

The Environmental Protection Agency is Queensland's lead agency to promote energy efficiency, renewable power and other initiatives that reduce greenhouse gas emissions throughout the state.



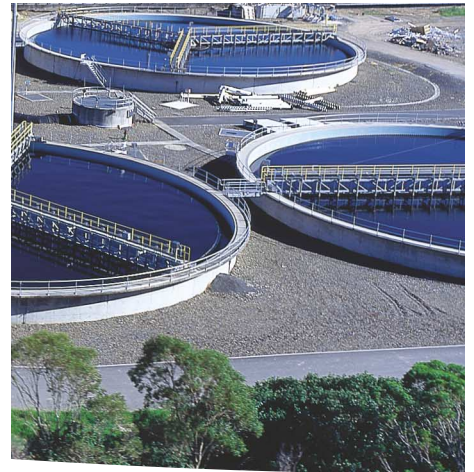
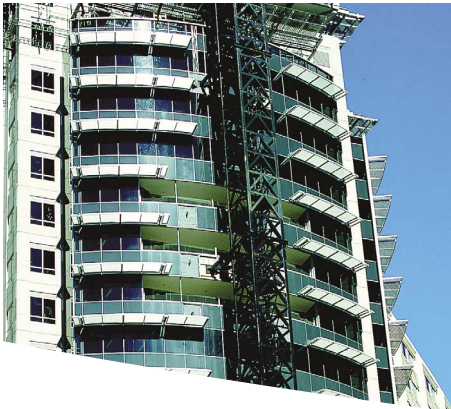
Case study
Turning waste
into wealth

CLEANER ENERGY

Renewable energy

Brisbane City Council

Turning waste into wealth



Overview

In November 2001, Brisbane City Council renewed its commitment to energy efficiency, greenhouse gas reductions and alternative energy use with the launch of the "Sustainable Energy and Greenhouse Action Plan" (SEGAP). The plan's three key targets for Council are:

1. A 45 percent reduction of 1990-level greenhouse gas emissions from council activities by 2010.
2. Stabilisation of greenhouse gas emissions from the Brisbane community, at 2000 levels by 2010.
3. Increased renewable energy generation and usage by council from three megawatts (MW) to six MW by 2003 and a further increase to 10MW by 2010.

The plan activates Brisbane City Council's strategic approach to energy efficiency, built on a foundation of extensive auditing of current energy use and detailed projections of future use and associated costs. It is the

cornerstone of council's participation in the Cities for Climate Protection program (CCP), an international initiative which focuses on local governments reducing greenhouse impacts and increasing energy efficiency and alternative energy use in their own operations and within their communities.

Introduction

Brisbane City Council is the largest local government in Australia and Brisbane is one of the fastest-growing commercial and residential areas in the country.

With the Brisbane population at 900,000, Brisbane City Council manages two operational and over 100 closed landfill sites, controls 6022 kilometres of water supply mains and 6397 kilometres of sewers. During 1999, Brisbane City Council buses travelled 39.2 million kilometres. It is hardly surprising then, that because of

rapid population growth and commercial development, trends indicate that the city's greenhouse gas emissions in 2010 will be 70 percent above 1990 levels if no preventative action is taken.

Brisbane City Council's Manager of Pollution Prevention, Health and Safety Ian Christesen said, "A clean and green Brisbane has been identified by residents as a priority and Brisbane City Council is now applying itself to the task of ensuring our own operations are sustainable and energy efficient. At the same time, we are working with all sectors of our community to encourage and enforce efficiencies.



Above: Brisbane City Council is focusing on data collection and analysis.
 Right bottom: Landfill methane gas is helping to heat the Chandler swimming pool.

“Brisbane City Council has been implementing environmental initiatives since the late 1980s. Our air quality, greenhouse and sustainable energy strategies are critical to this council’s focus on environmental sustainability.

“Brisbane can realise the economic benefits of efficient, sustainable energy use, the security of permanent energy and the environmental benefits of cleaner air and greenhouse gas reduction by making a commitment to a wide range of energy efficiency initiatives,” Mr Christesen said.

Brisbane’s energy consumption

One of Brisbane City Council’s key challenges within its sustainable energy program is to accurately calculate its own and the Brisbane community’s energy consumption and greenhouse gas emissions. While work is continuing to improve its data collection and analysis processes, council estimates that during 1999, its own operations:

- Used approximately 260 gigawatt-hours (GWh) of electricity in its buildings, street lights and water and wastewater operations. This is equivalent to the energy use of 40,000 households.
- Cost approximately \$22 million in electricity use.
- Produced 360,000 tonnes of greenhouse gas emissions.

During 1999 (as shown in Figure 1), the residents, businesses and industries of Brisbane:

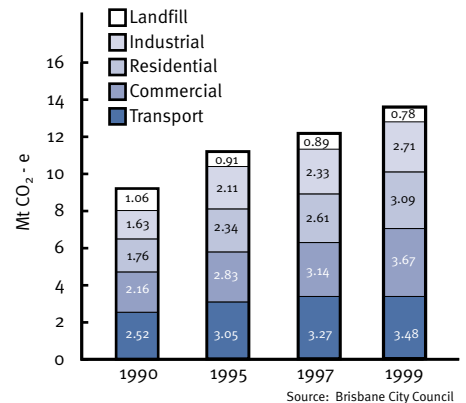
- Generated an estimated 12.9 megatonnes (Mt) of CO₂-equivalent emissions through the use of electricity, gas and transport fuels.
- Increased total greenhouse gas emissions by 22 percent on 1995 levels and by a massive 50 percent on 1990 levels.

“The collection and analysis of accurate greenhouse emissions data is now a high priority for Brisbane City Council,” Mr Christesen said.

“It is a difficult area to manage, yet it is crucial for accurate benchmarking and emissions targeting.

“Improvements in our database operation will result in a number of benefits. It will ensure better data

Figure 1: Greenhouse Emissions for Brisbane 1990 - 1999 by Sector



gathering leading to more effective analysis of our energy tariffs and related savings. It will also improve our account-keeping processes.

“This in turn, will generate financial savings which can potentially fund energy efficiency projects and ensure the implementation of short- and long-term initiatives.

“An increased data gathering and analysis capacity will also allow us to improve our setting of reduction targets,” he said.

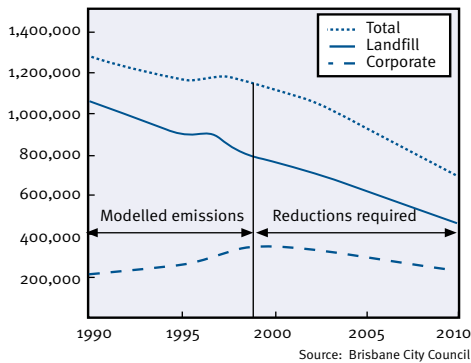
Figure 2 identifies Brisbane City Council’s current emission targets.

The Sustainable Energy and Greenhouse Action Plan

In a strategic, whole-of-Council and whole-of-city commitment to sustainable energy, Brisbane City Council joined the Cities for Climate Protection (CCP) program in 1997. It has since completed all five CCP milestones, one of the first councils in Australia to do so:

1. Establishment of an emissions inventory and forecast.

Figure 2: Emissions Targets for Brisbane City Council



2. Establishment of an emissions reduction goal.
3. Development and adoption of a local action plan.
4. Implementation of the action plan.
5. Detailed monitoring and reporting.

The SEGAP is Brisbane City Council's local action plan and details over 35 on-ground energy initiatives. These are the actions which will reduce council and community energy use and greenhouse-gas production to target levels. They address:

- waste and landfill sites
- water supply and wastewater treatment
- buildings
- transport and roads
- public education and action
- vegetation and tree planting
- commercial and industrial education and action.

Waste and landfill sites

Organic waste buried in landfills decomposes in the absence of oxygen and produces gas consisting of an estimated 55 percent methane and 45 percent carbon dioxide. Methane is a

particularly potent greenhouse gas with a global warming potential 21 times greater than that of carbon dioxide.

In 1999, Brisbane's current and former landfill sites produced approximately 0.8 Mt of greenhouse gas, or around six percent of total greenhouse gas emissions from the city.

While 400,000 tonnes of domestic waste is currently deposited at the Rochedale and Swanbank landfills each year, prior to 1993 organic waste went to many other landfill sites including Nudgee, Chandler, Fitzgibbon and Willawong. These sites are now closed, but continue to produce significant amounts of greenhouse gas emissions.

Brisbane City Council is installing landfill gas collections at Chandler, Fitzgibbon and Willawong and plans to generate electricity and thermal energy using the gas. By 2010, installed landfill gas collection systems will have reduced emissions from these sites by 70 percent.

Energy from wastewater

For almost 30 years Brisbane City Council has harnessed enough renewable energy from sewage treated at its Luggage Point Treatment Plant to provide approximately five percent of its electrical energy needs. This has saved almost \$1 million each year in electricity costs and saves approximately 12,000 tonnes per year of carbon dioxide emissions.

Methane, a by-product of the sewage treatment process, is used to operate two 1.6 megawatt (MW) Mirrlees Blackstone gas engines hooked up to alternators generating electricity.

These engines provide about 60 – 70 percent of the electricity needed to run the treatment plant. A small amount of electricity is exported to the grid.

Waste heat produced by the engines is used in the treatment plant to assist the breakdown of sewage sludge by anaerobic bacteria. This results in a very high overall thermal efficiency.

Brisbane City Council is now adopting this process at its Oxley Creek Treatment Plant and is investigating its suitability for several other Council treatment facilities.



Conclusion

The work of Brisbane City Council in the sustainable energy arena demonstrates links to all Council core business areas of rates, roads, rubbish, water supply and wastewater treatment, as well as innovations in other areas within the community. The council's SEGAP and participation in the CCP program, provide a strategic framework and implementation process to ensure its energy efficiency targets are achievable and cost effective.

Alongside these major initiatives at Brisbane City Council, is an awareness of the lessons learned from experience and the potential pitfalls still lurking in the process of implementing innovation.

"One of the most important lessons we've learned at Brisbane City Council is to be pragmatic when undertaking financial assessments of potential energy efficiency measures," Ian Christesen said.

"Locating and accessing funding programs can be extremely challenging at times and it is crucial to do your homework by ensuring the costs and benefits are accurately analysed and presented," he said.

Scott Losee, Council's Principal, Air and Water added, "Factoring in the social and environmental benefits of these measures can make a complete picture and help overcome their marginality.

"Information management is also vital. This includes data gathering, collation and analysis in important issues such as current emission production and target identification.

"In the end though, it is our community that has identified air quality, climate change and greenhouse gas abatement as priorities and we are committed to addressing these concerns as efficiently and effectively as possible," Mr Losee said.

Next steps

- Improved collection and analysis of data.
- Improved energy data base operation.
- Increased generation of electricity from landfills.
- Generation of renewable energy from Oxley Creek sewerage treatment plant.
- Feasibility study of opportunities for solar electricity.
- Multiple community and industry initiatives.
- Ongoing implementation of corporate initiatives.



Above: The BCC Greenhouse Team reviews the SEGAP report.

Brisbane City Council

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Brisbane City Council's SEGAP report is available from Council's call centre.

For more information

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Queensland Government
Environmental Protection Agency