

GREEN ENERGY FUELS SMART CAMPUS IN WESTERN CHINA



Located between Xi'an and Xiangyang, two historical capital cities in western China, a new satellite town has been built, spanning 143 square kilometres. This is now home to the emerging industries and comprehensive services that will help turn Xi'an into an international metropolis. Here, a smart, intelligent new campus is rapidly forming, attracting talent, technology and innovation.

The Western China Science and Technology Innovation Harbour, also known as iHarbour, is a national level project co-managed by the Ministry of Education and the Shaanxi Provincial Government. It is an important platform, helping local governments and the Xi'an Jiao Tong University achieve three key national strategies. Namely, the Belt and Road initiative, the National Innovation-Driven Development Strategy and the overall development of China's western region. Jointly constructed by Xi'an Jiao Tong University and the Xixian New Development Zone, iHarbour spans a total of 5,100 acres. The first phase of iHarbour was delivered in June 2019. Becoming China's first university campus without walls, it is safe to say that iHarbour represents more than just a new campus to Xi'an Jiao Tong University. It is also the largest smart campus in western China, not to mention the largest world-class science and technology centre. As such, it is leading the way as the national research and development platform for science and technology in the region.

CONSTRUCTING IHARBOUR: REALITIES ON THE GROUND AND ITS CHALLENGES

The iHarbour project covered an area of 1,750 acres, with a total of 52 building units. These included four main scientific research institutions, together with some smaller buildings under the medical, chemical and liberal arts departments. It also included a student living area. In March 2017, the construction of 48 of these building units kicked off at the same time. This remains the largest public construction project in Shaanxi after the founding of New China. To date, 29 research institutes and eight large-scale equipment-sharing platforms have settled in. Likewise, more than 300 scientific research institutions and think tanks, bringing together more than 30,000 scientific research talents and academics.

As the education system continues to progress, colleges and universities are providing students and researchers with a conducive environment for teaching, researching, and living. However, at the same time, the significantly larger buildings also create a substantial increase in energy consumption. According to a survey, the energy costs for Chinese universities have been increasing at an annual rate of 30%. The survey also found that the key source of energy consumption has been in meeting the basic needs of students, with electricity and water consumption accounting for about 40% of the school's total energy consumption. Colleges and universities are made up of large communities, which means that their energy use accounts for 7% of China's total energy consumption. In fact, the consumption of energy and water resources in universities is double that of the average public consumption, while colleges exceed the average by four times.

In order to solve this problem, China has rolled out many policies to encourage the building of smart, green and energy-efficient campuses. Back in 2008, the Ministry of Housing and Urban-Rural Development and the Ministry of Education released a report titled 'Recommendations on Developing Energy-efficient Campuses to Strengthen Energy and Water Conservation in Colleges and Universities'. This offers guidelines on achieving greater campus-wide energy-savings. On March 1st, 2017, the Ministry of Housing and Urban-Rural Development released the '13th Five Year Plan for Building Energy-efficiency and Green Building Development', requiring key cities to renovate their public buildings in order to increase their energy-saving levels.

RELIABLE ENERGY-SAVING BUILDING SOLUTIONS

Leading the way in green campus construction, Xi'an Jiao Tong University has accounted for optimising energy performance in buildings as part of its construction plan since the beginning of the project. The water supply and drainage systems of 52 buildings in this project are equipped with energy-efficient Grundfos solutions.

Grundfos supplied iHarbour with commercial water booster systems, Hydro MPC and Hydro Dig MPC, as well as wastewater submersible pumps, MD and DPK. These water supply and drainage solutions help to meet the daily needs of both teachers and students on campus, while ensuring energy is used efficiently.

Cao Qiankun, the technical lead of iHarbour from the Shaanxi Construction Engineering Installation Group, said, "As the municipal water pressure here is relatively large, in the interest of being energy efficient, we hope to adopt more efficient and intelligent water supply solutions to provide teachers and students with a reliable water supply. As a scientific research institution, water consumption during peak hours runs fairly high, requiring more water during those peak hours than ordinary households. As a result, we also prioritise an equipment's ability to operate reliably. Xi'an Jiao Tong University and Grundfos have cooperated for many years in innovative energy-saving solutions, and the university recognises and appreciates Grundfos and its focus on environmental protection."

He continued, "If we compare to a residential compound with an average living space of 20-30 square metres per capita, the scale of iHarbour is equivalent to a community of 60,000 people. Such population density will require solutions that can achieve higher energy-savings. Grundfos' Hydro pump systems are more intelligent and integrated compared to an individual water booster pump. It can also be connected to a platform that can be controlled remotely, which enables a reliable and safe water supply while still reducing energy consumption."



GREEN CAMPUS LIVING IN A HISTORICAL CITY

After two years of construction, iHarbour welcomed its first batch of teachers and students from Xi'an Jiao Tong University in September 2019. To date, Grundfos' water supply system has ensured a water supply that is reliable and well received by both teachers and students in the school.

One student from the School of Energy and Power vividly described his experiences at iHarbour, saying, "For me, it's great to be able to take a hot shower whenever I want. After my basketball sessions, I look forward to returning to my dormitory to take a hot shower right after. There is no noise generated as it operates and the overall experience is a good one. Additionally, as a graduate student from the School of Energy and Power, subjects like green energy, energy efficiency, and sustainability are a key part of my own higher learning and educational interactions. During the year or so of living here, I gradually discovered that our campus contains many such elements. I'm very proud to highlight these sustainable features of my school to my friends from other universities."

As a smart campus, iHarbour also applies 5G and other information technologies to its campuses and neighbouring communities. This has turned iHarbour into a key leading example among other local universities. iHarbour leverages intelligent interconnectivity across each solution utilised within the campus to serve a diverse range of applications. This includes providing various performance monitoring and real-time warning systems for the water circuit and gas heating networks. Grundfos' intelligent water supply equipment plays a key role. With 5G connection and the interconnecting platform on campus, Grundfos pumps can be easily monitored remotely. With information such as working time and water consumption, the system can be controlled from afar.

"The iHarbour project is a significant milestone for scientific and technological innovation in western China. As a result, we implemented high-quality equipment during the construction process and completed the construction of what became an award-winning project. We are heartened to see that the various pumps and solutions from Grundfos we've employed are operating reliably and have achieved outstanding performance in energy efficiency, reducing overall consumption and establishing intelligent interconnectivity. This adds a touch of 'greenness' to the smart campus and guarantees the long-term sustainable operation of the campus," concluded Cao Qiankun.

