BASIX Multi-Unit Residential Cogeneration Demonstration Project

Updated September 2008

The BASIX Multi-Unit Residential Cogeneration Demonstration Project is an initiative of the NSW Department of Planning and involves partnership with residential development companies Lend Lease GPT and Mirvac. The purpose of the project is to trial and showcase cogeneration technology in a residential setting, with a focus on reducing energy consumption and greenhouse emissions.

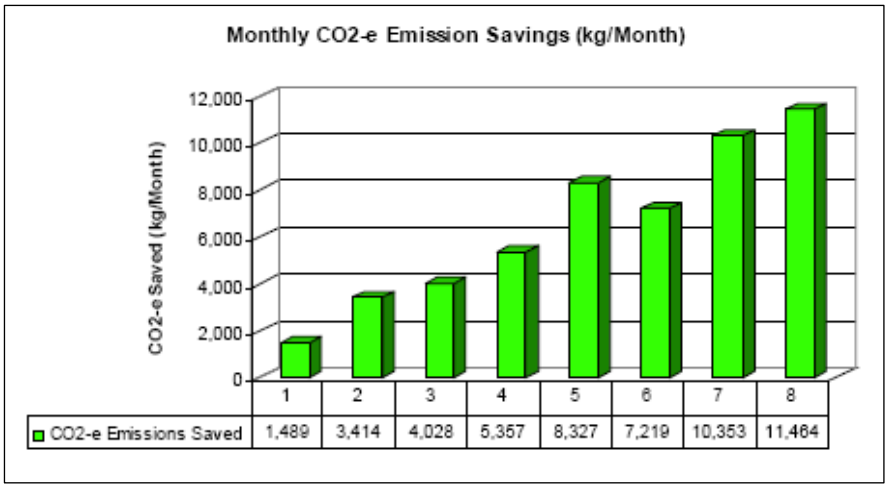
About the project

The Cogeneration Demonstration Project features the installation of small-scale, gas-fuelled generators in a 7 storey Lend Lease development at Rouse Hill in western Sydney, and in Mirvac's 25 storey Cambridge Lane apartment building at Chatswood in northern Sydney.

The generators are powered by natural gas with an electrical output of 25 kW. They are able to supply a modest part of the electrical demand of each building, which is used in common areas. It is the cogeneration function that provides significant greenhouse emissions abatement, by making use of the heat that is a by-product of generator operation. At the Lend Lease and Mirvac developments, this heat will be used to provide approximately two thirds of the hot water needed by the residents, saving around 80 tonnes of carbon dioxide per year for each site.

Initial results

Initial performance results show that cogeneration can achieve significant savings in both greenhouse emissions and costs. After eight months operation (mid-December 2007 to mid-August 2008), cogeneration at Mirvac's Cambridge Lane development is saving its occupants around $1,000 a month on power bills. By generating its own hot water and common area electricity, the apartment block has also cut its greenhouse emissions by 53,594kg. The potential saving for a year at this rate reaches 120 tonnes of CO_2, equivalent to greenhouse emissions from around 35 cars.



The cogeneration technology has also proven cost effective to install. It is estimated that the Chatswood generator would pay for itself within 12 years, well within its 25-year expected lifetime.

At Rouse Hill, lower building occupancy and a later start-up date mean that the cogeneration performance is still being tested.

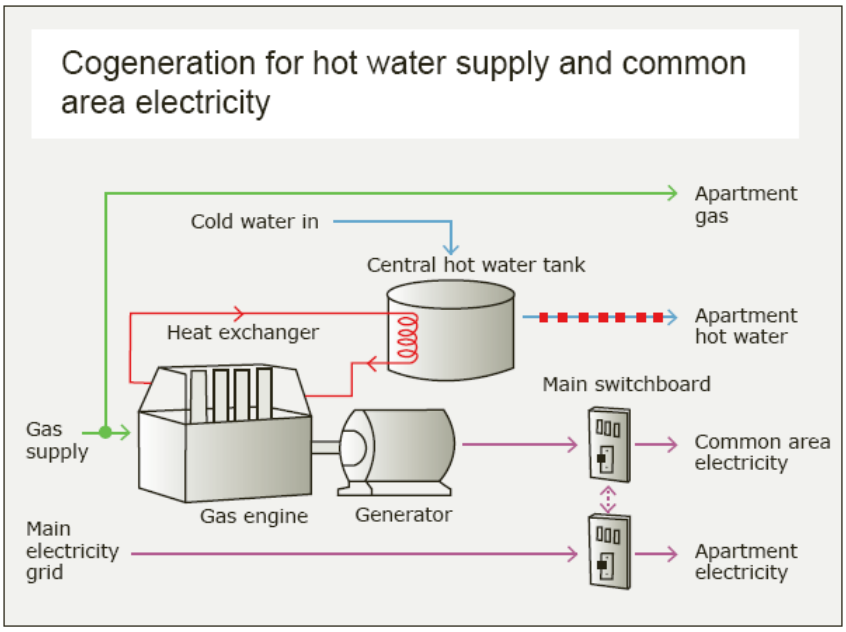
Performance monitoring
The Department of Planning is monitoring the performance of both sites for a year from the commencement of cogeneration. Specialist project managers, MPI, are involved in managing the systems to find maximum efficiencies. The first eight months of reports for the Chatswood site are available below. (PDF links)

Cambridge Lane apartments – Reports 1 and 2
Cambridge Lane apartments – Report 3
Cambridge Lane apartments – Report 4
Cambridge Lane apartments – Report 5
Cambridge Lane apartments – Report 6
Cambridge Lane apartments – Report 7
Cambridge Lane apartments – Report 8

What is cogeneration?
Cogeneration is the simultaneous production of two useful forms of energy, such as electricity and high temperature heat, also known as combined heat and power (CHP). By harnessing more energy from one generation process, cogeneration increases energy efficiency and can reduce greenhouse gas emissions when compared to other power systems. The generator can be located close to where the energy is needed, enabling local or building-based systems to control their own power.

Cogeneration has been applied around the world in a variety of industrial and commercial settings. In some larger applications, the heat can be used for space cooling as well as for water and/or space heating (trigeneration).

While the current initiative is focused on proving the effectiveness of a simple cogenerated hot water supply in a multi-unit residential setting, it is anticipated that Australian building designers and developers will be able to use the technology to provide a wider range of energy services to residential development, including low greenhouse emission air-conditioning. Trigeneration is already being considered for a number of major mixed-use development sites in Sydney.



Technical data:

Cogeneration units	Tedom micro T25, 4 cylinder 1.6 litre spark-ignition engine 25 kW electrical output 47 kW heat from water jacket and exhaust heat exchangers
Overall fuel efficiency	Approximately 87% (achieved 77% in demonstration)
Hot water supply	Approximately 65% of total domestic hot water demand
End-uses of electricity	Common area demands (e.g. lighting and ventilation)
Cost savings achieved	Up to $1,235 per month
CO_2 savings achieved	Up to 11,464kg per month
Payback period	Approximately 12 years (for setup cost of $185,000)