

Takeda Pharmaceutical opens their new energy-positive building – Promoting net-zero carbon

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At the G7 Ministers' Meeting on Climate, Energy and Environment held in Sapporo from 15 to 16 April, it was agreed that efforts should be strengthened to end the use of fossil fuels. On a similar note, this article will introduce examples from Singapore of striving towards net-zero carbon.

Pharmaceutical company Takeda's new building in Singapore which was just opened in March 2023 has received the Green Mark Platinum Positive Energy award from the local Building and Construction Authority (BCA). While Takeda has been carrying out its operations in Singapore since 2008, the new building marks the first time that a building in the biotech manufacturing sector in Singapore has achieved positive energy. In addition to numerous other sustainability guidelines, awardees of the Green Mark Platinum Positive Energy award must also produce renewable energy amounting to at least 115% of the energy consumption of the building. As a company committed towards sustainable development goals, this marks a milestone for Takeda Pharmaceutical which intends to attain net-zero carbon by 2040.

In order to make the energy-positive building a reality, Takeda first carried out a comprehensive study on energy and Singapore's unique weather. Situated near the equator, Singapore has an extremely hot and humid, tropical climate which poses many difficulties for designing an energy-efficient building compared to other countries. Taking the findings from the study into consideration, a multitude of different technologies and systems were incorporated in the design of the building.

Firstly, to generate energy for the building's consumption, the building uses solar photovoltaic panels, which convert sunlight into electrical energy. Over 660 solar photovoltaic panels are positioned on the roof of the building, covering a span of 1600 square meters. The panels generate between 30 to 40 megawatt-hours of electricity per month, of which 15% is saved, thus meeting the energy generation requirement for the Green Mark Platinum Positive Energy award.

Apart from the generation of energy, many measures were taken to improve the energy efficiency of the building. For instance, the building uses a hybrid cooling system comprising

of air-conditioners, ceiling fans and thermal diffusers to ensure good air circulation and that energy consumption is optimized. However, in Singapore's hot and tropical climate, a significant portion of energy consumption is also correlated to the heat gain of buildings. In the case of Takeda Pharmaceutical's building, the implementation of radiative cooling film technologies and the designing of the facade of the building in a way which reduces heat gain to the building were also large factors in reducing the energy consumption of the building.

Lastly, technologies such as plug load management and an intelligent building management system were also used to further optimize energy consumption for the building. Plug load management is a technology which monitors the energy consumption of electronic appliances connected via plugs such as printers and water coolers, and allows them to be turned on or off to optimize their energy consumption accordingly. On the other hand, the intelligent building management system controls the power and lighting of the building as a whole, saving energy by only powering up areas when human presence is detected.

Besides Takeda, there are many other net-zero carbon initiatives in Singapore such as carsharing company GetGo's addition of more electric vehicles to their growing fleet, and Changi Airport which reduced energy consumption by 25% by replacing alternating current fans in their air-conditioning units with more energy-efficient electronically commutated fans.

For Takeda's building, in addition to the usage of various technologies to generate renewable energy and improve the energy efficiency of the building, Takeda also employs other sustainable technologies such as rainwater harvesting and green concrete, truly setting a high standard in sustainable development for the industry.