline study on the implementation of the Passive House concept in hospitals, it is clear that the equipment in a hospital has a major influence on the energy demand and must be considered to its full extent. Using conventional verification methods however, only the energy demand for heating and cooling, ventilation, potable water and lighting is considered. With these methods though, almost half of the actual energy demand is disregarded during the planning phase.

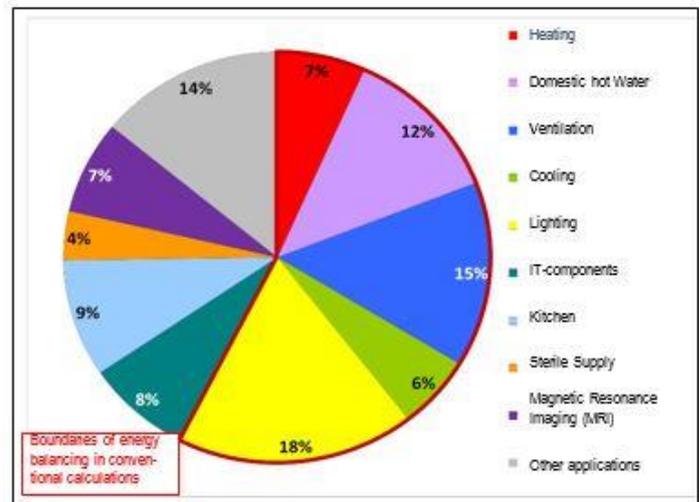


The existing hospital building in Frankfurt which was built in the 1960s. © Klinikum Frankfurt Höchst

Full equipment

Research on the energy demand

"The distribution of energy shows that hospitals are usually equipped with further devices and energy-intensive processes are also used here. In collaboration with those involved in the construction, we calculated the real energy demand of the hospital", explained Dr Berthold Kaufmann of the Passive House Institute. Other applications such as IT equipment, magnetic resonance imaging (MRI), and sterile supply have therefore been taken into account for the new building of the Klinikum Frankfurt Höchst. Further-more, energy efficient devices are recommended, especially in a hospital, as they use less energy on the one hand, and reduce the cooling demand on the other.



The energy demand was calculated in full for the construction of the German Klinikum Frankfurt Höchst. If it is calculated in a conventional way, planners miss a major part of the energy demand.
© Passive House Institute

Baseline study

Many hospital buildings all around the globe are in need of a refurbishment, in some cases new constructions are being discussed. The **baseline study on the implementation of the Passive House standard in hospitals** by the Passive House Institute is available free of charge.
>> [download](#)

General information

#Efficiency NOW: The call of the hour is to save fossil energy. To achieve this, the Passive House Institute has started the #EfficiencyNOW campaign. The research institute explains how each one of us can contribute towards becoming more independent of fossil energy, and ultimately phasing it out altogether. All information on this can be found on the platform [Passipedia](#).



Socially compatible and highly energy efficient: apartment blocks built to the Passive House standard.
© Neue Heimat Tirol

Latest report of the IPCC: "The time window remaining to us becomes smaller and smaller the longer we defer protection of the climate and adaptation" – this is what Hans-Otto Pörtner of the UN Climate Council IPCC had to say in February 2022. Solving the problems of supply security and climate protection in the building sector means highly energy efficient new constructions and retrofits. This is how the existing building stock will become climate-neutral: see [Video](#).

Passive House buildings: With the Passive House concept, the heat loss that typically takes place in buildings through the walls, windows and roof is drastically reduced. By applying the five basic principles – 1. excellent thermal insulation, 2. windows with triple glazing, 3. a ventilation system with heat recovery, 4. avoidance of thermal bridges, 5. an airtight building envelope – a Passive House building needs very little energy. For this reason, Passive House buildings can dispense with a *traditional* heating system. 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.

Advantages of Passive House buildings: In a Passive House building, in winter the heat is retained for a very long time since it escapes very slowly. In the summer (and in hot climates), among other things, the excellent level of insulation ensures that the heat stays outside. Therefore, active cooling usually isn't necessary in residential buildings (in Central Europe). Due to the low energy costs in Passive House buildings, the utility costs are predictable - which is a fundamental principle for affordable homes and social housing. The Passive House standard meets the requirements of the European Union (EU) for Nearly Zero Energy Buildings (NZEB).



The world's first Passive House building in Darmstadt, Germany recently celebrated its 30th

Pioneer project: The first Passive House in the world was built in Darmstadt, Germany, 30 years ago by four private homeowners. Professor 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.

Passive House and renewable energy: The Passive House Standard and generation of renewable energy directly on-site or near the building is a good combination. The Passive House Institute has introduced the building classes *Passive House Plus* and *Passive House Premium* for this purpose. The world's first Passive House building in Darmstadt has also been producing renewable energy since 2015 by means of a subsequently installed photovoltaic system, and received the *Passive House Plus* certificate for this reason.

Building types: Passive House 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 to the Passive House standard. The start of operations of the first Passive House hospital in the world in Frankfurt am Main is planned for Summer 2022.



Prof. Dr. Wolfgang Feist
© Peter Cook

Passive House Institute: The Passive House Institute was founded by Professor Wolfgang Feist in 1996 as an independent research institute. The Passive House Institute holds a leading position with regard to research and development in the field of energy efficient building construction and deep retrofits.

iPHA: The network iPHA – international Passive House Association – is an important contact point for all those involved in construction. The aim is to convey knowledge relating to highly energy-efficient construction and retrofits, as well as networking.

Social Media: Twitter: [@the_iPHA](#) // Facebook: [International Passive House Association](#)
Instagram: [@passivehouse_international](#) // LinkedIn: [@passive-house-institute](#)

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