It's in the fabric

A state-of-the-art building in Adelaide will showcase a new high-performance façade to maximise temperature control and manage ongoing costs.

Adelaide's new biomedical precinct is attracting a lot of attention from some of South Australia's most notable institutions, with tenants including the Royal Adelaide Hospital. But it's the latest facility, occupied by the University of Adelaide's Health and Medical School (AHMS), that is demonstrating an exceptional commitment to greener, more sustainable technologies.

Responding to the university's environmental aspirations, project designer Lyons Architecture implemented a building sustainability approach for the AHMS campus, creating a facility that integrates sustainability systems and technology within all layers of its form, fabric and function.

Director Adrian Stanic says the project was one of his most challenging, and rewarding. "The building delivers an indoor environment that will enable exceptional research and student learning to be undertaken while delivering efficient operation in a cost-effective manner," he says, noting the goal was to educate the local community on the intrinsic benefits of environmental sustainability, health and well-being within the built environment.

"This sustainability vision is realised through the implementation of quantifiable targets that allow the project team to assess the building as the design progresses and ultimately deliver a facility that can be operated cost-effectively," Stanic adds.

"To achieve this outcome, the operational performance of the building occupant's existing accommodation and the university's operational sustainability targets were assessed. The team have used this existing operational energy, water and greenhouse gas emission data as a benchmark, setting a target for the new facility to reduce annual greenhouse gas emissions by 10 percent when compared to the existing university baseline, and also potable water use by 30 percent.

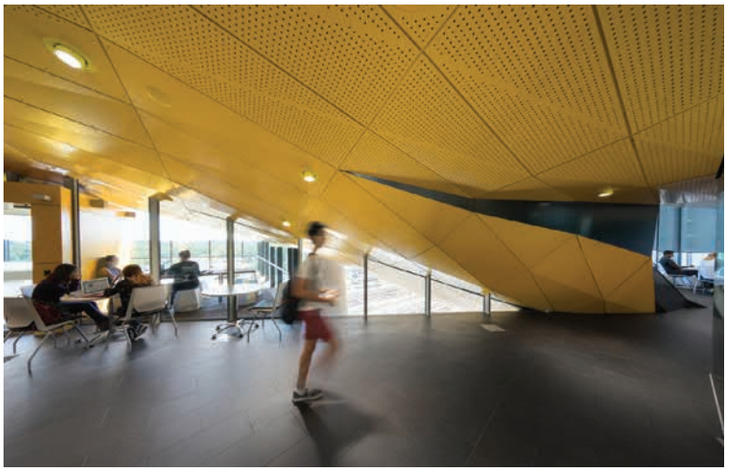
"A five-star Green Star Education v1 self-assessment has been completed that allows the team to benchmark the building's environmental performance against a range of areas that include indoor environment quality and sustainability education, both addressing the overall project vision."

NEW LEVELS OF PERFORMANCE

Stanic has identified several aspects of the building's sustainability initiatives and how they address the overall targets and vision, including some exciting new technologies and design features that will benefit facility managers, especially in the move towards more agile workspaces.

High performance façade

The building fabric is the main climate modifier and in the hot/temperate climate of Adelaide – where the summer ambient temperature can soar over 40 degrees Celsius and the winter night-time low drop below five degrees Celsius – the fabric will be required to moderate the heat gain and loss to maintain comfort



Images courtesy of John Gollings

conditions and conserve energy. The proposed façade design incorporates external sun shading, high-performance double-glazing and thermally engineered aluminium frames. This solution will reduce the loss and gain of heat through the building envelope, reducing the load on the air-conditioning system. In addition, the enhanced thermally efficient façade will maximise occupant comfort, reducing the exposure to uncomfortable radiant temperatures and glare.

'Edgescape' terrace balconies

These are unique mixed-mode breakout spaces with selected ancillary mechanical services fans and heating to increase the annual functional use period.

Water sustainability

To reduce the reliance on mains potable water, the use of efficient fixtures and fittings will be complemented by the use of non-potable water from the existing Glenelg-Adelaide Pipeline (GAP). The GAP water will provide 100 percent of the landscape irrigation and toilet flushing. The system will be a major strategy towards achieving the operational water target and reducing ongoing utility costs.

Fresh air ventilation control

This will be designed to maximise the amount of fresh air that occupants breathe inside the building and maintain a high level of thermal comfort. Sensors will be installed in air-conditioning ductwork that monitors carbon dioxide levels, varying the fresh air quantity when limits are exceeded.

Building information portal and BMS integration

One feature of the system is the integration of the university's timetabling with the BMS (building management system) to control when the air-conditioning turns on and off within the teaching spaces.

Waste management

The building supports high local environmental quality, promotes waste minimisation, reuse and recycling, and encourages wastewater, grey water and stormwater reuse through: minimisation of waste during the building's construction, dedicated building recycle storage and a fully integrated wastewater and stormwater management.

Architectural adaptability

The building has been designed for long-term adaptability with flexible services infrastructure and a large span structure that will enable any floor level to be adaptively reprogrammed.

Cyclist facilities

Secure bicycle storage is provided in a highly accessible area of the basement with change facilities close to the west entrance, with good passive surveillance and protection from the elements. Bicycles are also provided at ground level for general student/staff and public use. ●

The FM perspective

University of Adelaide director of infrastructure Virginia Deegan comments on the main features of the new building from the facilities management perspective.

The University of Adelaide is installing a cutting edge building analytics system to monitor and control the heating, ventilation and air-conditioning (HVAC) system in the newly built Adelaide Health and Medical Sciences (AHMS) building after successful implementation in the Braggs research building on the University's North Terrace Campus.

Traditionally, space conditioning and laboratory HVAC requirements in buildings such as the AHMS have been controlled using standard building management systems (BMSs). As buildings have become more complex with varied space conditioning requirements, however, the BMS system itself needs to be monitored and optimised continuously to ensure the best possible balance between energy performance and user requirements.

The AHMS building analytics system uses data aggregation software with proprietary algorithms to continuously gather information from the BMS, and overlay it against other information such as meteorological data and equipment efficiency data to identify mechanical system inefficiencies and energy/cost-saving opportunities. It has also been proven as a predictive maintenance tool, which can provide significantly better returns on investment compared to traditional maintenance models.

The integration of the AHMS energy management system into the BMS and emergency back-up power generation systems enable a holistic approach to the monitoring and consumption of energy throughout the building while also providing significant maintenance benefits.

The University of Adelaide is committed to continued leadership in developing environmentally sustainable capital infrastructure through adopting a holistic approach to design, construction and ongoing energy and maintenance requirements. The ability to actively and precisely monitor energy use/quality, and identify unusual consumption patterns can indicate equipment failure, the need to adjust maintenance regimes and manage high demand periods through operational and behavioural change.

Additionally, energy consumption dashboards, and the ability to provide real-time information to staff, students and the public, support responsible energy use and will lead to reductions in energy consumption, providing both environmental and financial benefits.