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Ingenuity for life

This building is a seed.

At Qingdao's Sino-German Ecopark, building management systems from Siemens make the Passive House Technology Center a perfect place to protect our future.

#CreatingPerfectPlaces

Siemens building technologies serve as a smart brain for the Passive House Technology Center (PHTC) at Qingdao Sino-German Ecopark.

As Yijing Xici says, "In ancient times, people lived in caves. Sages later built houses to shelter themselves from storms." Over thousands of years, mankind's appetite for architecture has been evolving – from caves to huts and then to palaces, from the initial need for shelter to an aesthetic demand for majestic buildings.

Now, expectations of buildings have risen to a new level. On the one hand, buildings should be people-oriented: throughout the year, the indoor temperature should be pleasant and the air is fresh. On the other hand, the building should be environmentally-friendly, with minimized energy consumption and carbon footprint. The passive house, a concept originating from Germany, can help meet all those demands.

Thanks to Siemens' intelligent building automation system, the Passive House Technology Center (PHTC) at Qingdao Sino-German Ecopark achieves the goal of being a nearly zero energy consumption building and providing a perfect living environment for people.

German passive house in Qingdao

The Sino-German Ecopark is located in Qingdao West-Coast Economic New Area. Among the spacious, clean avenues is a distinctive white building: the PHTC.

With a floor area of 13,800 square meters, the building integrates multiple functions, including a R&D center for passive green building technologies, an experience center, residences, and can also be used for exhibitions, conferences, and so on. As the largest passive house in Asia, it is also a demonstration project for passive house technology.

Passive houses are also known as passive ultra-low energy consumption green buildings in China. The PHTC is internationally recognized for providing a very comfortable environment with low energy consumption. It adopts optimized envelope structures that maximize thermal insulation and air tightness. It also incorporates devices in the central ventilation system that make efficient use of the heat or coolness from the inside air, along with renewable energy to reduce the building's heating and cooling demands. This helps to maintain a comfort indoor environment.

At present, passive house technology and associated value chains in Germany are quite mature. However, in China, the development of passive houses is still at an early stage, and the related building materials industry has just started.

“Qingdao PHTC is built in strict accordance with Germany’s highest energy-saving standards for passive houses,” said Yu Zhengjie, Chairman of the Board, Qingdao Passive House Engineering and Technology Co., Ltd.

Liu Lei, Deputy Director of the Technical Consulting Department at Qingdao Passive House Engineering and Technology Co., Ltd., said that for a passive house, exterior insulation, doors, windows, and other building envelope structures are necessary to reduce building heating and cooling loads. To achieve the desired energy efficiency, building management system is the key, which becomes the “smart brain” of a passive building.

The “smart brain” of the Qingdao passive house

Siemens, a leader in intelligent building automation technology, has tailor-made totally integrated intelligent building solutions for the PHTC at Qingdao Sino-German Ecopark. The Siemens solutions meet the most stringent standards of passive houses for sustainable development and achieve the goal of “sustainable, low-carbon, green, and environment-friendly”.

“Siemens highly values the PHTC project, as it recognizes that passive house technology is the future for building development. Since the two parties share the same vision, the partnership develops naturally,” Yu explained.

The Siemens building automation system deployed at the PHTC at Qingdao Sino-German Ecopark plays three major roles: firstly, it can create a perfect environment for living and working by using the Total Room Automation (TRA) to control and adjust the room environment, according to the human comfort levels. Secondly, the equipment such as the ventilation and air-conditioning system can be intelligently controlled and optimized by intelligent chiller control system. Based on the specific climatic zone and weather of the PHTC location, it can perform functions of cooling and dehumidifying in summer, heating in winter and smog filtration



on polluted days. Thirdly, Siemens Desigo CC can realize the management and optimization at a macro level as it collects and stores information.

“Desigo CC integrates systems such as TRA, the ventilation and heating exchange system, intelligent chiller control system, the building enveloped structure monitoring system, the water supply and system, and the solar energy system into one platform. This provides critical building operation data to the energy management platform, and, as an open system, enables integrated control of the third-party systems,” said Xu Xuanming, Project Leader and Energy Efficiency Business Development Manager at Siemens Building Technologies Division.

For the PHTC project, the Building Information Modeling (BIM) was not only used during the design and construction phase, but also extended to the operation and management of buildings for the first time. The real-time status of the building operation, such as energy consumption data and indoor and outdoor environmental parameters, can all be displayed in the management platform.

“The efficient and energy-saving operation of passive houses relies on continuous improvement of the operation strategies. Desigo CC and BIM achieve data exchange, injecting real-time data into the building information model. The accumulation of data gives support to future operation and optimization strategies, so that the building can be more efficient and energy-saving during its whole life cycle,” said Liu.

“The construction of PHTC in Qingdao is also a process of exploration and research, which is about how German standards are adapted to China. We work with Siemens to address various challenges with an open mind,” Yu said.

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The upgrade of the architectural industry

Statistics show that every year PHTC could save about 1.3 million kWh, reduce operating cost by half a million yuan and save 664 tons of carbon dioxide emissions.

“Given the momentum of Sino-German cooperation, PHTC is introducing advanced passive house technologies and standards from Germany, in an effort to promote passive buildings more widely in China, and develop a local standard system,” said Yu.

“Evolution of passive house technologies makes difference in the transformation and upgrade of China’s architectural industry,” he said.

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