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Renewable energy

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Townsville City Council Environmental sustainability

Case study
Environmental
sustainability



Overview

Townsville City Council takes an active approach to environmental sustainability through its shire corporate services, although smart-energy initiatives have only recently been addressed as a priority.

In early 2001, two of Townsville City Council's wastewater treatment plants had methane generators installed. These now power approximately one third of the plants' operations by converting the wastewater methane to electricity. According to recent energy audits at the two plants, greenhouse gas emissions have been reduced to virtually zero.

Council's Dalrymple depot was energy audited in early 2002 and six key energy-efficient recommendations were implemented at a total cost of \$5300. Savings were calculated at \$9600 a year with the payback period on investment estimated at six months to one year.

Several other energy-smart initiatives are also under development or being

implemented at Townsville City Council. These include staff training, a funding, investment and reward program, further audits, rationalisation of electricity billing systems and collation of energy-use data.

Introduction

Townsville is situated in far North Queensland. The regional population is 133,000 and Townsville City Council services 89,000 residents.

A variety of large manufacturing and service-related industries are located in the region. The Port of Townsville services industries such as minerals, sugar and beef.

In addition, Townsville is home to James Cook University, the Australian Institute of Marine Science and the Great Barrier Reef Marine Park Authority. Thousands of defence force personnel live in Townsville and form Northern Australia's largest defence contingent.

A recent greenhouse audit and energy cost-reduction plan identified that in 2000-01, Townsville City Council's greenhouse gas emissions were equivalent to approximately 120,000 tonnes of CO₂. Most emissions resulted from waste management practices, electricity usage, wastewater treatment and fuel for Council's fleet.

The audit was conducted as part of the Australian Greenhouse Office's Greenhouse Challenge program and was designed as a preliminary study of Council's energy impacts. Further auditing and the implementation of energy-smart initiatives is planned by Council.

For a number of years, Townsville City Council has promoted and undertaken a wide range of environmentally-sustainable activities, primarily through its Environmental Management Division.

Five core programs are underway:

1. Conservation Initiatives
2. Natural Area Management
3. Integrated Environmental Management
4. Coastal Management
5. Landcare and Catchment Management

In 2001-02, Townsville City Council was a finalist in the national Banksia Environmental Awards in recognition of its proactive environmental initiatives.

Green energy and wastewater treatment plants

Townsville City Council operates four wastewater treatment plants and a fifth is to be commissioned later in 2002. Two of the plants are located on the mainland - one at Cleveland Bay and another at Mt St John. Magnetic Island also has two operational plants - one at Horseshoe Bay and another at Nelly Bay, while a plant at Picnic Bay will become operational towards the end of 2002.

Many municipal wastewater treatment plants use anaerobic digesters to process the solid component of wastewater, the sludge. A byproduct of such anaerobic digestion is methane. From a greenhouse perspective, methane is significant because a single molecule of this gas has the same global warming influence as 21 molecules of carbon dioxide (CO₂). Therefore, small reductions in methane emissions can result in very large greenhouse gas savings.

At Townsville's wastewater treatment plants, the anaerobic digestion process occurs in large, sealed vats and the methane is collected. Until recently a small portion of this explosive gas was burned to provide heat to assist in the anaerobic digestion process while the rest was flared off.

Much greater greenhouse efficiency has been achieved at the Cleveland Bay and Mt St John plants as methane gas now drives generators providing up to one third of the power required to run the plants.

The program is an initiative of Citiwater, a commercial business unit of Townsville City Council. The financial flows associated with the methane generators are as follows:

1. Townsville City Council sells methane to Stanwell Corporation.
2. Stanwell uses the methane to produce electricity that it sells to Ergon.
3. Ergon sells the electricity to Townsville City Council to run the wastewater treatment plants.

Head of Environmental Management at Townsville City Council, Greg Bruce, believes the initiative is of great benefit to the council and the community and that it is a practical example of sustainability in action.

"What we're seeing at the two Townsville wastewater treatment plants is an example of how environmental sustainability can be financially rewarding," he said.

"A Council operation was having a significant negative impact on the environment. By changing the way we operate to reduce that impact, we have also developed a new income stream for Council.

"Everyone is benefiting. Council benefits because of the new revenue and reduced electricity costs. The environment benefits due to reduced greenhouse gas emissions and

ultimately the community benefits because of a healthier environment.

"It's a win-win situation with the environment as the bottom line," Mr Bruce said.

Dalrymple Road depot audit

In January 2002, a detailed energy audit was undertaken at Townsville City Council's Dalrymple Road depot. It was part of an audit package funded by the Queensland Environmental Protection Agency. The aim of the audit was to introduce Council to the process of energy auditing its own facilities and when further funding became available, to use the audit as a model for further, detailed operational audits.

The audit made six key recommendations where the council could make significant energy and cost reductions. These included:

- better management of lighting
- fitting a timer or controller to the air conditioning unit
- use of task lighting and rewiring of toilet blocks
- fitting solar control film to meeting room windows to reduce heat and glare
- fitting light switches to ground floor offices and canteen area
- fitting awnings over air conditioning coolers with west elevations.

Figure 1 identifies the projected costs, savings, CO₂ reductions and payback period for these recommendations. For an estimated expenditure of \$5300, savings of \$9600 a year and a projected payback period of between six and 12 months is expected. Greenhouse gas equivalent reductions total 86.4 tonnes a year.

Figure 1: Dalrymple road depot energy-smart recommendations

No.	Description	Savings \$ P/A	Cost \$ P/A	Payback	CO2 Reductions Tonnes P/A
1	Building 4: Better management of lighting.	1500	0	immediate	13.5
2	Building 2: Fit controller to air conditioning	6200	300	> 3 weeks	55.8
3	Building 2: Use of task lighting and rewiring of toilet blocks.	250	850	> 3.5 years	2.25
4	Building 2: Fitting of solar control film to meeting room	unkown	150	Approx 3 years	unkown
5	Building 1: Fitting of light switches to ground floor offices and canteen area.	750	1500	2 years	6.75
6	Building 1: Fitting of awning over air conditioning coolers to west elevation.	900	2500	> 3 years	8.1
Totals		9600	5300	6-12 months	86.4

Source: Townsville City Council

Staff training - the “Dummies Guide to Greenhouse and Sustainability”

One of the keys to Townsville City Council’s sustainability and smart energy programs is a ‘bottom-up’ approach within Council.

The aim is to engage all levels of staff, managers, directors and councillors in discussion about any sustainability issues they believe are relevant to their respective operations.

The starting point for this process is to ensure everyone has a common understanding of the term sustainability and issues such as greenhouse, climate change and smart energy.

“Creating this common understanding is a challenging task,” said Greg Bruce.

“To help us along the way, with the assistance of Sustainable Development consultant Guy Lane, we’ve designed and trialled two staff training programs - “Sustainability for Dummies” and “The Dummies Guide to Greenhouse”.

“The programs focus on familiarising people with terms associated with sustainability such as ‘ecologically sustainable development’. They also take people back through the basics of life on earth and why a healthy natural environment is so crucial to our survival.

“We help people to understand the connection between global issues and local sustainability applications,” he said.

“We want to introduce people to the notion and application of sustainability, debunk some of the myths and misconceptions about the term and identify potential sustainability champions within Council,” Mr Bruce said.

The programs are not compulsory and to date, all staff within the Financial Services Division have participated. It has proved to be very popular and plans are afoot to extend its availability.

Right: Townsville City Council is trialling a solar powered irrigation system.

Financial Services and the Sustainable Townsville Investment Initiative

Also linked to Townsville’s ‘bottom-up’ approach to sustainability is the Financial Services Sustainable Townsville Investment Initiative program which has two key aims:

1. To undertake a sustainability and greenhouse ‘needs analysis’ among Council’s managers and directors to identify a range of programs that could be undertaken by Council. The emphasis is on identifying what different divisions want, rather than imposing programs from above.
2. Present this information to Councillors, then build a structure within Council where sustainability initiatives can be funded by cost savings, particularly in energy and water use reductions. The development of a reward system for each division which undertakes initiatives will ensure that at least part of the savings they accrue are returned to their budgets to fund further initiatives.

To date, all directors and managers have been consulted about their sustainability priorities and a report was presented to Council at the end of June 2002.

“We are hoping to develop the ability to engender in-house interest in sustainability and then structure a reward system around that interest,” Mr Bruce said.



“We want a catalyst to develop a mechanism for sustainability to become the norm here in Townsville City Council,” he said.

Rationalising energy bills and data

An interesting finding to emerge from Townsville City Council’s greenhouse audit focussed on the council’s current electricity billing and data-collection system.

It was found that Townsville City Council receives over 1080 separate electricity bills a year from over 400 separate energy accounts with provider Ergon.

While some information such as bill reference numbers and price for metered energy demand is recorded on the Financial Services database, other important information, such as kilowatts of energy consumed and tariffs, is not.

This makes assessment and monitoring of Townsville City Council’s global warming impact very difficult. It also makes the calculation of projected financial savings from smart-energy initiatives almost impossible.

The recommendations to emerge from this finding are as follows and are an important information management issue for all councils to consider:

- Include tariff, kilowatt hours and location information in Financial Services database.
- Provide access to energy information for business unit managers.
- Encourage business unit managers to report their energy demand and to seek opportunities to reduce demand.
- Review existing energy audits. (It is believed that there are as many as 10 existing audits for Townsville City Council.)
- Implement recommendations of these energy audits where feasible.
- Undertake further energy audits to determine where cost savings can be made.

- Implement recommendations of the Dalrymple Road energy audit and use it as a model that can be applied Council-wide.

Learnings and pitfalls

Many case study contributors and auditors involved in the Local Government Energy-Efficiency Program have acknowledged that one of the most difficult aspects of introducing energy and sustainability initiatives into councils is engaging staff at all levels in the process. Most of the innovators within councils believe so much more could be achieved with the interest, support and commitment of a wide range of colleagues from operations and field staff, right through to administrators.

An important learning for Townsville City Council in its smart-energy and sustainability programs has been the trial of training and needs analysis/dialogue processes to elicit peoples’ ideas, needs and concerns regarding these issues.

It is the application of a ‘bottom-up’ methodology and so far it appears to be working effectively for Council. It may take more time and extra helpings of political savvy, but Greg Bruce believes they are well on the way to engaging many staff and uncovering sustainability champions within Council.

Conclusion

Townsville City Council has embarked on a wide-ranging energy-smart program. Importantly, it is trialling a number of initiatives on a relatively

small scale to identify how best to implement changes and enthuse staff, managers, directors and councillors. Still to come are swimming pool audits, a trial of water and energy-saving irrigation systems in Council, more training programs and more audits. Townsville has uncovered a fascinating smorgasbord of energy-smart options.

Next steps

- An energy audit of Council’s three public swimming pools.
- Development of sustainability links with Townsville Enterprises, an organisation set up to promote economic development in the Townsville region.
- Continuation of Council awareness-raising processes which encourage staff ‘buy in’ to smart energy and sustainability programs.
- Development and implementation of the Financial Services Sustainable Townsville Investment program.
- Ongoing development of corporate and community partnerships in smart energy and sustainability.

Townsville City Council

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