

MEASUREMENT & Verification

CASE STUDY: James Cook University reduces demand allowing further growth

James Cook University uses M&V to demonstrate reduced energy demand and meet network agreements

The Project

Douglas Campus Townsville had plans to increase its facilities from 70,000 to approximately 140,000 square metres of air-conditioned space. This would have increased its maximum site demand to 15MW post 2015, well above the current network agreement of 9MW and necessitating additional substation capacity and expensive high-voltage upgrades to both the Ergon Energy network and university electrical infrastructure.

In addition, electricity represented a large proportion of the ongoing operating costs of the university, with air-conditioning accounting for roughly 50-60 per cent of total electricity consumed.

To facilitate the university's expansion program and reduce ongoing operating

costs, JCU Douglas Campus needed to reduce peak daily electricity demand. As well, the university wanted to progress its strategic intent to become a leader in environmental sustainability in the Tropics.

The energy conservation measure (ECM) selected by JCU comprised building the largest central district cooling system in the Southern Hemisphere, incorporating high-efficiency chillers, sophisticated controls and large-scale thermal energy water storage for cooling 30 buildings with the capacity to connect future buildings as they are constructed.

M&V in the overview

Ergon Energy works with its customers on demand management projects. When overseeing a project, Ergon

Energy adopts the principles and guidelines for M&V as set down by the International Performance, Measurement and Verification Protocol (IPMVP). This includes engaging an auditor who is registered as a Certified Measurement and Verification Professional (CMVP) in Australia and using the IPMVP M&V Options. For this project, Ergon engaged Fred Nicolosi, of Energy Decisions, a CMVP, to undertake the M&V.

The JCU Chiller Project was measured and verified using Option C, Whole Facility (Building). This option was chosen because even though the project involved only one ECM, that ECM was implemented across the whole Campus.

Cost saved / yr:	\$2m
Energy saved / yr:	37,401 GJ
GHG saved / yr:	10,600 tonne CO2-e
Payback:	Immediate via avoided investment
M&V methodology:	Option C



JCU Water storage for the central district cooling system.

Courtesy of Ergon Energy

Benefits of M&V for this project

The M&V process for the project demonstrated the demand savings. M&V will continue for five years to allow the university to continue measuring energy performance and verifying that the changes work as planned and continue to work over time.

M&V also allows Ergon Energy to:

- demonstrate that the energy savings from the demand management project resulted in Ergon Energy having to spend less on its network
- quantify the incentive payment for demand reduction to the customer, and
- promote it as a crucial point of difference in the energy conservation and demand management space.

M&V Methodology

All M&V methodology employed by Ergon Energy is based on the measurement of results across a suitable test period after implementation of the ECMs. For the JCU Chiller Project, M&V was undertaken after a full 12 months' operation and will be repeated every year for a further four years.

The demand reduction achieved after one year was determined by the difference between the maximum demand in the baseline period of 2007 (the period before the Thermal Energy Storage (TES) was implemented) and the maximum demand in the performance period of 2011 (after TES was implemented), with adjustments for the addition of buildings to the JCU Campus since 2007. The adjustments made followed the IPMVP M&V guidelines.

Energy Decisions was given access to documents, billing and metering data from January 2007 to March 2011 to conduct its M&V audit. Since 2007, 10 new buildings have come online resulting in increased energy demand. This increase has been used as a baseline adjustment to the energy savings - calculated from the billing and metering data for the baseline and the performance period.

The M&V was scheduled to accommodate the university's teaching timetable.

The parties involved and why they made the M&V decision

The project was part of Ergon Energy's Townsville Network Demand Management Pilot Project, sponsored by The Office of Clean Energy (OCE) within the Department of Employment,



JCU chiller plant room

Economic Development and Innovation (DEEDI). OCE sponsorship was conditional on the results of each participant project being properly measured and verified by an independent third party. This is a standard requirement for most grant bodies.

As well, M&V of the demand savings by an independent third party was part of the contractual agreement for participation between Ergon Energy and its customer.

The M&V option adopted for the project was established through negotiation of the M&V Plan with all major parties: including JCU's Facilities Management Office, M&V auditor Energy Decisions and the party that undertook the initial Opportunity Evaluation, MGF Consultants P/L and McClintock Engineering Group, with oversight by and approval from Ergon Energy.

The party undertaking the Opportunity Evaluation was a key player in the M&V decision because, having undertaken the evaluation, it held a clear view of the opportunities available, the expected demand savings and the appropriate M&V methodology to measure those savings.

More information

For more information on the JCU project, contact Ergon Energy Development Manager Large Customer Demand, Ian McGregor by telephoning 0418 664140 or emailing ian.mcgregor@ergon.com.au or visit www.ergon.com.au.

Courtesy of Ergon Energy