

MEASUREMENT & Verification

CASE STUDY: Hornsby Council measures its success

Measurement and Verification gave Council the surety that energy savings were being achieved and targets were being met.

The Project

Hornsby Shire Council covers 510 square kilometers to the north of Sydney. There are over 160 buildings and facilities within the Council's control including a fire brigade, childcare centres, libraries and sports centres. The Council wanted to reduce the greenhouse gas (GHG) emissions generated from these facilities in line with its commitments under the Cities for Climate Protection Program. It set itself the target of reducing emissions by 35% by 2012. To help achieve this target, Council entered into an Energy Performance Contract (EPC) with Energy Conservation Systems (ECS).

An EPC is a convenient and streamlined way of implementing and financing energy efficiency upgrades. A key feature of the EPC for the Council was that it delivers guaranteed savings. The savings are measured and verified (M&V) in a documented M&V plan.

The main aims of this EPC were to achieve guaranteed reductions in energy use and operating costs, leading to a reduction in GHG emissions. It was also critical that there were improvements in the internal management processes to ensure the reductions are sustained over the long-term.

Costs saved / yr: \$165,100
Energy saved / yr: 5740 GJ
GHG Saved / yr: 448
Tonnes CO₂-e
Payback (yrs): 7
M&V methodology: Option A,
B & C

The key energy conservation measures (ECM) installed included:

- Modifying air conditioning systems for optimum performance
- Upgrading light fixtures to more efficient luminaries
- Installing an intelligent occupancy-based lighting control system

- Installing power factor correction equipment to reduce demand charges
- Installing solar and high efficiency gas boiler systems for efficient water heating at aquatic centres

M&V overview

M&V provides a basis for quantifying the savings from an ECM, and measuring those savings over time. It is a critical tool for ensuring that everyone involved in a project understands and agrees on the potential savings of an ECM, how the ECM is expected to perform and how the savings will be reported. Also, if there are variations in performance, M&V can help to explain why.

ECS uses the International Performance Measurement and Verification Protocol (IPMVP) as a guide to the development



Hornsby Aquatic Centre

Courtesy of Hornsby Council



Pennant Hills Library

Courtesy of Brewster Hiorth

of its M&V Plans. Each ECM has a well thought through methodology that delivers a level of accuracy and confidence that is suited to the cost of the program and risk involved.

An example of the simplest form of M&V may be the logging of electrical circuits before and after an efficiency measure has been implemented (option A). At its more complex M&V may require analysis of building performance against ambient weather conditions (option C). This will allow the energy usage as a result of weather patterns (or other variables) to be distinguished from energy savings as a result of the measure. ECS uses software programs such as Metrix and their own site specific regression analysis for this purpose.

M&V Methodology in detail

Options A, B and C were all used as part of this EPC. For example the typical lighting improvements were measured using option A or B. HVAC improvements were typically measured using Option C and the water heating solutions for the swimming pool were confirmed using Option C. All these details are documented in the M&V report, which is provided on a yearly basis to the council. As the savings were tracked over seven years the report is critical to ensuring the agreed savings are met.

The M&V report to the Council lists all the ECM's and the actual energy savings resulting from the improvements,

along with the GHG and dollar savings. It compares the actual savings with the expected savings, and addresses any shortfalls.

The report also details the calculations used to determine the energy savings for each ECM at each facility. It includes the data used, assumptions made and any adjustments made when calculating the savings (for example, a change in operating hours at a facility). This allows for a high level of transparency around the savings from the energy efficiency improvements.

Benefits of M&V for this project

Accurate data is critical for the Council to effectively manage GHG emissions, monitor its progress towards the reduction goals, and identify any areas that the Council needs to focus on. The M&V part of this project provided the data the council needed, in sufficient detail, to do this.

By guaranteeing the energy savings through the M&V plan the Council was protected in the event the actual savings fell short of the planned savings.

The Parties involved and why they made the M&V decisions they did

Hornsby Shire Council as part of a commitment under the Cities for Climate Protection program wanted to make GHG savings across as many facilities as economically feasible in the shortest timeframe with the least drain on council's own resources. The EPC provided the framework to do this, and the M&V plan (a critical part of any EPC), and subsequent M&V reports, provided the council with surety the energy savings were being achieved, and the data necessary for them to track their GHG emission reductions. It also ensured that any shortfall in energy savings were addressed, giving the council surety they would meet their GHG emission targets from this project.

For more information on this project please visit:
www.ecsaustralia.com.au

