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Headline: **Singapore university turns campus into 'Living Lab' for energy, robotics**
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EDUCATION

Singapore university turns campus into 'Living Lab' for energy, robotics

Hitachi and Hyundai Motor plan collaboration with SIT to test new technologies

Singapore Institute of Technology's campus in the country's Punggol district. The main building is connected with neighboring offices by a bridge, reflecting the university's intention to collaborate with companies. (Photo by Mayuko Tani)

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SINGAPORE -- The Singapore Institute of Technology is turning its campus into a "laboratory" for technologies such as power systems and robotics, as the national university aims to foster work-ready talent and accelerate collaboration with industry.

At its new campus, completed in 2024 in the northeastern district of Punggol, 20,000 sensors collect data on classroom temperature, brightness, air quality, noise, human movement and more. The data is used not only for energy-saving and security purposes

but also for research by students majoring in fields such as energy engineering, environmental engineering, and information and communications.

The rooftop of the 10-story main building is covered with solar panels. A microgrid (small-scale independent power system) combining these solar panels with storage batteries supplies 4% of the campus's electricity needs. A cooling system utilizing chilled-water circulation has also been installed. Operational data from these systems is also being collected and used for research.

"[One of the things] that is important to us as a university of applied learning is the authenticity of the learning environment," SIT President Chua Kee Chaing told Nikkei Asia in an interview.

"On campus, in the absence of that real (industry) environment, we set up the university infrastructure with real systems and allow the students to work with them," he said, adding that the university calls it the "Living Lab."

He emphasized that, based on data collected on campus, students can formulate problems and use the data to solve them. "When the learning environment is real, problem sets are real, and so are the solutions," he said.

SIT President Chua Kee Chaing speaks to Nikkei during an interview. (Photo by Mayuko Tani)

Dinesh Murugan, an SIT student pursuing a Bachelor of Engineering in electrical power engineering, chose cybersecurity in microgrids for his final-year dissertation.

"The environment at SIT allows learning and research to be conducted on actual engineering systems, where data reflects real operating conditions, system interactions, and constraints. Access to such infrastructure supports hands-on experimentation, system-level analysis, and applied research, helping students better understand how complex built-environment and energy systems function in practice," he told Nikkei.

"With the introduction of campus-scale infrastructure and access to real system data, we graduates will be better prepared for transitioning confidently and effectively into industry roles."

SIT is a relatively new institution, only given an autonomous university status in 2014, joining the ranks of other national universities in Singapore. It specializes in practical education in science and technology and is recognized as the "University for Industry."

Companies outside the university will be able to use the campus "laboratory" starting in the first half of this year. By opening the door to companies seeking demonstration experiments, SIT aims to establish a win-win relationship where students can learn from corporate research and development.

Japan's Hitachi plans to test its energy-saving tech. In collaboration with SIT, it is considering developing technology for data centers that reduces power loss by using direct current electricity from solar power without converting it into alternating current. Such technology to improve power efficiency has become crucial as demand for data centers has grown rapidly due to the spread of artificial intelligence.

Among other companies planning to collaborate is South Korea's Hyundai Motor, which is considering demonstrations of bidirectional charging technology that allows electricity stored in electric vehicles to be supplied back to the power grid. In the field of cyber defense, a blockchain company under China's Wanxiang Group plans to test the resilience of its systems against cyberattacks.

SIT also plans to extend its initiatives beyond the campus. Local startup dConstruct Robotics is planning to conduct trials of automated robot delivery around the campus, where many office buildings are located.

The fields SIT is targeting, such as power and energy, robotics and cyber defense, are where technological innovation is rapid and reflect Singapore's strategic priorities to stay competitive in the fast-changing global economy. SIT's efforts are aimed at training manpower desperately needed in such industries and attracting more investment from foreign companies.

"To remain competitive, we cannot simply do more of the same," Prime Minister Lawrence Wong said in his televised New Year's message to the nation on Dec. 31. "We must rethink, reset, and refresh our economic strategies."