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Passive House Technology Center

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About the Passive House Technology Center

The Passive House Technology Center (PHTC), located in the Sino-German Ecopark within the Qingdao West-Coast Economic New Area, is the first sustainable development demonstration project led by the Chinese and German governments. With a floor area of 13,800 square meters, the building integrates multiple functions, including an R&D center for passive green building technologies, an experience center and residences. It can also be used for exhibitions, conferences and other events. As the largest passive house in Asia, the PHTC is a lighthouse project for passive house technology.

- Originally developed in Germany, passive houses not only ensure pleasant indoor temperatures and fresh air throughout the year but also – with their minimized energy consumption and carbon footprint – meet the demand for environmentally friendly buildings.
- As the demonstration building for all the passive houses in the Sino-German Ecopark, the PHTC was unveiled in September 2016 to showcase the development of green, ultra-low-energy passive buildings in China. The PHTC features optimized envelope structures that maximize thermal insulation. The building's central ventilation system also makes efficient use of heat or coolness from the inside air, helping maintain a comfortable indoor climate. The use of renewable energy further reduces the environmental impact of heating and cooling the building and helps maintain a comfortable indoor environment.

Passive house technology and the associated value chains in Germany are now quite far advanced. However, in China, the development of passive houses is still at an early stage, and the related building materials industry is still in the startup phase.

Siemens Solutions

- Siemens has tailor-made totally integrated intelligent building solutions to enable the PHTC create the conditions for sustainable, low-carbon, green and environmentally friendly buildings.
- The Siemens building automation system deployed at the PHTC plays three major roles. First, Total Room Automation (TRA) is used to control and adjust the room environment for maximum human comfort. Second, the intelligent chiller control system controls and optimizes equipment such as the ventilation and air-conditioning system. Third, Siemens Desigo CC enables management and optimization to be carried out at a macro level through the collection and storage of information. Desigo CC is an open building management platform that is designed to improve building performance by means of strong data integration and an operating and monitoring framework.
- For the PHTC project, Building Information Modeling (BIM), a 3D model-based process that can depict the geometric data of all the components of the building, was used not only during the design and construction phase, but also, for the first time, during the operation and management of the building.
- The Passive House relies on continuous improvement of the operation strategies to ensure that it is always efficient and energy-saving. With Siemens' building automation system, data is exchanged through Desigo CC and BIM, and real-time data is injected into the building information model. The accumulation of data supports future operation and optimization strategies, so that the building can be more efficient and energy-saving during its whole life cycle.
- Statistics show that every year PHTC could save about 1.3 million kwh, cut operating costs by half a million yuan and reduce carbon dioxide emissions by 664 tons. Energy efficiency in buildings totals as much as 90 percent, far higher than the current domestic energy efficiency rate of 65 percent.