

New approach to building sustainability

Issues of global warming and new legislative demands for the energy consumption in buildings have resulted in a need for methods for developing sustainable architecture. At the moment mainstream architects have difficulties achieving sustainable results in their projects. The sustainable projects that are completed often achieve their sustainable status by the implementation of solar panels, glassed verandas or low-flushing toilets. However, this does not necessarily ensure sustainability, as the systems in the building do not really work together and often the users do not use the building as intended. Addressing this issue, Swire Properties, one of the leading property companies in Hong Kong and mainland China, teamed up with Tsinghua University to form a joint venture, back in 2008. Together they have developed the Integrated Design and Whole-process Management (IDM). This is a system which enables commercial developers to make informed decisions on energy efficiency during the entire building development process. Cary Chan, General Manager Technical Services and Sustainability at Swire, explains how IDM works.

Swire Properties was established in Hong Kong in 1972, and was briefly listed for the first time on the Stock Exchange of Hong Kong in 1977. Thirty five years later, the company went public again, this time on the Main Board of the Stock Exchange of Hong Kong, where it is still listed today. Over the years the company has (co-)developed many prestigious properties in Hong Kong, Mainland China, Singapore, the United States, and

in the United Kingdom. It is best known for its commercial (office) developments and shopping malls, but also increasingly develops prestigious residential property. Its investment portfolio in Hong Kong currently comprises Taikoo Place, Cityplaza and Pacific Place as its core holdings.

The Hong Kong real estate market comes with some unique technical and

sustainability challenges, as Mr. Chan confirms, and many of those are related to a lack of space. Hong Kong does have plenty of country parks, agricultural land and undeveloped brownfields, but the areas where most people want to live and work are extremely densely populated and built up with tall properties. This can make solar energy an unattractive option: Hong Kong's skyscrapers cast long shadows, which in effect minimises the economic feasibility of solar.

So Swire had to look for other technologies to make its developments more sustainable. In 2008, the company decided to team up with Tsinghua University's Building Energy Research Centre (BERC), and together they established a joint venture named The Joint Research Centre. The joint venture has proved very successful since its inception, says Mr. Chan. Over the past seven years, Swire Properties has saved a total of 67 million kWh of electricity





through continuous system improvement, with the company's developments also achieving various sustainability accolades.

Mr. Chan explains that IDM represents an integrated, holistic approach: from the very first design stages, all stakeholders and technical/architectural designers work together on a development, and interact with each other in order to meet the pre-set target for energy consumption. "To set energy consumption targets, we use databases of existing, similar buildings as a reference," Mr. Chan explains. "Our objective is to reduce energy consumption of new developments by 30%, when compared to those existing developments. That's the energy target of our Taikoo Place re-development project – Phase 2A (office). To do this effectively, we have created extensive databases over the years. Where Tsinghua University comes in is that they and their students analyse the data. This is very useful for them, as students get to research real life projects, rather than learn about them from a textbook. And for Swire, of course, the partnership is beneficial as it produces new insights into how we can improve energy

efficiency. University analysis goes much deeper than what ordinary engineers would do."

IDM will be implemented and tested on Swire Properties' new joint-venture project in Dalian, which is in the early planning stage. Dedicated research teams from Tsinghua University will be stationed onsite and use simulation tools to compare different design options to achieve the energy conservation and emission reduction targets set for the project. In the second phase of this research project, Swire Properties targets to build an Energy Management System (EMS) for its commercial buildings across Hong Kong and Mainland China. The EMS will allow real-time remote monitoring of the buildings' electricity consumption data. Tsinghua University is expected to work hand-in-hand with Swire Properties' technical teams to optimise the structure of EMS. Together they also plan to investigate potential energy savings in other Swire group assets, including beverage plants, aircrafts maintenance facilities and cold storage.

"The challenge for us is to effectively gather data," says Mr. Chan. "Our

properties are built to last. Some of the buildings in our portfolio are twenty years old, with outdated systems and technology. It will take a lot of money and effort to gather data from such buildings. In a similar vein, many of our technical staff did not grow up working on advanced database systems, and they don't train such skills at universities yet. We're hoping that our partnership with Tsinghua University will make our job less challenging, and support us in our ambition to maintain our leadership ship position in sustainability in the global property development market."



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