



Case Study

Greener SMU Campus Achieves Two Green Mark Platinum Awards Along the Way

Enhanced building efficiency from chiller plant retrofit solutions leads the way to a full-fledged green campus

Summary:

The Singapore Management University (SMU) is a top academic institution located in the heart of Singapore. Driven to lead the cause for environmental sustainability among its neighboring buildings, the global University sought to become a full-fledged green campus by meeting the BCA's Green Mark Platinum certification requirements. Johnson Controls' chiller plant retrofit solutions helped to enhance the efficiency of the plant, and achieve significant cost and energy savings for the University.

The Story

Established in 2000, the Singapore Management University's (SMU's) mission is to generate leading-edge research with global impact and produce broad-based, creative and entrepreneurial leaders for the knowledge-based economy. Today, SMU is internationally recognized for its world-class research, quality graduates and distinguished faculty. Built over 4.5 hectares of prime Singapore land, the SMU's campus is the first of its kind. It is designed, integrated and constructed in the heart of a fully developed cityscape. The campus comprises six buildings – a 14-storey Administration Building, the Li Ka Shing Library, and four buildings to house six schools.

Mapping the pathway to a Green Campus

As part of its continuous drive to be a world-class academic institution, SMU aimed to host a Platinum-rated Green Campus as defined by the Singapore BCA's Green Mark Platinum certification.

In the words of the Senior Vice President of SMU Mr. Sim Teow Hong,

"As we are located right in the heart of downtown Singapore, we wanted to take small but steady steps towards becoming a fully green campus. This would set a concrete example of urban environmental consciousness for our neighbors and the community at large, and reflect our staunch support of environmental sustainability at the same time."

SMU had worked with Johnson Controls in the past and were happy to re-appoint the company as their Green Mark Consultant. The challenges of obtaining the Platinum Green Mark certification for an existing building can be enormous, but Johnson Controls took on the project with ease.

The project was implemented smoothly because of the close cooperation among the SMU facilities team and the Johnson Controls' Energy Team, whose expertise includes proven experience in transforming existing buildings to achieve high Green Mark ratings.

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Mr. Sim Teow Hong,
SMU Senior Vice President

Case Summary

Customer Challenges:

- Building owner had a vision for a green campus for resource conservation and to express the University's support for "environmental sustainability"
- Targeted to achieve Green Mark Platinum certifications for the City Campus and Administration Building
- Existing chiller plant efficiency levels did not meet Green Mark Platinum requirements
- Good project planning and execution required for chiller plant retrofitting works in a campus with on-going operations

Our Solution:

A comprehensive solution comprising:

- Energy audits for the chiller plant to establish a baseline
- Redesign of the chiller plant to achieve new goals
- Assisted SMU in applying for the Green Mark Incentive Scheme for Existing Buildings (GMIS-EB) from the BCA
- Good project planning and management in implementation

Customer Benefits:

- Awarded BCA Green Mark Platinum certifications for the City Campus and the Administration Building respectively
- Successfully granted the Green Mark Incentive Scheme, saving them significant costs as BCA will co-fund 50% of the Green Mark Consultancy fees and retrofitting works
- Significant energy savings and expenditure for the University

The Johnson Controls' Energy team conducted a due diligence exercise and reviewed SMU's building systems thoroughly to help the University achieve the Green Mark Platinum certifications for both the Administration Building and the City Campus. After careful consideration of the circumstances, the team proposed an energy retrofit solution that was readily approved.

Whilst there are numerous "green features" integrated into the University's operations, the Energy Team found that the chiller plant system efficiency was operating at an average of 0.83 kW/RT. This critical measure did not meet the Platinum certification requirement. The team hence redesigned the chiller plant to achieve the required system efficiency of 0.60 kW/RT or lower. These include streamlining the chilled water pipes and condenser water pipes, rightsizing the plant capacity and selecting high efficiency VSD chillers and water pumps.

The team also worked closely with SMU to prepare the appropriate tender specifications for a new chiller plant retrofit implementation. Weekly project meetings were held with SMU to ensure ongoing communication and quality control. On top of that, they also led the way in organizing for the submission of the Green Mark Certification to BCA, which included compilation of the documentation and project narratives for every pursued credit and for presentation to the BCA assessors.

Redesigned chiller plant successfully meets BCA requirements

In 2014, SMU was awarded the Green Mark Platinum certifications for their City Campus and Administration Building respectively. The improved chiller plant system efficiency is expected to yield significant energy savings and expenditure for the University.

As the icing to the cake, they were also successful in obtaining BCA grants under the "Green Mark Incentive Scheme for Existing Buildings", which saw SMU benefiting from significant savings of up to 50% off the Green Mark Consultancy fees and retrofitting investments.

"The BCA Green Mark Platinum Certification is an important milestone in our sustainability initiatives. It reaffirms our commitment and belief in providing our students and faculty with an eco-friendly learning environment," concluded Mr. Sim.