



Australian Government

Department of the Environment,  
Water, Heritage and the Arts

THE PLUS FACTOR  
GREENHOUSE CHALLENGE PLUS  
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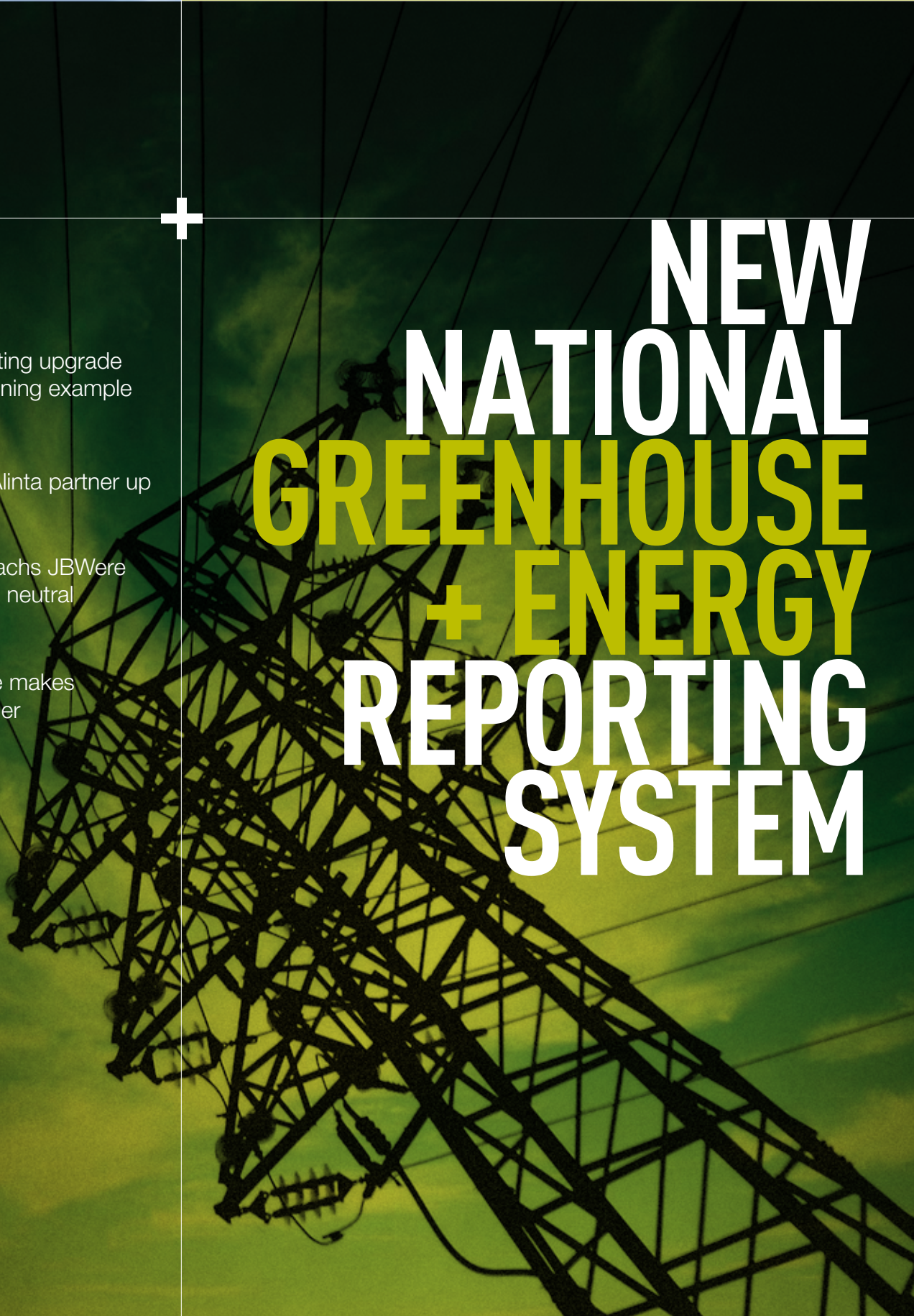
06  
Council lighting upgrade  
provides shining example

07  
Alcoa and Alinta partner up

08  
Goldman Sachs JBWere  
now carbon neutral

10  
Tiny change makes  
diesel greener

# NEW NATIONAL GREENHOUSE + ENERGY REPORTING SYSTEM





## Ross Carter

Ross Carter, First Assistant Secretary,  
Industry, Communities and Energy Division,  
Department of the Environment, Water,  
Heritage and the Arts

Since our last edition there has been a great deal of change with the election of a new Government and changes to Departments. Greenhouse Challenge Plus falls within the Department of the Environment, Water, Heritage and the Arts and has a new Minister, the Honorable Peter Garrett.

The new Government has listed climate change as a top priority. As part of DEWHA, Greenhouse Challenge Plus will play an important role in informing a new generation of government programs.

In the transition to new approaches, including emissions trading, capacity building programs such as Greenhouse Challenge Plus will continue to help businesses contribute to an effective response to climate change.

A major factor in the program's success has been the continuing efforts and commitment of our members, who are always finding new ways to reduce greenhouse gas emissions. As the articles in this edition of *The Plus Factor* attest, there are many different ways to minimise your environmental footprint. By thinking laterally and committing to improving understanding of your emissions profile, there are many opportunities open to business to benefit both their financial bottom line and the environment.

For example, Crown Coaches, a Melbourne-based bus company, has undertaken a suite of emissions saving measures, setting the company well on track to complete sustainability. For more information on Crown Coaches' green initiatives and other great ideas on how to reduce your emissions, read the many articles on individual

company successes that are contained in this newsletter.

Of course, *The Plus Factor* not only provides great examples of what members are doing to reduce emissions, it also contains useful updates on what government is doing. In this edition, we have updates on the Greenhouse Friendly™ initiative and the National Greenhouse and Energy Reporting System.

Also keeping you informed on issues related to the program are our industry advisors. You may have noticed that a number of new faces have joined the team recently, and I would like to welcome Andrew Hirsher, Ray Fulcher, Jason Roberts, Terry Hogan, Chris Mobbs and Kelle Roberts. They are making a valuable contribution, and are available to answer any questions you may have on the program.

With the recent change in government, there has been a considerable increase in workload, as the new Government implements its policies. Consequently we have had to allocate new industry advisors to some companies. For those companies, we appreciate your patience and understanding and hope that these changes do not cause you any inconvenience.

Another significant change on the horizon is the *National Greenhouse and Energy Reporting Act 2007*, due to take effect in July 2008. The

NGER Act establishes a single, national system for corporations to report greenhouse gas emissions, abatement actions, and energy consumption and production. This is good news for Australian businesses, as it cuts red tape by reducing the number of reports to government and eliminates duplication across existing state, territory and national schemes.

The data and methodologies accumulated from Greenhouse Challenge Plus reporting put the Australian Government in a strong position to carry National Greenhouse Energy Reporting forward. Information on how this Act might affect your business is on page 3.

With many changes having taken place and many more on the horizon, 2008 will be a year to remember. I urge you all to continue the excellent work you are doing to meet the challenge of climate change.

## Contents

- 03 New national greenhouse and energy reporting system
- 03 New depot the jewel in Crown Coaches' operations
- 04 Chains link cement Australia to the future
- 04 Printing is Greener with ECO series
- 05 New SCT locos are Strong, Clean and Tranquil
- 05 A Vision to be 'Twice as Green'
- 06 Council lighting upgrade provides a shining example
- 06 Envi – Australia's First Range of Carbon Neutral Papers
- 07 Alcoa and Alinta partner up
- 07 The environmental benefits of broadband
- 08 Goldman Sachs JBWere now carbon neutral
- 08 Lion Nathan goes barefoot to reduce greenhouse footprint
- 08 'Trigeneration' at Canberra International Airport
- 10 Tiny changes make diesel greener
- 11 Greenhouse Friendly™ projects help householders do their bit





## New National Greenhouse and Energy Reporting System

Does your corporation emit 125 kilotonnes (CO<sub>2</sub>-e) or more of greenhouse gas emissions or use or produce 500 terajoules or more of energy annually?

03

[www.environment.gov.au/index.html](http://www.environment.gov.au/index.html)

If you answered yes to either of these questions then your corporation may be required to report from 1 July 2008 under the National Greenhouse and Energy Reporting Act 2007.

The NGER Act establishes a national framework for corporations to report greenhouse gas emissions, reductions, removals and offsets, and energy consumption and production.

Corporations meeting or exceeding the thresholds identified above will need to report on greenhouse gas emissions, energy consumption and energy production from 1 July 2008.

Corporate level thresholds for mandatory reporting will be reduced, over a three-year period, to 50 kilotonnes of greenhouse gas emissions (or CO<sub>2</sub>-e) and 200 terajoules of energy produced or consumed.

Corporations or facilities nearing these thresholds are encouraged to access the Department of Climate Change website to read more about their potential obligations under the system and to register for email updates.

Regulations to underpin the NGER Act are being developed to provide industry with further guidance on their obligations.

The Greenhouse and Energy Reporting Taskforce will be holding a series of information sessions and workshops on the NGER System in the coming months.

To register for email updates and notification of workshops, email your contact details to [reporting@climatechange.gov.au](mailto:reporting@climatechange.gov.au)

To find out more about the National Greenhouse and Energy Reporting System, go to [www.climatechange.gov.au/reporting](http://www.climatechange.gov.au/reporting)



**Australian Government**  
Department of Climate Change



## New depot the jewel in Crown Coaches' operations



**Crown**  
COACHES

The move to a new depot is always a huge challenge. When Crown Coaches moved to its current site at Nunawading Victoria, in late 2006 the owner of Crown Coaches, Vic Haoust, took the challenge head on.

Mr Haoust has always been an innovative leader in the bus industry, and saw the move as a chance to do much more than just change premises.

In the past year Crown Coaches has introduced 14 new coaches that meet European Union emissions standards (Euro 3 and Euro 4). The company uses only new tyres, thereby eliminating the use of recapped tyres. Since the move to Nunawading, Crown Coaches has upgraded to a GPS system that is integrated with its own mapping software to improve route management, shorten travel time and efficiently monitor distances traveled and fuel usage.

Within the new depot Crown has also made big changes. Mr Haoust explains, 'We now use wind turbine generators to charge banks of disused coach batteries which power 12 volt lighting used for security in the depot. And we are trialing a solar heated water system that pre-heats the water before it reaches the hot water storage tanks.'

'We are also using less water. Our new bus wash uses rainwater and fully recycles all water used. Our rainwater tanks also supply water for general use in the depot and we use only recycled water in the toilet system.'

'Crown Coaches was one of the first bus operators to join the Greenhouse Challenge and we are always looking for new ways to reduce our greenhouse impact.'

For more information visit: [www.crowncoaches.com.au](http://www.crowncoaches.com.au)

## Chains link Cement Australia to the future

Cement Australia has shown that it does not take high cost, capital driven projects to improve environmental performance.



In 2005, Cement Australia contracted the Process Engineering Group to evaluate its operations in Rockhampton, Queensland, part of Cement Australia's commitment to best available technology and environmental performance. On Process Engineering's recommendation, management commissioned a kiln upgrade involving the redesign of the chain zone system to maximise heat recovery and a significant overhaul of the cooler system within the kiln.

The recently completed second phase involved improving the existing chain system and false air leaks existing within the kiln. In the year since this phase was completed, the company has recorded drastic reductions in coal consumption per tonne of clinker, some 14 per cent since the project commenced. This reduction in coal consumption is forecast to reduce greenhouse gas emissions by 30,000 tonnes per year upon project completion, exemplifying Cement Australia's commitment to

improving environmental performance as part of the Greenhouse Challenge Plus program.

It is projected these positive trends will continue as bag filters and a new exhaust fan are installed in such a way that dirty air and clean air ducts will be optimised leading to a significant improvement in Cement Australia's carbon footprint.

Cement Australia's message to other Greenhouse Challenge Plus members is that significant improvement potential exists even in older plants and through effectively using existing resources. Exploring the boundaries of existing operations and benchmarking against world best practice has delivered extraordinary gains in cost and production, whilst minimising Cement Australia's environmental footprint.

## Printing is greener with ECO Series

The printing industry is one of Australia's largest local industries and also a significant contributor to greenhouse gases.

In February 2008, Fluid Technologies launched their ECO Series of products, new high performance, vegetable based press solvents made from renewable resources and emitting virtually no volatile organic compounds. The new products do the same job as traditional petroleum distillates.

There are many products that have been historically used in all large printing pressrooms that contribute to greenhouse gas emissions, including low flash point solvents used in the wash process and volatile chemicals used in the dampening system. Easily evaporated at room temperature, these chemicals cause a release of greenhouse gases and volatile organic compounds which contribute to climate change and low level smog.

Kel Drewett, Director of Fluid Technologies, believes that his company is playing a critical leadership role in assisting large and small printing businesses to make the transition to environmentally responsible practices, in turn reducing

their greenhouse footprint. When the ECO Series products are combined with Allstar IPA (Iso Propyl Alcohol) replacement Dampening Solutions, Fluid Technologies is now able to offer a pressroom package that is 100 per cent free of volatile organic compounds.

Mr Drewett sees the ECO Series as an important environmental development for the printing industry in Australia and is seeking support from the industry to get this technology widely accepted by Australian printers.

To find out more go to [www.fluidtechnologies.com.au](http://www.fluidtechnologies.com.au)



## New SCT locos are Strong, Clean and Tranquil

SCT Logistics has invested more than \$100 million in a new locomotive fleet that will cut emissions on its rail operations and reduce its overall carbon footprint.

SCT is an Australian transport and logistics specialist which has rail and road operations. Its 15 new locomotives will make up one of the most efficient and greenest fleets to operate across the Australian rail network.

When SCT was specifying its new locomotive in 2005, it chose a locomotive built by Downer EDI that offered an engine that met the latest emission standards for heavy haul locomotives. The engine, an EMD 710 G3C, produces nearly 50 per cent less nitrogen oxide and other pollutants than main line locomotives currently operating in Australia. It also better meets the tier one standards set by the US Environmental Protection Agency.

Apart from being one of the greenest engines that will operate in a heavy haul locomotive in this country, the engine, in its latest configuration including an advanced fuel injection system, will be more fuel efficient than the locomotives currently working the SCT services.

The SCT locomotive is also quiet, meeting the demanding NSW Government noise requirements, despite being the most powerful locomotive to be introduced to the Australian network. Downer EDI analysed all components for noise and chose the quietest, like a unique dynamic brake fan arrangement, to ensure the SCT locomotive met all the required EPA standards.

Other features include the ability to shut the locomotives down in the stabling yards and only start them when the locomotive needs its battery recharged or engine lubricated. Most operators leave their locomotives idling for long periods to avoid starting or lubricating problems. In the USA it has been determined that on average locomotives are left idling for more than 30 per cent of their life, wasting precious fuel and contributing to emissions.

For more information please visit [www.sctlogistics.com.au](http://www.sctlogistics.com.au)

## A Vision to be 'Twice as Green'

The impacts of climate change are being felt globally, and the world's poorest people will feel the effects despite their minimal contribution to greenhouse emissions. In response, World Vision has launched a new environmental program – 'Twice As Green'.

Supporters of Twice As Green will help fund projects that go beyond just tree planting, to encompass ways to protect and revive barren land, encourage sustainable farming practices and provide alternative, environmentally friendly income-generating activities for poor communities around the world.

### Australians embrace a green vision

Within a few months, Twice As Green has received great support from like-minded Australians. Their support will help plant more than 2,500 trees and train farmers in sustainable farming, revegetation and tree nursery establishment. It will also help absorb more than 642 tonnes of greenhouse gas emissions.

Through Twice As Green, World Vision is teaching farmers how to revive tree stumps and roots that have been cut down, burnt or slashed, encouraging them to regrow. Such methods are easy, enduring, and inexpensive and produce higher yields than conventional tree planting programs.

Once established the trees protect agricultural land from erosion, return nutrients to the soil, provide fodder for livestock and absorb greenhouse gases from the atmosphere.

Trees are most often cut down in developing countries for firewood for cooking and heating. Through Twice As Green, World Vision is introducing alternative cooking methods such as 'miracle baskets' that cook food over the

course of the day on hot rocks, biogas digesters that collect methane from cow dung, and solar cookers that look similar to an upturned satellite dish.

Aside from the environmental benefits, introducing alternative fuel sources frees many women and children to reclaim the hours spent collecting firewood.

### Greening World Vision Australia's activities

As well as its work in developing countries, World Vision is addressing its environmental impact within Australia, with the aim of making its domestic operations carbon neutral by 2015 at no additional net cost to the organisation.

As a member of Greenhouse Challenge Plus, the organisation has reduced the size of its car fleet, revamped its national office with an open plan layout that lets in more natural light and uses lighting and air conditioning more efficiently, installed energy efficient lighting and switched to using forestry paper products.

Improved infrastructure has also reduced water consumption by more than 50 per cent within three months.

Climate change requires a global response and through its development work, World Vision hopes to better equip those in most need to cope with the effects of a changing climate, while reducing its greenhouse gas emissions.

For more information visit [www.worldvision.com.au/green](http://www.worldvision.com.au/green)



## Council lighting upgrade provides shining example

Shellharbour City Council in NSW is providing a shining example to local businesses and to councils around the country on how to reduce their environmental footprint, simply by switching to energy efficient lighting.

The council will save ratepayers more than \$7,500 and reduce greenhouse gas emissions by 57 tonnes per year as a result of changing its fluorescent tubes.

Mayor David Hamilton said the lighting efficiency upgrade was an important part of the council's vision which is firmly focused on sustainability.

'As part of our commitment to preserve the natural beauty of our part of the NSW south coast, this lighting upgrade will deliver significant energy savings and environmental benefits to the city,' Councillor Hamilton said.

Shellharbour Council Environmental Officer, Levi Gibson, identified a number of council buildings with older style fluorescent lighting and saw an opportunity to improve energy performance and light output and to extend maintenance cycles.

'As part of the lighting upgrade, the fluorescents in council's main office area, Lamerton House, and a number of other buildings have been changed to T5 energy efficient lamps,' Mr Gibson said.

'The new 28 watt T5 fluorescent tubes offer an approximate 30 per cent energy saving over the old T8 36 watt lamps they have replaced. In addition we have been able to remove some lamps altogether due to the higher light levels achieved by the T5 lamps.'

The conversion was cost effective and simple, thanks to innovative technology provided by Sydney firm, Ilum-a-Lite.

Ilum-a-Lite Chief Executive Officer, Mark Rutherford, said by fitting Ilum-a-Lite's 'Save-it-Easy' adaptors to each end of the smaller T5 tube, the T5 can be fitted to an existing T8 light fitting.

'Because the process is quick and easy and doesn't require a professional electrician, our installers were able to complete the task in only a few days, minimising disruption to office operations and saving the council time and money,' said Mr Rutherford.

'Importantly, all of the old T8 fluorescent tubes have been recycled, in order to minimise waste from the upgrade.

'The new T5 lamps have double the life expectancy and only a third of the mercury content of the old T8 lamps they replaced, making them even better for the environment.

'To mark the council's new environmental initiative Ilum-a-Lite has purchased 100 native trees from the council nursery for planting in the local area,' Mr Rutherford said.



## ENVI – Australia's first Range of Carbon Neutral papers

As Greenhouse Friendly™ members Australian Paper has undertaken an aggressive carbon reduction strategy over the last 12 months resulting in a 33,000 tonne reduction in carbon dioxide emissions each year – ongoing.

This is equivalent to taking over 8,250 cars off the road completely. Projects that have and will contribute to a reduction in their carbon emission include actions such as:

- The replacement of an oil boiler with three natural gas boilers at the Wesley vale mill in Tasmania
- The replacement of two coal boilers with a natural gas boiler at the Shoalhaven mill
- Centralising warehousing (resulting in reduced transportation requirements)
- The anticipated reuse of our Maryvale mill landfill materials as agricultural fillers,

In addition to reducing their carbon footprint, Australian Paper is leading the world by launching ENVI, a range of carbon neutral papers suitable for catalogues, books, and general printing. All grades have been or are in the process of being certified through the Department of Climate Change's, Greenhouse Friendly™ programme.

Through an exhaustive Life Cycle assessment, Australian Paper has calculated all emissions associated with the production of the paper from the growing and harvesting of the forest, manufacture, transport and even the percentage of paper that is not recycled and is disposed of in landfill. In addition to their own internal carbon reduction strategies, they have purchased offset credits through a Department of Climate Change Greenhouse Friendly™ abatement provider.

The ENVI range offers businesses, Government departments and individuals with an instant, low cost Carbon solution. For more information please call the ENVI hotline on 1800 280 037



## Alcoa and Alinta partner up

Alcoa believes improving energy efficiency has an important part to play in the solution to global climate change.

Alcoa and Alinta, a leading Western Australian energy retailer, have partnered to develop cogeneration power plants at Alcoa's refineries at Pinjarra and Wagerup in WA. The plants will provide power to WA consumers while providing the Alcoa refineries with steam generated from waste heat, allowing some of the older boilers to be decommissioned.

Each cogeneration unit will supply over 140 megawatts of power, enough to provide the power needs of 90,000 households. Energy will be supplied to WA households and businesses directly through the south-west grid.

Cogeneration plants use the by-product heat from the electricity generation process (for example from the exhaust systems of a gas turbine) to produce steam rather than discharging this heat to the atmosphere as hot exhaust gas. This results in much higher energy efficiency as more of the energy from the fuel source is used.

Cogeneration is around 75 per cent energy efficient, compared with 25 to 50 per cent for other power plants operating in WA.

Two cogeneration plants were commissioned at the Pinjarra refinery in 2006. The two plants plus an efficiency upgrade improved the refinery's greenhouse intensity by 8.3 per cent.

In 2005, Alinta announced plans to build the first stage of a 351 megawatt cogeneration unit at Alcoa's Wagerup refinery.

Stage one was commissioned in October 2007. It operates as a peaking power plant supplying power into WA's South West Interconnected System. Stage two will involve conversion to cogeneration. It will be commissioned in the future as the refinery's capacity grows.

Cogeneration plants at the Pinjarra and Wagerup refineries will save up to 1.6 million tonnes of greenhouse gas emissions each year when compared with coal fired electricity generation. This is equivalent to taking 400,000 cars off the road each year.

For more information please visit [www.alcoa.com/global/en/about\\_alcoa/sustainability/env\\_overview.asp](http://www.alcoa.com/global/en/about_alcoa/sustainability/env_overview.asp)

## The environmental benefits of broadband

A study commissioned by Telstra shows the positive impact that can result from the use of telecommunications networks to reduce Australia's greenhouse gas emissions.

The report, *Towards a high-bandwidth, low-carbon future: Telecommunications-based opportunities to reduce greenhouse gas emissions*, was prepared by climate change experts, Climate Risk. According to the report 'telecommunications networks can help reduce Australia's greenhouse gas emissions by almost 5 per cent by 2015 and deliver up to \$6.6 billion a year in savings for Australian businesses and households'.

The Report identifies seven major opportunities for Australian consumers and businesses to reduce or avoid the release of carbon emissions into the atmosphere. Individually, each opportunity could deliver per annum carbon emission savings of:

- 1.8 million tonnes (Mt) by using broadband to remotely manage power for appliances not in use or on "stand-by"
- 2.4Mt by improving business productivity with "in-person" high-definition videoconferencing
- 2.9Mt with broadband based, real-time freight allocation systems to fill empty freight vehicles

- 3.0Mt with presence-detecting services that turn off devices that are "on" but not being used
- 3.1Mt with teleworking and working in regional centres by reducing commuter car traffic
- 3.9Mt by bringing integrated personalised public transport to your door with a phone call
- 10.1Mt by increasing renewable energy use with networked demand-side management.

Dr Turlough Guerin, Telstra's Group Environment Manager said the Report shows that telecommunications has a significant role to play in helping reduce Australia's carbon emissions.

The full report can be accessed at [www.telstra.com.au/abouttelstra/csr/climate\\_change.cfm](http://www.telstra.com.au/abouttelstra/csr/climate_change.cfm)

## Goldman Sachs JBWere now carbon neutral

Goldman  
Sachs

JBWere

Goldman Sachs JBWere recently became the first financial services organisation to be certified carbon neutral under Greenhouse Friendly™.

Goldman Sachs JBWere is a leading Australasian investment banking, financial advisory, securities and investment management firm that services individuals, corporations, governments and institutions worldwide<sup>1</sup>.

The firm launched its environmental policy early in 2007, and in just one year has achieved its goal of becoming carbon neutral.

Craig Drummond, Chief Executive Officer of Goldman Sachs JBWere, said becoming carbon neutral reflects the firm's belief that corporations have an integral role to play in the protection and sustainability of the environment.

Carbon neutrality for an office-based organisation involves much more than just turning off lights and recycling paper. In order to achieve carbon neutrality under Greenhouse Friendly™, a carbon footprint of all upstream, direct and downstream greenhouse gas emissions related to the firm's operations was taken and strategies to reduce, then offset, those emissions were implemented.

As well as in-house energy efficiency measures, the firm invested in Greenhouse Friendly™ accredited emissions reduction projects. These projects have been independently verified, meeting strict requirements, thereby ensuring they result in a net reduction of Australian greenhouse gas emissions.

The firm approached the task with energy and thoroughness, and provides a good example of how large, office-based organisations could go about becoming certified carbon neutral.

For more information go to [www.climatechange.gov.au/greenhousefriendly/index.html](http://www.climatechange.gov.au/greenhousefriendly/index.html)

<sup>1</sup> The scope of the certification does not include Goldman Sachs JBWere's New Zealand operations as the Greenhouse Friendly™ initiative does not have the capacity to include overseas aspects of a business. Goldman Sachs JBWere is undertaking a separate study of its New Zealand operations. The small offices in London and New York have been included in the Greenhouse Friendly™ certification for the sake of completeness and use conservative Australian emission factors.

## Lion Nathan goes Barefoot to reduce greenhouse footprint

Lion Nathan's recently launched premium beer Barefoot Radler is now officially certified Greenhouse Friendly™, making Lion Nathan the first company to offer a Greenhouse Friendly™ certified, greenhouse neutral beverage (alcoholic or otherwise).

To achieve Greenhouse Friendly™ certification Lion Nathan has undergone a rigorous and independent process to work out how much greenhouse gas is produced in making the beer, and how the company could minimise and offset these emissions. Consumers can purchase Barefoot Radler knowing that all greenhouse gas emissions over the life cycle of the product – from the process of growing barley to the fuel used to deliver the product to the retailer – have been offset using certified carbon abatement.

As Australia's first carbon neutral beer, Barefoot Radler provides consumers with a unique greenhouse friendly beverage. It is a full strength beer infused with natural lemon and lime.

Lion Nathan has a long history of actively managing its carbon footprint; it has been a member of Greenhouse Challenge Plus since 1996 and has won numerous awards for greenhouse gas emission abatement. Recently, Lion Nathan achieved Leader membership under the Greenhouse Challenge Plus programme, only the second company to be awarded this status. Lion Nathan has reduced its greenhouse emissions by 16 per cent since 1995 despite an increase in production and the company intends to invest to achieve further significant reductions in emissions.

Not only is Barefoot Radler an excitingly new refreshing product, it's also about treading more lightly on the planet. As the company says, 'Life's Better Barefoot'.

To find out more go to [www.climatechange.gov.au/greenhousefriendly/index](http://www.climatechange.gov.au/greenhousefriendly/index)

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[www.environment.gov.au/index.html](http://www.environment.gov.au/index.html)



LION NATHAN





# 'Trigeneration' at Canberra International Airport



Canberra International Airport will soon have Australia's largest onsite gas trigeneration plants, massively cutting energy use and greenhouse gas emissions.

Canberra International Airport has already developed some of Australia's most sustainable commercial buildings, including Australia's first 5 Green Star rated building, 8 Brindabella Circuit.

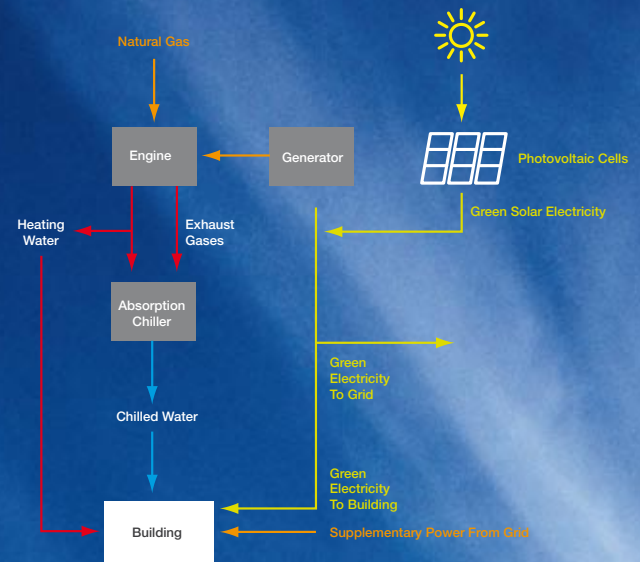
The installation of trigeneration plants in the new Majura Office Precinct and new buildings in Brindabella Business Park, which will dramatically reduce energy use and greenhouse gas emissions, is the next step in the airport's commitment to environmental sustainability. The move will reinforce Majura Office Precinct and Brindabella Business Park's standing as Australia's greenest business parks.

The plants are powered by a natural gas generator which produces green electricity for the buildings. Excess heat, lost as 'fugitive emissions' during the production of electricity in conventional plants, is used to heat the buildings in winter and cool them in summer using state of the art absorption chillers. Trigeneration plants have the potential to produce power surplus which can be sold back to the grid as green electricity.

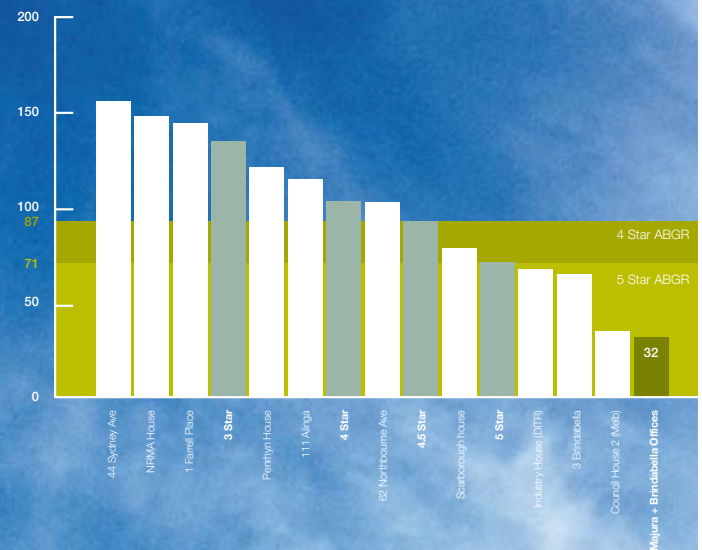
Canberra International Airport has set its sights on far exceeding the highest Australian Building Greenhouse Rating standard and has modelled the new generation buildings to emit around 32 kg greenhouse gas emissions per square meter per year, that's less than half the greenhouse gas emissions of a 5 Star ABGR building and a quarter of the Building Code of Australia requirement.

This means that the buildings are modelled to emit approximately a quarter of greenhouse gas emissions of a conventional building, and to far surpass the Commonwealth Green Lease Requirement of 4.5 Star ABGR.

## Trigeneration



## Carbon dioxide emissions



## Tiny change makes diesel greener



## Greenhouse Friendly™ projects help householders do their bit

Adding trace amounts of the chemical ferrous picrate to diesel fuel can increase energy efficiency and reduce emissions. The technology's efficiency has been validated by many highly respected, independent authorities, including Southwest Research Institute (Texas), the University of Western Australia, UCLA and Brigham Young University.

Cost Effective Maintenance (CEM) is a supplier of greenhouse gas reduction technologies, and works with large diesel users such as the mining industry to reduce their energy and greenhouse emissions footprint.

CEM and the Australian manufacturer of the ferrous picrate technology (FTC), Fuel Technology Pty Ltd, have tested the technology on the large trucks used in the mining industry. The trucks used in the test haul material over a set route that is repeated without change, so that their fuel use data are stable and repeatable. Using the adapted SAE

Type II Truck Test protocol, CEM and Fuel Technology showed efficiency gains of 5 to 9 per cent due to adding ferrous picrate, with 95 per cent confidence.

BHP Billiton's Mount Keith Operations in Western Australia is one mine to have validated and implemented the ferrous picrate technology. Business Improvement Manager, Tim Riley concluded that the SAE Type II Truck Test protocol adapted by CEM and Fuel Technology was by far the most acceptable method for measuring energy efficiency changes in mine mobile plant.

The graph below shows the cuts in CO<sub>2</sub> emissions per unit of production during the first 12 months of ferrous picrate use in a Queensland mining fleet.

Other work under way by CEM includes using a lubricant assistant to improve hydraulic response and performance in equipment such as excavators, shovels and loaders, and using a fuel lubricant to reduce frictional horsepower losses. The company describes energy efficiency gains demonstrated to date as 'very encouraging'.

Member businesses can have their carbon neutral products and services certified Greenhouse Friendly™, and also invest in projects that reduce emissions.

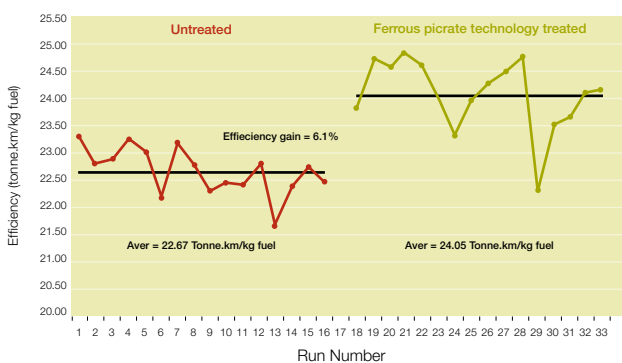
Lighting and hot water are two of the main drains on household energy use. Australian companies Low Energy Supplies and Services (LESS), EnergyAustralia, Fieldforce Services and Origin Energy have all achieved Greenhouse Friendly™ approval for projects that reduce household energy use in these areas, through compact fluorescent lighting or water efficient, low flow showerheads.

The projects deliver greenhouse abatement by reducing emissions, either:

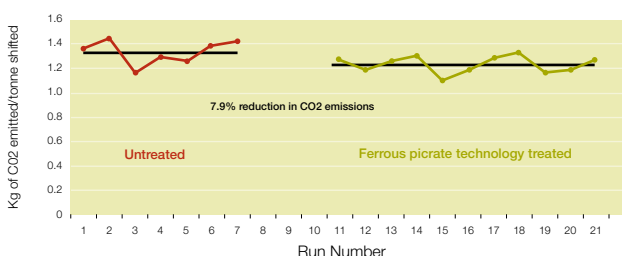
- by replacing incandescent lighting with energy efficient compact fluorescent lights that provide the same level of lighting; or
- by installing low flow showerheads that use less hot water thus reducing energy used to heat water.

In return for free compact fluorescent lights or low flow showerheads, household recipients assign ownership of the greenhouse abatement from the products to the project proponents. Once the quantity of carbon abatement is independently verified and then approved by the Greenhouse Friendly™ the project

Caterpillar 793 rear dump truck



reduced greenhouse gas emissions per unit of







Australian Government  
Department of Climate Change



The Greenhouse Friendly™ initiative is a partnership between the Australian Government and industry to help reduce Australia's greenhouse gas emissions.



proponents are able to sell the approved abatement to the market.

Greenhouse Friendly™ has strict criteria for creating and selling greenhouse gas abatement. To be eligible, all abatement must be extra, thus ensuring that it makes a real contribution to a net reduction in Australia's greenhouse gas emissions.

These energy efficiency projects join a host of other Greenhouse Friendly™ approved abatement projects that cover areas such as waste diversion, recycling and forestry. For further information on Greenhouse Friendly™ go to [www.greenhouse.gov.au/greenhousefriendly](http://www.greenhouse.gov.au/greenhousefriendly)

### Low Energy Supplies and Services Pty Ltd (LESS)

Australian-based energy efficiency company LESS has achieved approval as an Greenhouse Friendly™ abatement provider with its *Live Green with LESS* project. The project provides free compact fluorescent light bulbs to households across the country.

LESS's Chief Executive Officer, Keith Tracey, said the environmental services company, founded in 2001, has been successful in creating and delivering energy efficiency and demand management

programs nationally.

'Compact fluorescent bulbs use substantially less energy than standard incandescent bulbs. *The Live Green with LESS* project not only results in a reduction of greenhouse gases emitted and helps save on power bills, but also contributes to educating householders as to what they can do to make their homes more energy efficient,' Mr Tracey said.

### EnergyAustralia

EnergyAustralia, an Australian energy supplier with involvement in energy efficiency projects, has so far given away approximately 64,000 compact fluorescent lighting packs, each pack containing six bulbs. These giveaways have assisted Queensland residents to save money, energy and the environment.

Replacing incandescent lamps with compact fluorescent bulbs is expected to deliver combined savings of up to \$32 million to householders on their electricity costs over the life of the light bulbs.

EnergyAustralia's Executive General Manager Retail, Mike Bailey, said the company provides ongoing energy and greenhouse gas saving options.

'By participating in the Greenhouse Friendly™ scheme we can be confident

that the abatement from our energy efficiency programmes represents real and measurable greenhouse gas reductions,' Mr Bailey said. 'We chose this project because it was a simple and practical way for people to be more energy efficient in their homes and, at the same time, to make a difference to the environment.'

### Fieldforce Services Pty Ltd

Fieldforce Services Pty Ltd supplies environmental and demand management services throughout Australia. The company provides water, energy and conservation services to clients in the electricity, gas and water industries, as well as local government authorities, corporations, and the private residential sector.

Fieldforce Services' *Enviro Saver* project consists of compact fluorescent lighting and low flow showerhead giveaways and installation. The project will cover Victoria, Queensland, New South Wales, the Australian Capital Territory, South Australia and Western Australia.

Fieldforce Services Pty Ltd expects to reduce greenhouse gas emissions by approximately 24.1 million tonnes over the life of the project. The company will also provide advice on water

and energy saving products.

'The *Enviro Saver* project will help householders save money and the environment by making it easy to change the things they do every day which result in greenhouse gas emissions. And Fieldforce provides this assistance to householders for free!' said Craig Bathie, Managing Director of Fieldforce Services.

### Origin Energy

Energy retailer and generator Origin Energy plans to give away compact fluorescent light bulbs to Victorian, South Australian and Queensland households. Energy efficient compact fluorescent lighting packs will be distributed at giveaway events and to retail customers through mail order campaigns.

Mary Whyte, Origin Energy's Carbon Markets Analyst, explained that Origin aims to reduce greenhouse gas emissions by 1.1 million tonnes over the life of the project.

'Energy efficient lights are up to five times more efficient than commonly used globes,' said Ms Whyte. 'Through our initiative we can help householders reduce energy use to not only save on electricity bills but also reduce the impact of greenhouse gas emissions on the environment.'



LIVEGREEN  
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LESS



# Use of hydrogen to supply electricity and heat for steam production at a chlor-alkali plant.



## Project aims

- Conduct an energy audit of the plant to identify the magnitude of energy usage and wastage
- Investigate the use of hydrogen currently vented to the atmosphere to reduce energy use and hence reduce carbon dioxide gas emissions
- Investigate other possible energy saving and efficiency improvement measures that could be implemented at the plant
- Report on the findings of the investigation.

## Brief company profile

- The Chlor-alkali plant of Orica, located in Laverton, Victoria, is one of the major producers of chlorine and caustic soda in Australia
- Orica has joined the Australian Government's Greenhouse Challenge program with the aim of reducing their greenhouse gas emission.

## Emission reduction measures investigated

- Use of currently-vented hydrogen gas for zero-emission on-site electricity generation using a PEM fuel cell
- Use of vented hydrogen gas for zero-emission on-site electricity generation using a gas turbine generator

- Use of vented hydrogen gas for boiler firing
- Optimisation of the cooling tower outlet water temperature and refrigeration plant efficiency
- Insulation of heat exchanger
- Insulation of a boiler economiser
- Use of hydrogen to supply electricity and heat for steam production at a chlor-alkali plant.

## Method

- Conduct a plant energy audit
- Identify best areas for emission reduction
- Investigate options for the reduction of grid-electricity and natural gas consumption.
- Evaluate emission reduction and economic benefits of the preferred options.

## Potential emission reduction

- A Nedstack PEM fuel cell (1.5 MW) would yield a reduction in carbon dioxide emissions of around 16 000 tonnes per year or 15% of the plant's total emissions
- A hydrogen gas turbine generator would give a reduction in carbon dioxide emissions of 11 000 tonnes per year

- A boiler economiser and heat exchanger insulation combined could reduce emissions by 18 tonnes per year.

## Financial payback/net benefits

### PEM fuel cell:

- The Nedstack PEM fuel cell would cost with in the order of \$3 million, and would reduce yearly electricity costs by over \$500 000 based on the current electricity cost
- Simple payback period is less than 6 years.

### Gas turbine generator:

- Capital investment on a Pratt and Whitney gas turbine generator would be \$1.55 million
- The electricity cost would be reduced by nearly \$300 000 per year
- Payback period is less than 6 years

### Boiler economiser and heat exchanger insulation:

- Total investment on economiser and insulation would be around \$43 000
- Total saving would be \$10 500
- Payback period is 4 years.

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