

China's green future

Extract from the Siemens research magazine Pictures of the Future (issue Spring 2010)

By Sebastian Webel

The Middle Kingdom is growing, especially in its big cities. China's major metropolitan areas are already bursting at the seams — to the detriment of the environment. The urbanization process still hasn't peaked, however, which is why Shanghai's Tongji University is working with Siemens on the development of Eco-City Models that will enable urban growth and environmental protection to proceed hand in hand in the future.

Looking down at the city of Shanghai from one of the upper floors of Tongji University's Science Building gives you a pretty good idea of what urbanization is all about, as the campus is surrounded by a huge number of grey concrete structures huddled together. Giant excavation pits bring to mind the houses that were torn down because they were too small to accommodate the masses streaming into the city. This dreary area could definitely use a little sunlight. However, even when the sun shines you can't see it because of the smog. The view from the top of the building also includes Yangpu District and its 18,000 residents per square kilometer — the highest population density in Shanghai. By comparison, Berlin's population density is only one-fifth of this figure.

"Urbanization is a great challenge for China," says Professor Wu Siegfried Zhiqiang, Assistant President of Tongji University and head of the University's *College of Architecture and Urban Planning* (CAUP). "In the last 30 years alone, the proportion of the population living in China's cities has risen from 19 percent to approximately 50 percent, which corresponds to 400 million people moving into urban areas." The resulting increase in demand for housing, energy, and industrial products has made China the world's biggest producer of CO₂ emissions today.

"And the urbanization process has only just begun," says Wu, who expects China's urban population to once again double over the next 30 years. "We're therefore going to need completely new infrastructure concepts that address the requirements of both a growing urban population and environmental protection. This especially applies to new cities in China, which are literally springing up from the ground to accommodate the 13 million people moving into urban areas each year."

With this in mind, in 2002 Wu launched the Eco-City Model project, which aims to develop complete infrastructure models for both individual districts and entire cities. These models must provide answers to the following crucial question: How can we meet the huge energy demand of a city, improve its efficiency and quality of life, and at the same time drastically reduce its energy consumption, and thus its emissions, from the levels common in large cities today? "Each city has its own specific needs," says Wu. "For example, requirements vary just on the basis of the different climate conditions we have throughout our huge country." In the first phase of the project, Wu analyzed the needs of different types of cities. Since 2007, he has been studying how the associated challenges can be addressed with technology, which is why he's brought Siemens in as a partner.

This is not the first time Siemens has cooperated with Tongji University: The Shanghai College, which has around 55,000 students, is one of eight Siemens Centers of Knowledge Interchange (CKI) around the world. The company has entered into strategic partnerships with the CKIs in order to conduct joint research, promote talented individuals, and establish networks. "With its virtually unique worldwide expertise in technological infrastructure, Siemens is the ideal partner for us in this project because it can provide us with both advice and practical support," Wu explains. Siemens also benefits from the partnership, as Dr. Meng Fanchen, General Manager of Siemens in Shanghai, points out: "When we provide Professor Wu's team with support on technological matters, we also learn a great deal about the future requirements of the Chinese market and how to prepare for them."

The next step in the partnership will be to develop Eco-City Model master plans that help ensure new satellite cities are as self-sufficient, ecological and, above all, as pleasant to live in as possible from the very beginning. The master plans will include intelligent building management systems and the use of renewable energy sources such as wind, solar, and hydro power, depending on the region in question. Efficient water treatment facilities and extensive public transport systems will also be part of the picture — two areas in which Siemens already offers solutions. At the same time, the models developed need to be implemented in a cost-efficient manner and, more importantly, they have to be reproducible as well.

The goal of Tongji and Siemens is clear: to ensure that these models, which are already being eagerly awaited by urban planners and government officials, are ready as soon as possible. This is not something that can be done from one day to the next. Nevertheless, China already seems to understand the importance of Wu's work, given that the professor has been appointed Chief Planner for Expo 2010 in Shanghai.