

Case Study //

Critical Research Facility, **Australian National University, Canberra** Intelligent HVAC Optimisation Solution

The Australia National University (ANU) is a public university in Australia's capital city, Canberra. Located in the suburb of Acton, the main campus encompasses seven teaching and research colleges, in addition to several national institutes. With over 23,000 students enrolled, ANU is consistently ranked among the world's top universities. The University is home to the John Curtin School for Medical Research. Founded in 1948, the school is Australia's national medical research institute.

Business Needs //

The John Curtin School for Medical Research is a special purpose building designed to combine a public interface with state-of-the-art secure research and laboratory facilities, and supports the pioneering medical work undertaken by ANU students and researchers.

The client needed to ensure that critical environmental conditions were maintained within these spaces.

Airmaster worked closely with Conserve It to deploy the award-winning PlantPRO® - Plantroom Performance Reliability Optimisation Solution on a CI-DEG-3000 to deliver reliable 24/7 operation, and to ensure stable conditions are always maintained for the building's critical research functions

The PlantPRO Plant Room Optimisation Solution controls the facility's four air-cooled chillers located in the main plantroom. These include two Daikin McQuay low load chillers, one Daikin McQuay mid load chiller and one Trane high load chiller featuring a total cooling capacity of up to 3150 kW_r / 900 tons. Eight primary chilled water pumps and five secondary chilled water pumps serve these chillers.

PlantPRO was installed as part of a chilled water plant controls upgrade process. New variable speed drives were also installed on the pumps as well as a Schneider Electric building management system.

Solution Overview //

PlantPRO uses intelligent self-learning algorithms that optimise a chiller plant by running the most efficient combination of chillers for the given conditions, even when some machines may be out of service. It selects the most efficient load point for each running chiller. If a chiller goes below the nominal efficiency of that chiller, it can be proactively checked by service personnel minimising electrical energy waste and avoiding compounding service issues that can be costly.



The system has been configured in fixed sequencing mode to collect and learn plant operation. Once enough data is gathered, PlantPRO will be switched over to “Smart Sequencing” mode.

PlantPRO also optimises the chiller plant through advanced variable pumping control

- Advanced Variable Primary Pump Control is utilised to under drive or alternately overdrive chilled water flows to maintain balanced flow with the secondary chilled water system. This ensures that optimal heat transfer between the primary and secondary chilled water systems are always maintained.
- Dynamic field differential pressure control has been implemented to constantly vary the secondary chilled flow to match the given set of field conditions
- Lift optimisation on the refrigerant side is also utilised and uses field valve position data to further optimise plant efficiency while at the same time always ensuring conditions are never compromised.

The sum of these strategies equates to industry leading plant performance levels that set an industry benchmark for energy efficiency.

Fully integrated with Niagara 4 framework, the Conserve It CI-DEG-3000 units were selected as being ready-made for immediate deployment to the University. Headless, fanless and weighing just 1kg (2.2lbs), the CI-DEG-3000 Series is a compact gateway ideal for the ANU project.

Customer Benefits //

- Improved plant operation reliability
- 24/7 uninterrupted Operation
- Full Plant Control and Automation with optimisation
- Ongoing Measurement and Verification
- Regular Diagnostics and Reporting
- Full visibility of plant operation
- Easy to use system
- Potential energy and cost savings

Predicted results //

Although optimisation is always a key factor for any PlantPRO installation, reliability and plant stability was the first priority on this plant. This KPI has already been proven with zero down time or loss of conditions since the completion of final commissioning.

With regards to plant efficiency, even under low load conditions, an improvement in running costs has been shown. As the plant is placed under higher ambient loads, it is predicted greater savings will be extracted from the plant. Based on the type of plant and the optimisation strategies implemented, it is envisaged savings in the vicinity of 6% to 8% over baseline will be achieved.

Edge analytics for mobile and field applications //

PlantPRO on the CI-DEG-3000 is an intelligent system designed to aggregate, secure, analyse and relay data from diverse sensors and equipment at the edge of the network. It bridges both legacy systems and modern sensors to the internet, helping the University obtain business insights from the real-time, pervasive data in their machines and equipment.

Small footprint but big connectivity //

Engineered with an industrial-grade form factor and solid-state drive, the CI-DEG-3000 can reliably run 24/7 with long life at extended temperatures. This series was selected for its wide connectivity via Wi-Fi, Bluetooth LE, optional cellular mobile broadband 3G or 4G LTE as well as 10/100 Ethernet, including Power over Ethernet (PoE).

Easy on power usage //

By targeting I/O and single application computing, the University's power use has been reduced through the use of the CI-DEG-3000.



About Us //

Airmaster is an award-winning technical solutions company, delivering end-to-end management of heating, ventilation, air conditioning, industrial and process cooling and building automation across Australia and South East Asia. Based in Melbourne and with 12 branches Australia-wide, Airmaster's commitment to sustainability is achieved through a proactive, integrated approach to helping organisations achieve energy efficiency in innovative ways.

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