



WATER SERVICES ASSOCIATION
OF AUSTRALIA

Energy and Greenhouse Mitigation Strategies

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Overview of WSAA

The Water Services Association (WSAA) is the peak body of the Australian urban water industry. Its 30 members and 27 associate members provide water and sewerage services to approximately 15 million Australians and to many of our largest industrial and commercial enterprises.

WSAA was formed in 1995 to provide a forum for debate on issues important to the urban water industry and to be a focal point for communicating the industry's views. WSAA encourages the exchange of information and cooperation between its members so that the industry has a culture of continuous improvement and is always receptive to new ideas.

The functions of WSAA are:

- be the voice of the urban industry at the national and international level and represent the industry in the development of national water policy,
- facilitate the exchange of information and communication within the industry,
- undertake research of national importance to the Australian urban water industry and coordinate key national research for the industry,
- develop benchmarking and improvement activities to facilitate the development and improved productivity of the industry,
- develop national codes of practice for water and sewerage systems,
- assess new products relating to water, sewerage and trade waste systems on behalf of the water industry,
- jointly oversee the Smart Approved Watermark Scheme for products and services involved in conserving water use
- coordinate annual metric benchmarking of the industry and publish the National Performance Framework with the Federal and State Governments.

Foreword

The water industry is one of the first industries to be impacted by climate change as runoff is the first casualty of a changing and drying climate. Of course it is self evident that runoff is the raw product for the water industry.

The new sources of water such as desalination and water recycling being developed to mitigate the impacts of climate change are far more energy intensive than traditional sources of water such as a dam in the hills behind a city.

The urban water industry is a major consumer of electrical energy and it is imperative that the industry understand the relationship between energy consumption and greenhouse gas emissions. It is looking for ways to reduce energy use and options for generating green energy from sources such as bio gas.

This occasional paper summarises the outcomes of a workshop where experts from urban water utilities across Australia agreed on approaches for accounting for energy use and greenhouse gas emissions so that the industry was adopting a consistent approach which is in line with the expectations from the Australian Greenhouse Office.

The workshop also facilitated an exchange of information on the range of measures being adopted by urban water utilities to mitigate greenhouse gas emissions and develop greenhouse neutral sources of energy from water and wastewater systems.

It is imperative that the urban water industry is proactive in this area given the community concerns over climate change and increasing greenhouse gas emissions.

Ross Young, Executive Director, WSAA

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Executive Summary

For some time WSAA members have been aware of community concerns about greenhouse gas emissions and potential impacts on the environment. Members are incorporating measurement systems for these emissions and developing strategies to mitigate emissions. Net greenhouse emissions are also an indicator for reporting in the National Performance Framework. In September 2007 the Federal Government introduced legislation requiring mandatory reporting of emissions from 1 July 2008.

A number of WSAA members are already very active in emission mitigation strategies via the use of energy use demand management, the use of renewables, the use of offsets and the incorporation of decision systems that are designed to deliver more sustainable outcomes.

Both Federal and State Governments have also introduced various programs to encourage mitigation of emissions. These include the Greenhouse Challenge Plus programs and the mandatory renewable energy trading systems. An Emissions Trading Scheme, intended for commencement in 2010, is currently undergoing public consultation.

The Greenhouse gas offsets market is also flourishing; however there are a number of “traps” for novice players due to the lack of formal accreditation systems.

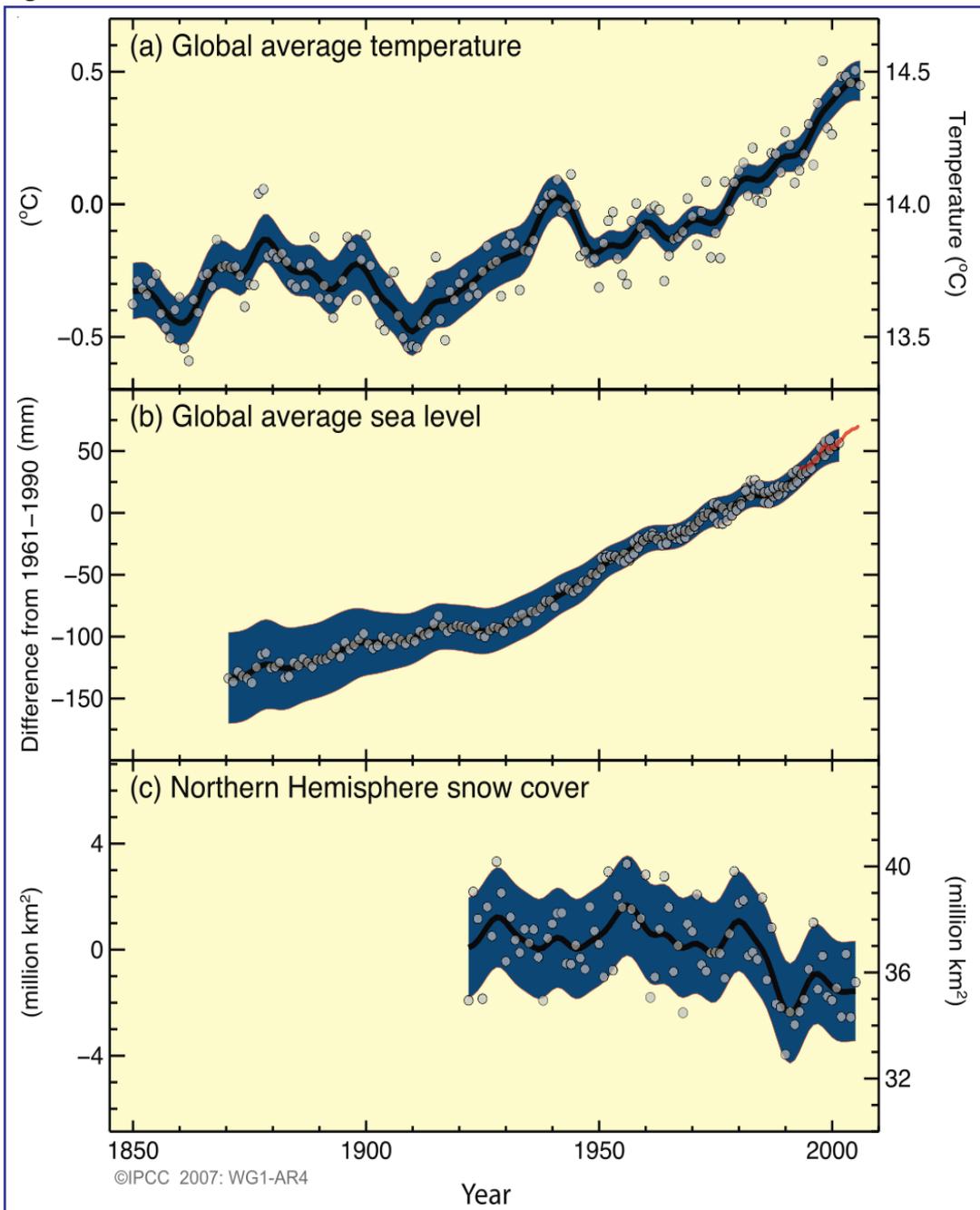
The report is in two parts covering:

1. An overview of federal and state government requirements and programs to assist mitigation of greenhouse emissions
2. A description of strategies either in use or being developed by WSAA members to mitigate greenhouse emissions

1 Climate Change Science

Warming of the climate system is indisputable, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global mean sea level (see Figure 1 below).

Figure 1: Climate Trends



Source: Intergovernmental Panel on Climate Change, Summary for Policymakers, Contribution of Working Group I to the Fourth Assessment Report, February, 2007

1 Climate Change Science

Continued

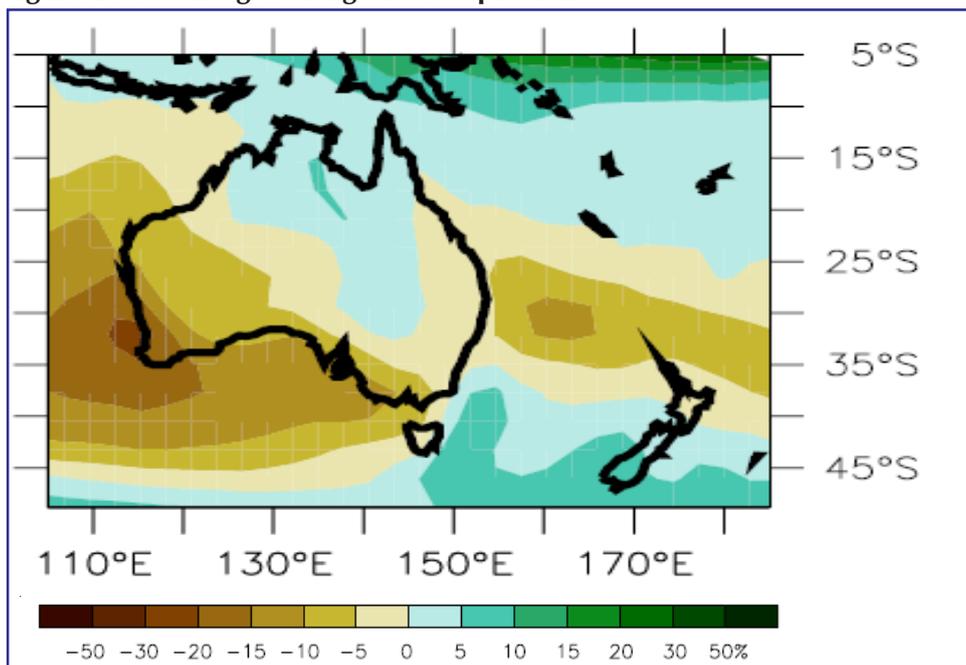
The IPCC now state with high confidence (80-90% chance) that Australia will suffer the following climate change impacts:

- As a result of reduced precipitation and increased evaporation, water security problems are projected to intensify by 2030 in southern and eastern Australia.
- Significant loss of biodiversity is projected to occur by 2020 in some ecologically-rich sites including the Great Barrier Reef and Queensland Wet Tropics. Other sites at risk include Kakadu wetlands, southwest Australia, sub-Antarctic islands and the alpine areas. Ongoing coastal development and population growth in areas such as Cairns and Southeast Queensland are projected to exacerbate risks from sea-level rise and increases in the severity and frequency of storms and coastal flooding by 2050.

- Production from agriculture and forestry by 2030 is projected to decline over much of southern and eastern Australia due to increased drought and fire.
- The region has substantial adaptive capacity due to well-developed economies and scientific and technical capabilities, but there are considerable constraints to implementation and major challenges from changes in extreme events. Natural systems have limited adaptive capacity.

Figure 2¹ is the modelled percentage change in the annual mean precipitation response in Australia and New Zealand precipitation. The change in precipitation is from the years 1980-1999 to 2080-2099, brown indicates a reduction in precipitation and green an increase.

Figure 2: Percentage Change in Precipitation



Source: IPCC

¹ Source: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. The modelling is from the A1B scenario of the IPCC.

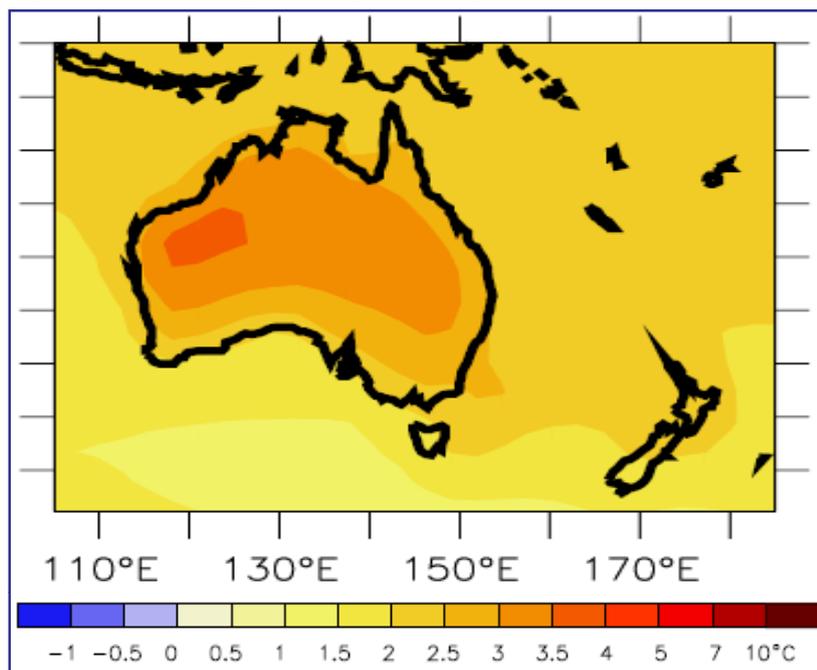
1 Climate Change Science *Continued*

Shown in Figure 3 is the modelled² change in annual mean temperature response in Australia and New Zealand. It shows the forecast temperature change from the years 1980-1999 to 2080-2099.

Precipitation is generally considered to be more difficult to project with higher confidence than temperature, but for a few regions the IPCC Working Group 1 found that over 90% of models agreed on the sign of precipitation changes. Mediterranean climates, like south-eastern Australia, are likely to suffer decreased precipitation combined with higher temperatures.

In conclusion, the modeled impacts of climate change present a high risk for water utilities as the key impacts are water shortages, heat waves and bush fires; all of which impact water supply.

Figure 3: Percentage Change in Temperature



Source: IPCC

² Source: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. The modelling is from the A1B scenario of the IPCC.

2 Reporting Schemes

The water services industry is impacted by greenhouse gas and energy management schemes currently in place or planned for Australia. The following sections provide a summary of each scheme, plus a risk and opportunity overview for organisations in the water services industry.

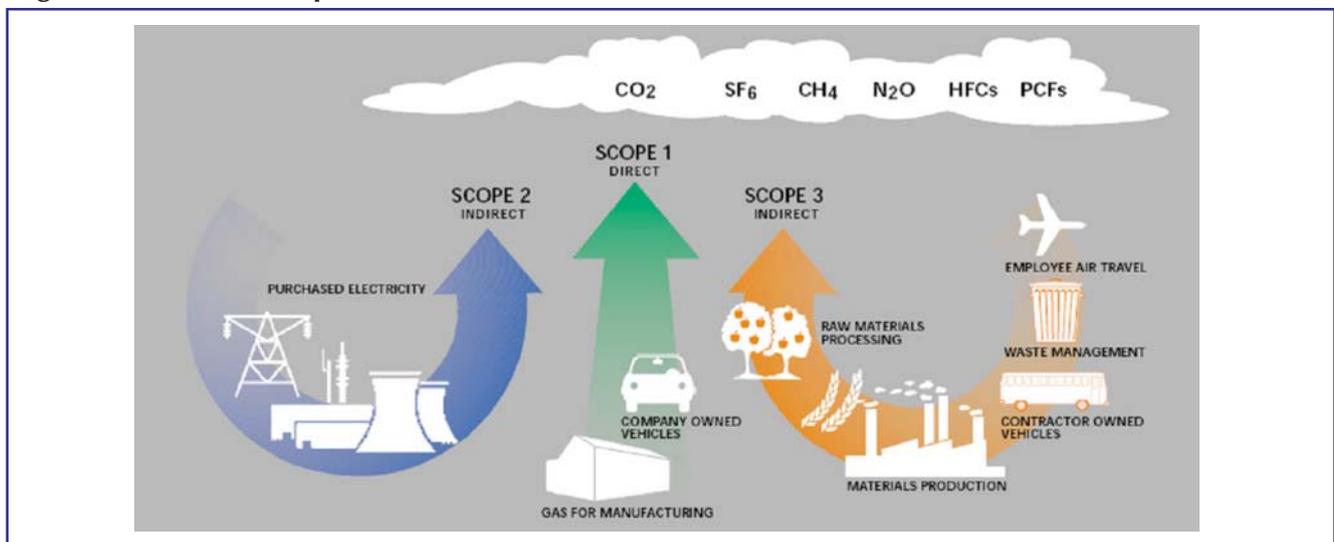
2.1 Definitions of emission sources

As a first step in greenhouse gas reporting, a company should identify and report direct emission sources from its operations, and indirect emission sources from the consumption of purchased energy such as electricity. The Greenhouse Gas Protocol (Revised Version, 2004) defines direct emissions as 'Scope 1', and emissions from the generation of purchased energy consumed as 'Scope 2'. 'Scope 3' indirect emissions result from an organisation's upstream and downstream activities as well as emissions from outsourced/contract manufacturing or leases not included in Scope 1 and 2 as set out in Figure 4.

The six greenhouse gases listed are those covered in the Kyoto Protocol, namely:

- Carbon dioxide (CO₂)
- Methane (CH₄)
- Nitrous oxide (N₂O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulphur hexafluoride (SF₆)

Figure 4: Emissions Scope Definition



Source: New Zealand Business Council for Sustainable Development

The Greenhouse Gas Protocol definitions are used by many of the programs outlined in the following sections.

2.2 Greenhouse challenge plus

Greenhouse Challenge Plus (GC+) is a national greenhouse emissions reporting program, run by the Department of Climate Change. Its purpose is to provide the framework and assessment tools necessary to assist companies mitigate greenhouse emissions. The scheme superseded the Greenhouse Challenge program in 2005. The program follows the accounting guidelines established by the Greenhouse Gas Protocol.

Participation is mandatory for companies claiming diesel excise credits in excess of \$3 million per annum (mostly mine and transport operations). For all other companies, this is a voluntary program.

Reporting Requirements:

Participation in the Greenhouse Challenge Plus program requires development of a Co-operative Agreement with the government, including an emissions inventory and action plan of proposed abatement actions and related timeline.

The programme covers all emissions of greenhouse gases, including those from stationary energy use (electricity, LPG, fuel oil etc), transport energy use (diesel, petrol etc), and process emissions (such as methane emitted from wastewater treatment). All members are required to report scope 1, 2 and selected scope 3 emissions.

2 Reporting Schemes *Continued*

Activity data such as electricity purchased is converted into units of CO₂-e using the standard Australian emissions factors from the AGO Factors & Methods Workbook³.

Abatement actions must also be reported and include all measurable and verifiable internal emission reductions. Examples include the installation of energy efficient equipment, mini-hydro installations and new forestry plantations greater than 0.2 hectares in size.

Offsets ⁴

Purchased offsets that have been generated in Australia can be subtracted from the member's gross emissions inventory. Offsets that are independently verifiable and eligible to be subtracted include:

- Greenhouse Friendly™ verified abatement
- Renewable Energy Certificates (RECs) retired in the REC registry and not used to meet the Mandatory Renewable Energy Target
- NGACs retired in the NGAC registry and not used under the NSW GHG Abatement Scheme
- Kyoto compliant forest sinks that are outside the company's operational control (forest sinks inside the company are reported as an abatement action).

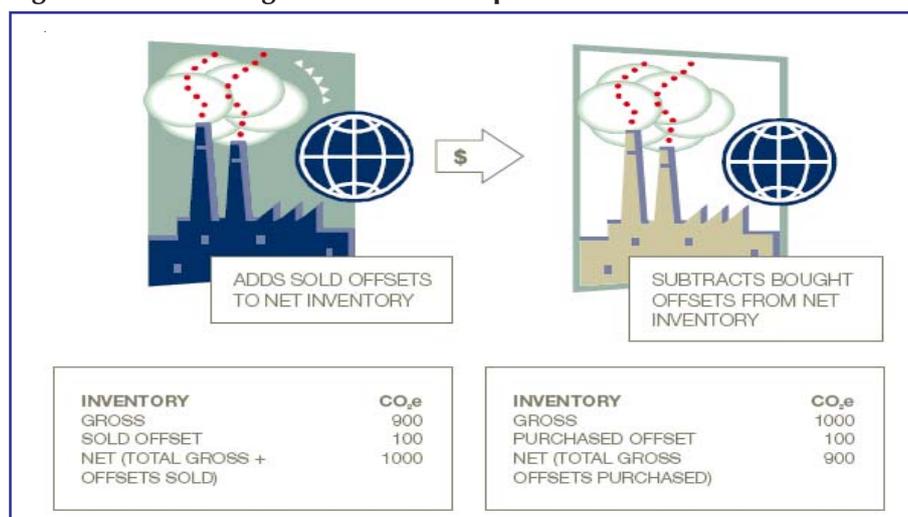
The Greenhouse Challenge Plus Team must approve any additional Australian offsets a member has purchased and wants subtracted from their gross inventory.

Purchased offsets must be recorded against the relevant area of the member's inventory. For example, record renewable energy purchases (such as RECs) against stationary energy consumption. RECs must be converted to the equivalent CO₂ emission saving using the relevant States' emission factor for electricity before being deducted from the member's inventory. The emission factor to use for where REC is being used, not where the REC was generated (although this approach fails to deal with differing emissions factors and transmission losses)..

Sold offsets should be reported under this category, and are added to the member's gross inventory. For example, if a member sells Greenhouse Friendly™ offsets, NGACs or RECs, they must add the emissions sold, back to their inventory because the abatement rights have been transferred to the buyer. This provision is in place to avoid double counting of abatement with those who have purchased the offsets.

This is illustrated in Figure 5.

Figure 5: Accounting for the sale and purchase of offsets



Source: Greenhouse Challenge Plus Reporting Guidelines January 2007

³ The latest workbook can be found at <http://www.greenhouse.gov.au/workbook/index.html>

⁴ This section is taken directly from the Greenhouse Challenge Plus Reporting Guidelines, January 2007 edition.

2 Reporting Schemes

Continued

Water Businesses Opportunities/Risks

The Greenhouse Challenge Plus program provides a systematic methodology for accounting for greenhouse gas emissions and identifying areas to focus on for reductions. This has been successful in helping organisations proactively manage their full carbon footprint. As it is a voluntary program, there is minimal risk in participating and it is a good testing ground for the development of internal policies and procedures for data gathering. Water utilities already participating include:

- Coliban Water
- Hobart Water
- Melbourne Water
- Power and Water
- SA Water
- Water Corporation
- Yarra Valley Water Ltd

Links to further information:

- The Greenhouse Challenge plus home page includes information on the latest industry guidelines and case studies.

<http://www.greenhouse.gov.au/challenge/>

- Most recent list of members:

<http://www.greenhouse.gov.au/challenge/members/membernet.html>

2.3 Energy Efficiency Opportunities Act

The Energy Efficiency Opportunities (EEO) Act was passed in 2006, and is a national scheme run by the Department of Resources Energy & Tourism (DRET). It aims to improve the identification and evaluation of energy efficiency opportunities by large energy using businesses and, as a result, to encourage implementation of cost effective energy efficiency opportunities. Participation is mandatory for organisations using 0.5

PJ or more total energy per annum, excluding power generation activities.

The 0.5PJ threshold equates to approximately (depending on prices):

- \$5 - 10 million on electricity,
- \$1.5 - 2.5 million on gas OR
- \$11 - 13 million on diesel.

EEO requirements are the obligation of the entity that pays for the energy.

Requirements:

- The focus is on identification of energy savings and efficiency opportunities with a payback period of up to four years. Business practices must be in place to manage energy use and there will be external audits to ensure these systems exist. To ensure that uniform and robust data gathering and analysis procedures are applied by all participants, the assessment framework provides prescriptive detail on the key requirements of six elements: leadership, people, information, data & analysis, opportunity identification & evaluation, decision making and communicating outcomes.
- An assessment plan and assessment and reporting schedule was due by December 31 2007 and needed to include details such as corporate structure, current energy use and savings data, and assessment and reporting schedule.
- Public reporting must commence by 31st December 2008, followed by annual progress updates.
- The programme addresses all energy use including stationary energy use (electricity, LPG, fuel oil etc) and transport energy use (diesel, petrol etc).

Water Businesses Opportunities/Risks

The EEO program can be used by water businesses as a driver to implement an energy management and reporting system based on a continuous improvement process. The key point to note for EEO action in the short term is that as action is not mandatory under the EEO program, there exists the potential to create carbon abatement from projects identified during the assessments under the Greenhouse Friendly™ program (Section 3.8). There is a proposal to use the Greenhouse Friendly program as the mechanism for recognising early action abatement prior to the commencement of the Australian Emissions Trading Scheme (Section 3.1). The

2 Reporting Schemes *Continued*

NGAC program (Section 3.4) does not have this additionality requirement so EEO projects in NSW may potentially create NGACs.

Projects identified under the EEO program that reduce emissions by 2,000 tonnes CO₂-e or more per year are potentially viable as abatement projects, taking cost of accreditation into account.

Some of the larger water utilities have registered under EEO. These include Brisbane Water (as part of Brisbane City Council), Melbourne Water, SA Water, Sydney Catchment Authority, Sydney Water and Water Corporation. Water utilities planning desalination projects may discover that the associated electricity consumption puts them over the EEO threshold.

Links to further information:

The Energy efficiency opportunities homepage.

<http://www.energyefficiencyopportunities.gov.au>

2.4 National greenhouse gas and energy reporting

The Commonwealth Government passed the National Greenhouse and Energy Reporting Act, in September, 2007. The purpose of the legislation is to provide for the reporting and dissemination of information related to greenhouse gas emissions, greenhouse gas projects, energy production, energy consumption, and is a precursor to establishing the Australian Emissions Trading Scheme.

The system will be in place by July 2008 with the first reporting period the 2008/2009 financial year. Reporting will be managed through a system based on the Australian Government's Online System for Comprehensive Activity Reporting, developed for the Greenhouse Challenge Plus programme.

The thresholds for reporting may be triggered in three ways: direct emissions levels; total energy produced; or total energy consumed.

(a) Company threshold

- Year 1: 125,000t CO₂-e gross direct emissions or 500 TJ energy produced or consumed
- Year 2: 87,500t CO₂-e or 350 TJ of energy produced or consumed
- Year 3 and subsequently: 50,000t CO₂-e or 200 TJ of energy produced or consumed

(b) Facility threshold of 25 kt CO₂-e or 100 TJ (from year 1).

A facility is defined as a single physical area (or in the special case of some mining and mineral processing activities, a series of physical areas within a single production process) containing buildings, machinery, plant, appliances, equipment, implements, tools or other items that use energy and/or produce greenhouse gas emissions, and has a single ANZSIC classification.

There is also reporting relating to greenhouse gas projects:

- Reduction of greenhouse gas emissions; and
- Removals of greenhouse gases; and
- Offsets of greenhouse gas emission.

A greenhouse gas project is an activity or series of activities designed to remove or reduce the emissions of greenhouse gases. The regulations will specify more detail.

Further consultation with stakeholders about the new regulations will be held later in 2007.

Links to further information:

Further information on mandatory reporting scheme
<http://www.greenhouse.gov.au/reporting/index.html>

3 Trading Schemes

3.1 Australian Emissions Trading Scheme (AETS)

Five tests for an emissions trading scheme⁵

The Australian Government is establishing an emissions trading scheme as part of an effective framework for meeting the climate change challenge. Work is progressing with the development of a national emissions trading scheme starting no later than 2010 with the detailed design finalised by the end of 2008.

The Australian Government has outlined five tests for an emissions trading scheme (ETS):

First, an effective emissions trading scheme must be a cap and trade scheme to be internationally consistent.

- A cap and trade approach is the most widely used scheme design, in which total emissions are 'capped', permits allocated up to the cap, and trading allowed to let the market find the cheapest way to meet any necessary emission reductions. The Kyoto Protocol and the European Union emissions trading scheme are both based on this approach.

Second, an effective emissions trading scheme must effectively reduce emissions.

- Such a scheme must stop further growth in Australia's emissions and set Australia on a path to reduce emissions by 60 per cent by 2050 - the minimum required to avoid dangerous levels of climate change.

Third, an effective emissions trading scheme must be economically responsible.

- Such a scheme must provide the right incentives to drive investment in low emission technologies and renewable energy while keeping the total cost as low as possible.
- In taking the lead before an effective international agreement is in place, it is also vitally important that a domestic scheme does not undermine Australia's competitiveness and provides mechanisms to ensure that Australian operations of energy-intensive trade-exposed firms are not disadvantaged.
- A scheme will also need to be complemented by measures like a Mandatory Renewable Energy Target to encourage the domestic development and use of new technologies.

⁵ This section is taken directly from the Department of Climate Change website.

⁶ Source: The Garnaut Climate Change Review website

Fourth, an effective emissions trading scheme must be fair.

- An effective scheme must allow both the costs and the benefits to be shared across the community. This means additional complementary policies to make homes more efficient and comfortable while saving money on energy bills.

Fifth, an effective emissions trading scheme must recognise the need to act now.

- A scheme needs to commence as soon as possible to minimise the costs of inaction because economic modelling clearly shows that early action is far less costly than delayed action.
- Work should progress on developing a national emissions trading scheme starting no later than 2010 with the detailed design finalised by the end of 2008. Meeting each of these tests will provide for an effective emissions trading scheme.

Early Abatement Incentives

The Early Action - Abatement Incentives discussion paper addressed incentives for firms to pursue abatement in the period leading up to the commencement of emissions trading, including proposals for:

- Arrangements to ensure firms are not disadvantaged in their permit allocations for undertaking new abatement prior to the emissions trading start date;
- Defining 'existing assets' eligible for compensation for disproportionate loss; and
- Providing incentives for new, additional abatement prior to the commencement of the emissions trading scheme.

Design of the emissions trading scheme

Key to the design of an emissions trading scheme is the level at which the cap is set. The Government has indicated it will use recommendations arising from the release of the Garnaut review in June 2008. A summary of the review and the process by which it is being developed is provided below.

Garnaut review⁶

The Garnaut Climate Change Review is an independent study by Professor Ross Garnaut, commissioned by Australia's State and Territory Governments on 30 April 2007. The recently elected Prime Minister of Australia has confirmed the participation of the Commonwealth Government in the Review.

3 Trading Schemes

Continued

The Review will examine the impacts of climate change on the Australian economy, and recommend medium to long-term policies and policy frameworks to improve the prospects for sustainable prosperity.

The Review's final report is due on 30 September 2008, with a draft by 30 June 2008. A number of forums will also be held around Australia to engage the public on various issues relating to the Review.

Links to further information:

- Emissions trading
<http://www.climatechange.gov.au/emissionstrading/index.html>
- The Garnaut Climate Change Review
<http://www.garnautreview.org.au/CA25734E0016A131/pages/home>
- Early Action - Abatement incentives discussion paper prior to the commencement of the Australian Emissions Trading Scheme
<http://www.pmc.gov.au/consultation/emissions/index.cfm>

3.2 Mandatory Renewable Energy Target Scheme

The legislation was introduced in 2001, and is administered by the Office of the Renewable Energy Regulator (ORER) within the Environment and Water Resources portfolio to encourage additional renewable energy into the various state electricity grids. Participation is mandatory for all large wholesale electricity buyers.

The Renewable Energy (Electricity) Act 2000 requires the generation of 9,500 gigawatt hours of extra (above 1997 baseline levels) renewable electricity per year by 2010. This target level is to remain constant from 2010 until 2020, at which time the program will cease.

The newly elected Government has however set the goal of a 20% share for renewable energy in Australia's electricity supply by 2020. Accordingly, the Government has committed to increasing the mandatory renewable energy target (MRET) from 9,500 gigawatt-hours to 45,000 gigawatt-hours in 2020. It is intended that the expanded measure will be phased out between 2020 and 2030 (as emissions trading matures and prices become sufficient to ensure that an MRET is no longer required to drive deployment of renewable generation technologies).

At the Council of Australian Governments (COAG) meeting in December 2007, the Commonwealth and States agreed to work cooperatively, commencing early in 2008, to bring the existing MRET and the various state-based targets into a single, expanded national MRET scheme by early 2009. An implementation plan and interim report on progress is to be put to COAG at its March 2008 meeting. The final design is to be provided to COAG for consideration at its September 2008 meeting.

Tradable instrument

The tradable instrument is the Renewable Energy Certificate (REC), which must be certified and registered. Each REC represents one megawatt hour (MWh) of eligible renewable electricity.

Key dates and requirements:

Participants must surrender a number of registered RECs between 1 January and 14 February each year in the REC registry. The number of RECs required is determined by the total amount of liable purchases of electricity multiplied by the relevant Renewable Power Percentage (RPP) for the year, as specified in the Regulations for each year (eg. The RPP for 2008 is 3.14%).

The process of REC creation is similar to that of NGAC creation:

- Abatement project registration application and supporting documentation is submitted to the Office of the Renewable Energy Regulator (ORER).
- ORER determines eligibility and assigns a production baseline to generation that was built before 1 Jan 1997. As the scheme is designed to only allow RECs to be created for new investment in renewable energy, existing power stations must increase their efficiency or total production in order to be eligible create RECs. They can create RECs for any output they generate over their assigned baseline. New generation built after 1997 has a baseline of zero.
- Once a project is approved it can create RECs at any time after the generation has taken place.
- Each REC generator must submit an annual report to ORER for auditing.

Forward prices began to surge in the market around October/November 2007, following speculation that a change of government would lead to an increased target. Following the election win and the commitment to the new 20% target, the spot price too has moved to record highs in recent months. (Please see the REC spot price history in Figure 6).

3 Trading Schemes

Continued

Figure 6: REC Spot Price History



Water Businesses Opportunities/Risks

The following water businesses have already participated in the REC program through renewable energy projects such as hydro-electricity generation and cogeneration at sewage treatment plants:

- Burnett Water
- Sun Water
- Melbourne Water
- Sydney Water
- Power and Water
- The Caloundra-Maroochy Water Supply Board
- Rous County Council - Rous Water
- Veolia Water
- Brisbane Water
- Water Corporation

As a consequence of the expansion of the MRET, further opportunities exist in new installations and upgrades of existing systems.

It is worth noting that installations of mini-hydros that replace pressure reduction valves will not be eligible for RECs if pumping has been used to create the pressure. Similarly generation from a dam that receives water due to pumping is not likely to be eligible for RECs. In these instances the generators may still be eligible for GreenPower (see section below).

Links to further information:

- Information on updates to the Mandatory Renewable Energy Target:
<http://www.greenhouse.gov.au/markets/mret/>
- The Office of Renewable Energy Regulator homepage:
<http://www.orer.gov.au/index.html>
- The REC registry site contains registers of registered persons, accredited power stations, Renewable Energy Certificates (RECs), and applications for accredited power stations:
<https://www.rec-registry.gov.au/>

It should be noted that, in general, renewable energy installations created by water utilities and used to power utility installations can claim greenhouse gas offsets provided the renewable energy certificate is held by the utility (or at least not on-sold to a third party). An example of this is legal advice received by Melbourne Water where at Eastern Treatment Plant, renewable energy is generated from biogas. Provided Melbourne Water retains the Victorian Renewable Energy Certificates (VRET) generated, greenhouse emissions generated due to power use at the site can be lowered by the VRET offset amount.

However, this can be a very complex area depending on contractual arrangements with power companies and before utilities net out greenhouse emissions from these sources, written advice should be sought from the Australian Greenhouse Office.

3 Trading Schemes *Continued*

3.3 Greenpower

GreenPower is a voluntary program of nationally accredited renewable energy available to end-users. Electricity users may elect to purchase any amount of GreenPower to replace some or all of the power supplied from conventional sources. A retailer must have purchased renewable energy from an accredited generation project for each MWh of GreenPower purchased by a retail customer.

Some GreenPower products only contain a percentage of GreenPower. The minimum required under the program rules is 10%.

3.3.1 Forecast Price Ranges

The forecast price range for GreenPower is shown in Figure 7. The top of the range indicates the marginal cost of new wind power in Australia.

GreenPower prices have increased \$20/MWh over the past 12 months throughout Australia due to a recovery in the REC market. An increase in demand for GreenPower is one of the reasons for this price recovery, as is the introduction of renewable energy targets in both Victoria and NSW, and the announcement of the Clean Energy Target at Federal level.

Water Businesses Opportunities/Risks

Some water utilities already participate as suppliers of GreenPower from hydro or sewage methane generation.

For water utilities that sell GreenPower generation already, there may be a different way of maximising GreenPower revenue. Many of these water utilities already purchase a portion of their electricity as GreenPower. Retailers currently sell Green Power at a \$10 to \$15/MWh premium over what they pay generators. By bypassing the retailer and registering to self-supply GreenPower, water businesses can save approximately \$10-15/MWh on GreenPower costs⁷.

Water businesses can become accredited GreenPower Product Providers and sell the output from generators directly to end users such as themselves. This enables utilities to become their own GreenPower Provider and avoid purchasing GreenPower through a retailer.

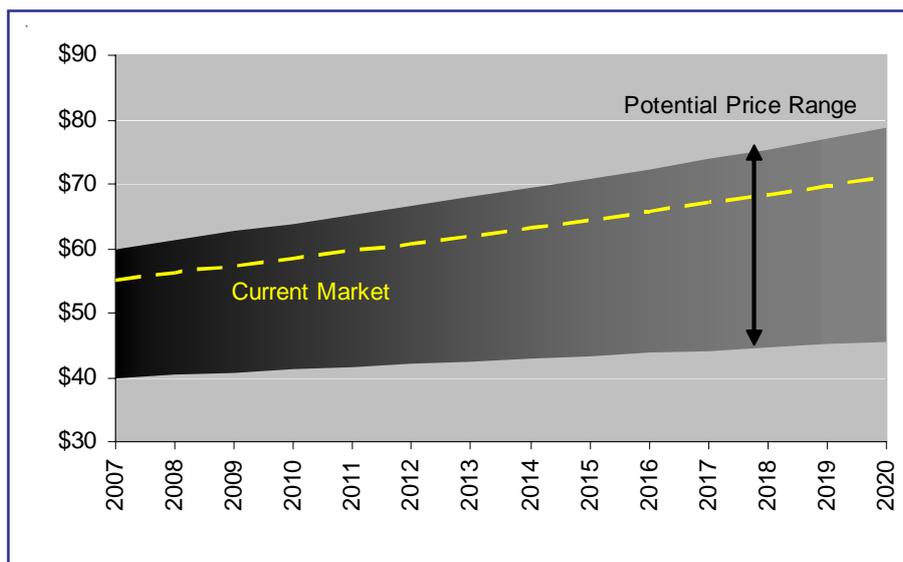
The requirements of being an accredited Green Power Product Provider are no more onerous than an independently audited annual report to ensure that the business is complying with the scheme rules.

Links to further information:

The GreenPower homepage:

<http://www.greenpower.gov.au/home.aspx>

Figure 7: Forecast Price Range for GreenPower



⁷ SA Water have requested the ability to do this, but currently the AGO have declined, so these types of arrangements need careful checking.

3 Trading Schemes

Continued

3.4 NSW Greenhouse Gas Abatement Scheme

The NSW Greenhouse Gas Abatement Scheme (NGAS) is a NSW State Government legislated scheme administered by NSW Independent Pricing and Regulatory Tribunal (IPART).

Participation is mandatory for benchmark participants (electricity suppliers to NSW, - further detail is available in key requirements below).

The trading instrument is the NSW Greenhouse Gas Abatement Certificate (NGAC).

Key dates and requirements:

Targets are in place until 2020 although the scheme is likely to be discontinued once the Australian Emissions Trading Scheme commences.

The scheme imposes an intensity based GHG reduction obligation on its participants, in tonnes of greenhouse gas per (NSW) capita. Benchmark participants are allocated a share of the total emissions based on their electricity purchases. Emissions exceeding the benchmark must be offset by surrendering abatement certificates. There is a penalty of \$12 per t CO₂-e for participants who do not meet their target.

The scheme is mandatory for benchmark participants (for latest list, see links below), including:

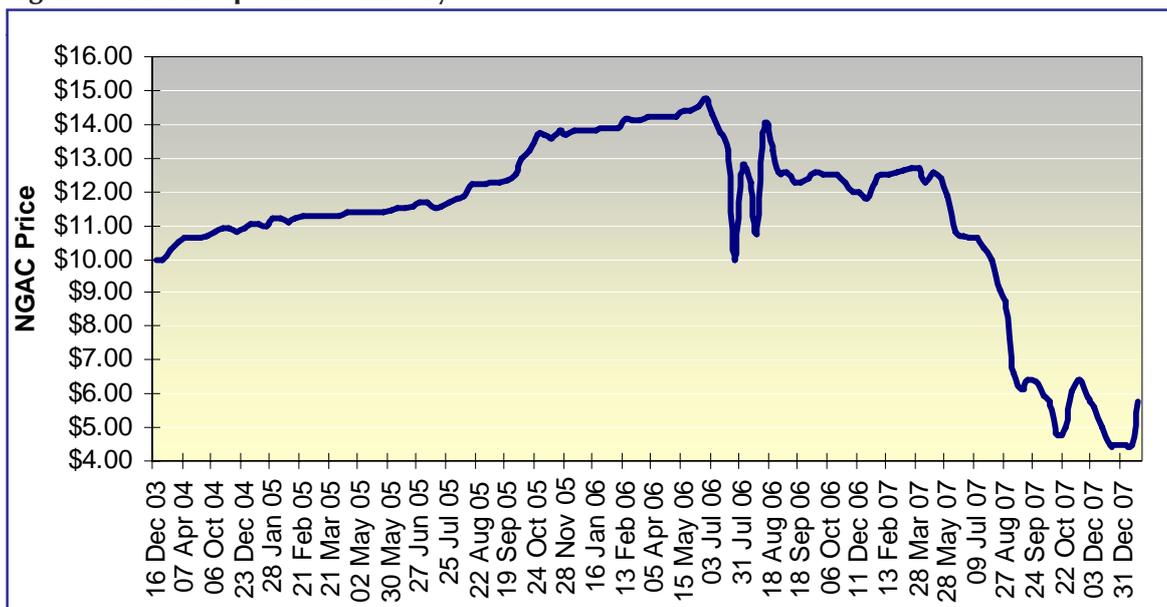
- Electricity retailers who have customers in NSW;
- Generators who supply directly to end-users in NSW;
- Large electricity users in NSW who elect to manage their own liability (consuming greater than 100 GWh of electricity per annum in NSW); and
- Persons carrying out a NSW State significant development who have elected to become benchmark participants.

NGAC Prices

NGAC prices have experienced the volatility inherent in all carbon markets in the past 6 months. The scheme rules were modified when it was clear that NGACs created from some demand side abatement projects (compact fluorescent light globe giveaways) were overstating the abatement. This highlights the issue of regulatory risk.

The price has also fallen since the announcement of the Australian Emissions Trading Scheme as it is unlikely that abatement created as NGACs will be eligible as abatement under the AETS.

Figure 8: NGAC Spot Price History



3 Trading Schemes *Continued*

Water Business Opportunities/Risks

Accredited providers create abatement certificates by:

Activity Type	Water Utility Example
Low emission generation of electricity (eg natural gas or renewable)	Generation from sewage gas that is exported to the national electricity market. Additional NGACs are available for the destruction of methane.
Activities resulting in reduced electricity consumption (demand side abatement)	Only NSW or ACT activities are eligible. Activities include installation of low flow showerheads in houses with electric hot water.
Capture and storage of carbon from the atmosphere in forests (carbon sequestration)	Reforestation of land cleared prior to 1990 may be eligible.
Activities carried out by elective large user participants that reduce on-site emissions not related to electricity consumption.	Not applicable

Links to further information:

- The GGAS homepage
<http://www.greenhousegas.nsw.gov.au/>
- The GGAS registry site contains details of registered NGAC providers and their abatement projects as well as individual NGAC details.
www.ggas-registry.nsw.gov.au

3.5 ACT Greenhouse Gas Abatement Scheme

The ACT has commenced a scheme that effectively expands the NSW Greenhouse Gas Abatement scheme into the ACT. It began on 1 January 2005 and has identical rules to the NSW Scheme. The certificates are also NGACs and will be created in the NGAC registry. The scheme regulator is the ACT Independent Competition and Regulatory Commission, and the scheme administrator is IPART.

3.6 Vic Renewable Energy Target Scheme

The Victorian Renewable Energy Target (VRET), introduced in January 2007, is a Victorian State government program run by the Essential Services Commission designed to encourage additional renewable energy into the states electricity grid. Participation is mandatory for all large wholesale electricity buyers and retailers in Victoria.

The tradable instrument is the Victorian Renewable Energy Certificate (VREC), which must be certified and registered. Each VREC represents one megawatt hour (MWh) of eligible renewable electricity.

The VRET scheme operates in parallel to the MRET scheme described above, and the structure and intent of the two schemes are closely aligned. If a participant does not surrender the required number of VRECs each year (see key requirements below), then the Renewable Energy Shortfall Charge (penalty) of \$43 (indexed to CPI) per VREC applies.

Key dates and requirements:

- The Victorian Renewable Energy Act 2006 requires 10% of Victoria's electricity consumption to be generated from renewable sources by 2016. The program will continue until 2030.
- RECS can be created by accredited renewable energy power stations and small generation unit owners within Victoria.

3 Trading Schemes

Continued

Water Businesses Opportunities/Risks

The VRET scheme only provides opportunities to renewable energy projects located in Victoria. Care must be taken when determining how a project is registered. The VRET legislation prevents project owners from switching between the MRET and VRET programs. Once a project has created RECs under MRET it can never go back to creating VRECs. The rules are still under development.

Links to further information:

- The Essential Services Commission homepage information on VRET :

<http://www.esc.vic.gov.au/public/VRET/>

- The REC registry site, which contains the registers of registered persons, accredited power stations, Renewable Energy Certificates (RECs) and applications for accredited power stations.

<http://www.esc.vic.gov.au/public/VRET/Registers.htm>

- The Victorian Renewable Energy Act 2006 can be found on the following Victorian Consolidated Act website, under 'V'.

http://www.austlii.edu.au/au/legis/vic/consol_act/

3.7 Vic Energy Resource and Efficiency Plans (EREP)

The Victorian EREP scheme is administrated by EPA Victoria, and commenced on 1 January 2008 (replacing the Industry Greenhouse Program). Participation is mandatory for all commercial and industrial sites in Victoria that use more than 100 TJ of energy and/or 120 ML of water in a financial year. Broad-acre agricultural primary production will not be included.

Key dates and requirements:

Participants are required to prepare Environment and Resource Efficiency Plans (EREP) and then implement actions with a payback period of three years or less.

Draft regulations and guidelines will be released for comment later in 2007, and will include requirements for:

- self-assessment and registration
- the assessment of energy/water consumption and waste disposal reduction opportunities
- the development, approval, implementation, monitoring and review of action plans.

Links to further information:

- EPA Victoria homepage information

<http://www.epa.vic.gov.au/bus/erep/>

3.8 QLD 13% Gas Scheme

The scheme began on 1 January 2005 and will operate until 2020 and is designed to increase the percentage of gas generation in Queensland.

It was recently announced that this target will be increased to 18% by 2020. Participation is mandatory for electricity retailers selling to end users in Queensland. The tradable instrument is the Gas Electricity Certificate (GEC). One GEC represents 1 MWh of eligible gas-fired electricity.

Eligible fuels are:

- Natural gas
- Coal seam gas (including waste coal mine gas)
- Liquefied petroleum gas
- Waste gases associated with conventional petroleum refining

The penalty for not surrendering the required number of GECs is \$11.40/MWh. The after tax equivalent is \$16.29. GECs have traded for no less than \$14.00 since the market started due to a shortfall in supply.

Water Businesses Opportunities/Risks

Sewage methane is not listed as an eligible gas it is considered a renewable energy source and is thus eligible to create RECs.

Links to further information:

Queensland Government information website

<http://www.energy.qld.gov.au/13percentgas.cfm>

3 Trading Schemes *Continued*

3.9 Greenhouse Friendly™ Program

The Greenhouse Friendly™ Program is a voluntary offset trading program that can be used to make products or services carbon neutral in Australia. The Greenhouse Friendly™ logo shows the consumer that the manufacturer or service provider has offset the greenhouse emissions produced during the life of a product or service by reducing emissions elsewhere. Projects to offset greenhouse emissions may include, forestry sequestration, methane capture and destruction, renewable energy and energy efficiency projects and capturing greenhouse emissions from mining and production activities.

Eligibility requirements for abatement projects

The broad eligibility requirements for GF abatement projects are:

- Permanence – a GF project must be a permanent and verifiable project that results in GHG emission reductions, avoidances or sequestration.
- Location – a GF project must take place in Australia.
- Additionality – a GF project must be additional to normal or required investment in GHG abatement, that is, beyond business-as-usual activities.
- Retirement after use – a project may only be used once as an identified quantity of abatement under the Greenhouse Challenge Plus programme (irrespective of whether this is a GF project or not), after which it must be retired and can not be reused for any other offset or emissions credits scheme. Similarly, if a quantity of abatement has been declared or used in another scheme or for another purpose, it cannot be reused.

An abatement project will not be accepted if:

- The project was financed through another Australian Government or state program, other than for research and development purposes; or
- The project shifts emissions to other locations within Australia or overseas
- The abatement produced by the project cannot be verified to an acceptable standard.

If the abatement is financed through another Australian Government or State/Territory or local government measure (other than for research and development purposes), proportional crediting of the abatement will be applied.

Current offset providers include AGL, Global Renewables, Collex, Landfill Management Services and Origin Energy.

Examples of current carbon neutral products and services include the Sunrise Programme, Qantas flights, BP Global Choice fuels, Virgin Blue flights and Dulux Aquanamel paints.

Water Businesses Opportunities/Risks

Water business can potentially become suppliers of offsets. In addition, it may be that such projects could be eligible for Early Reduction Credits under the emissions trading scheme.

Greenhouse gas reduction projects of 5,000 tonnes of CO₂_e or more that meet the additionality requirements are worth investigating. Energy efficiency projects with a payback period of 4 years or more identified through the EEO program may be eligible. Methane reduction activities are also potential offset projects. Note that it is very difficult to prove additionality for projects or programs that have already commenced.

The Greenhouse Friendly™ Program can also be used by water businesses to achieve carbon neutrality. A lifecycle assessment (LCA) is required to calculate the entire greenhouse gas footprint of the organisation. The costs of conducting an LCA and associated verification activities start at \$30,000. The benefit of undertaking to become carbon neutral under Greenhouse Friendly™ is that all claims are supported by the independent verification process.

Links to further information:

- Greenhouse Friendly™ homepage:
<http://www.greenhouse.gov.au/greenhousefriendly/>

3 Trading Schemes *Continued*

3.10 Trading Commentary on carbon markets

The prices in environmental markets can be very volatile. The regulated markets are demand driven, and once demand has been satisfied, the price experiences a collapse. This phenomenon has occurred in the REC, NGAC markets (as shown above) and internationally in the European Union Emissions Trading Scheme. However the voluntary markets tend to behave in a different way. In these markets the demand has steadily increased, as more companies and individuals choose to offset some or all of their carbon footprint. Traditionally the early movers source the cheapest forms of abatement or renewable energy first, and as demand increases, the price also steadily increases. Price shocks tend to only occur in voluntary markets when new legislation is introduced, changing the fundamental value of the offset activity.

There are two other limits in both voluntary and mandatory markets that are critical:

The marginal cost of new abatement tends to be the upper limiting price. For Australia this price is approximately \$40/tonne for new renewable energy projects

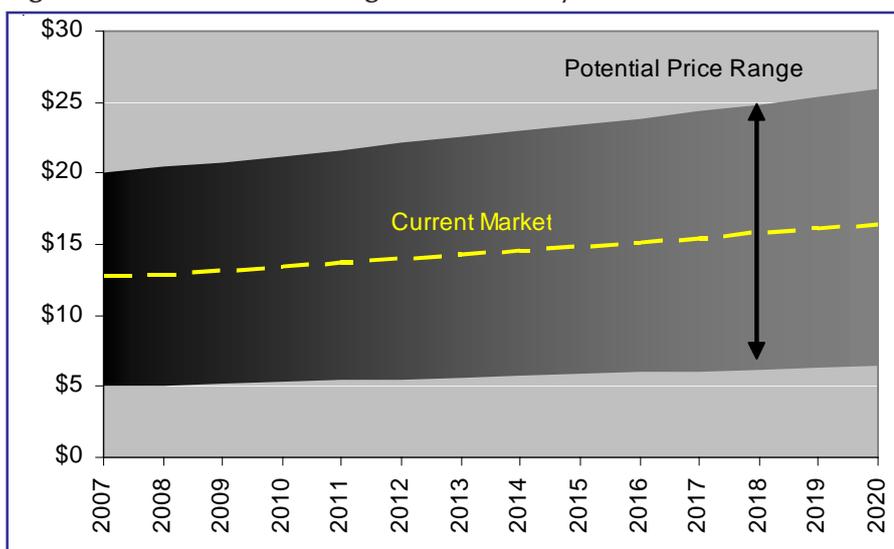
and \$12/tonne for forestry sequestration. Even mandatory markets with penalty provisions tend to track to the marginal cost of abatement

The lowest that the price can theoretically fall to is zero; however we have seen in Europe that voluntary buyers keep prices to levels of at least \$2-3/tonne.

The forecast price range for Voluntary Carbon Offsets such as Greenhouse Friendly™ is shown in Figure 9. The top of the range indicates the marginal cost of large scale forestry plantations in Australia. The lower bound on this chart is the cost of methane flaring activities, the cheapest form of carbon abatement under the program.

The price in the voluntary carbon market has also increased over the past twelve months, particularly due to the number of large organisations such as KPMG, PWC, NAB and IAG announcing they will be going carbon neutral. There is however large potential for forestry sequestration in Australia, and as such this will substantially limit price rises beyond the \$20/tonne level in the short to medium term.

Figure 9: Forecast Price Range for Voluntary Carbon Offsets



4 Licensing Requirements

4.1 VIC EPA Protocol for environmental management

In 2006, a new Protocol for Environmental Management (PEM) was released for Greenhouse gas emissions and energy efficiency in industry. Applicants submitting a works approval or licence application must now ensure that requirements under the protocol are met. The PEM aims to ensure that cost-effective opportunities for greenhouse gas mitigation are undertaken, and greenhouse and energy issues are integrated with existing environmental management procedures.

Key requirements:

The anticipated impact of the proposed works on energy use and greenhouse gas emissions. Other feasible process options and fuel type selection may also be required in the application where relevant.

An estimate of annual energy consumption and non-energy related greenhouse gas emissions associated with the proposed works. This includes the quantity of each fuel (and electricity) to be used by the proposed works, the associated energy use and emissions.

A discussion of best practice for energy use and greenhouse gas emissions is required when the proposed works are estimated to use at least 500GJ of energy per annum and emit at least 100 tonnes of energy related CO₂-e emissions per annum. The same is applicable for any non-energy related GHG emissions. The application must provide sufficient information to demonstrate that best practice has been investigated and identified, and will be implemented as far as practicable.

Links to further information:

The 'Resources' links on the following EPA website provide further detail on this area:

www.epa.vic.gov.au/greenhouse/

5 Impending Legislation

5.1 Qld ClimateSmart 2050

The Queensland State Government recently announced (3 June 2007) a new Climate Change policy (ClimateSmart 2050 Initiative) including a number of new policy and funding areas. This included a Queensland renewable and low-emission energy target of 10% by 2020.

Details of the program have not yet been released, but it is likely to be similar in structure to the other state and national renewable energy target schemes.

The Queensland Government also announced a Smart Energy Savings Program. The scheme will require medium to large energy users to undertake energy efficiency audits and implement actions that have a pay-back period of three years or less.

A \$55 million fund for energy efficiency projects will be accessible to small and medium sized enterprises.

Links to further information:

- Queensland ClimateSmart 2050 Initiative
<http://www.thepremier.qld.gov.au/climatechange>

5.2 W.A Energy Efficiency Scheme

On 6 May 2007, the WA Premier released a new policy: Climate Change - Making Decisions for the Future. The statement announced that the Western Australian government would be developing new climate change legislation including the following:

- A mandatory energy efficiency program that will require large and medium energy users to invest in cost effective energy efficiency measures
- A target to reduce emissions by at least 60% below 2000 levels by 2050
- A target to increase renewable energy generation on the South West Interconnected System to 15% by 2020 and 20% by 2025
- A clean energy target of 50% by 2010 and 60% by 2020.

Links to further information:

- WA Department of Energy and Conservation
http://portal.environment.wa.gov.au/portal/page?_pageid=54,5690266&_dad=portal&_schema=PORTAL

6 International Ratings Programs

6.1 Carbon Disclosure Project (CDP)

The Carbon Disclosure Project questionnaire, focussed on greenhouse gas emissions reporting, is sent to over 2000 of the world's largest companies in February of each year, including the ASX100 and the NZ50. Responses are returned by May of each year and published in September.

In 2007, 77% of the FT500 answered.

Link to further information

<http://www.cdproject.net>

6.2 Dow Jones Sustainability Index (DJSI)

The DJSI questionnaire, focusing on economic, environmental and social sustainability criteria, is sent to the top 10% of the 2500 largest companies in the Dow Jones World Index. The questionnaire is sent out in April of each year, and companies are required to return questionnaires in June of each year and published in September.

Link to further information

<http://www.sustainability-index.com>

6.3 FTSE 4 Good Index

The FTSE4Good index was launched in 2001, and is updated in real time based on corporate social responsibility criteria. A licence is required before company performances under the index can be accessed.

Link to further information

http://www.ftse.com/Indices/ftse4good_index_series/index.jsp

6.4 Australian SAM Sustainability (AUSSI)

The Australian SAM sustainability Index (AuSSI) was launched in 2005 and tracks on a daily basis the sustainability performance of the top third of Australian companies. The AuSSI is published by SAM industries (Sustainable Asset Management), a wholly owned subsidiary of Dow Jones.

Link to further information:

<http://www.aussi.net.au/>

6.5 Reputex Carbon Ratings

The Reputex Carbon indices are updated in real time based on a company's ability to identify, manage and control risks associated with operating in a carbon constrained environment. All S&P/ASX300 companies are tracked, as are 1800 global companies. A licence is required before company performances under the index can be accessed.

Link to further information:

<http://www.reputex.com.au/>

6.6 Corporate Responsibility Index (CRI)

The Corporate Sustainability Index was first created in the UK by a group of leading businesses with Business in the Community (BITC), a 700 member business-led UK charity.

The index was launched in Australia in 2003, licenced to the St James Ethics Centre for implementation with The Sydney Morning Herald and The Age. Results are validated by Ernst & Young.

Business Council of Australia members and Australia's top 250 companies participate by invitation, completing an online survey focused on responsible business practice. Input is benchmarked against other respondents, and results published in The Age and The Sydney Morning Herald in May each year.

Link to further information:

<http://www.corporate-responsibility.com.au/default.asp>

6.7 TruCost PLC

TruCost is a UK based environmental research organisation which analyses environmental performance of companies based on external damage costs and benchmarking between companies and against Government Guidance. The index includes over 3,200 companies globally, including FTSE All-Share, S&P 500, Nikkei 225, DJ EuroSTOXX and MSCI indices.

TruCost utilises environmental impact profiles generated for different business activities and combines them with financial and segmental analysis to estimate a company's direct impacts. Indirect impacts are also quantitatively modelled and any public disclosures made by the company incorporated. An external cost is then applied to each resource/emission to generate an external cost profile.

Membership is available for a fee, and all results shared among members.

Link to further information:

<http://www.trucost.com>

7 Water Case Studies

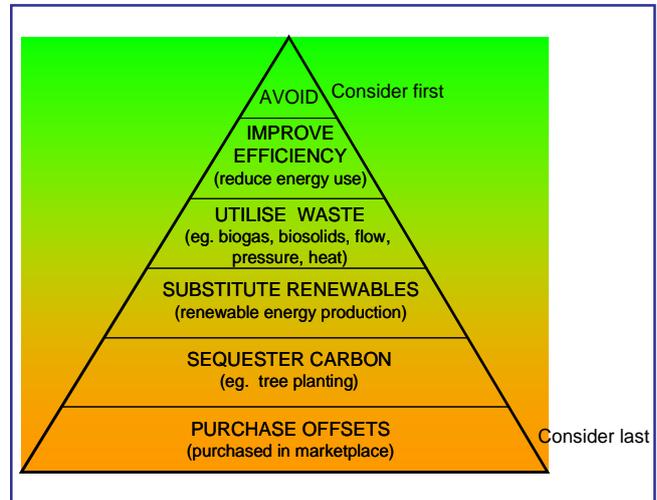
The following section summarises the carbon strategies of several of the water service organisations that presented at the WSAA workshop on the 30th and 31st of May 2007. The purpose of the workshop was to:

- Understand the issues surrounding climate change and the management of greenhouse gas impacts;
- Obtain an update on international science and directions;
- Get an overview of Australian greenhouse management programs and policy directions, including future regulation and targets;
- Understand reporting systems development;
- Examine some case studies on mitigation from within the water industry
 - Practical work by utilities
 - Asset Based
 - Policy and Decision Based
 - Decision Analysis

7.1 Common Greenhouse Strategy Elements

The fundamentals of greenhouse gas risk management are the same for all large energy users such as water utilities. All of the case studies presented at the workshop used a similar form of a carbon abatement hierarchy. One such example is presented below in Figure 10. The underlying principles of each management strategy are the same, that is avoid or reduce emissions first, then switch to greener fuel sources and lastly offset only when the other options have been exhausted.

Figure 10: Carbon Abatement Hierarchy (Source: Melbourne Water Corporation)



Similarly the selection of offsets usually involves evaluation against common criteria as listed below.

- Cost – measured in terms of \$/tonne greenhouse gas abated
- Transparency and verifiability of abatement
- Additionality (see below)
- Certainty of delivery – contractual certainty that abatement is delivered when required
- Flexibility to accommodate changes in volume required which may change from year to year depending on factors such as rainfall
- Adaptability to future policy and market environments
- Management complexity of implementation
- Communications – ability for abatement to be articulated to stakeholders
- Co-benefits – existence of benefits beyond the primary outcome of greenhouse gas abatement (such as improved catchment management).

The only difference between organisations are the rankings that are assigned to each of the qualitative criteria.

7 Water Case Studies *Continued*

Additionality

Additionality is never far from any discussion regarding greenhouse gas mitigation policies and markets. It is a particularly complex and contentious issue to resolve, not helped by the fact that different stakeholders identify different types of additionality and place different importance on these.

Very broadly, additionality may be classified in two ways: emissions additionality and project additionality.

A project has emissions additionality if the emissions are reduced from what they would have been in the absence of the project and emissions have not been transferred to elsewhere in the world.

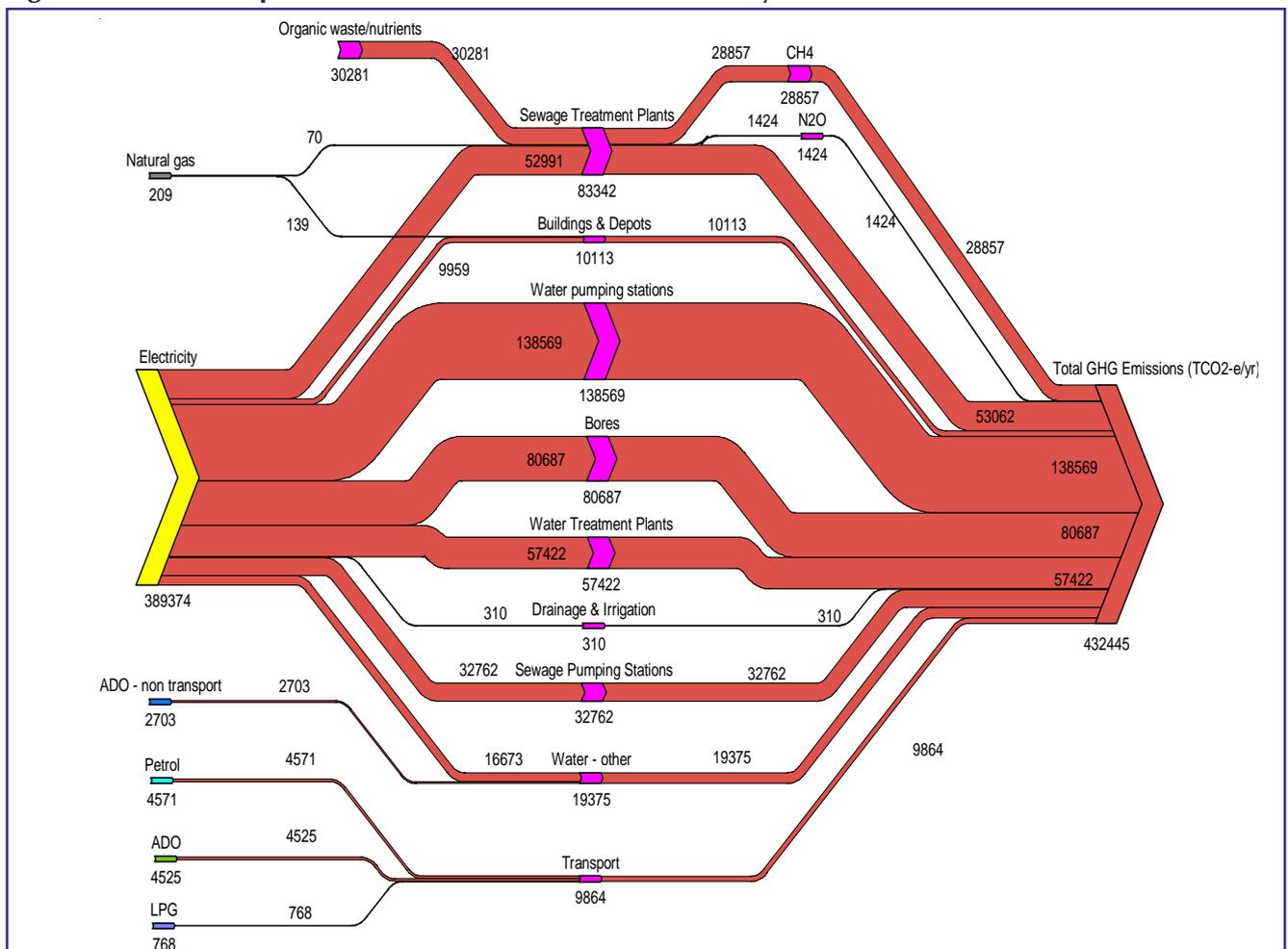
Project additionality addresses the more difficult question of “would the project have happened anyway?” either due to regulatory requirements or because it made financial sense. Proving financial additionality can be difficult, particularly where there is a positive internal rate of return that is close to the investment level required for the organisation.

7.2 Water Corporation

The Water Corporation has been investigating GHG emissions reductions for over 5 years and has so far reduced emissions by 10% and received an AGO Gold award in 2003 for its achievements. It participates in Greenhouse Challenge Plus and has a comprehensive understanding of its energy use.

7.2.1 Current Greenhouse Inventory

Figure 11 Water Corporation’s Current Greenhouse Inventory



7 Water Case Studies

Continued

7.2.2 Greenhouse Gas Management Policy

Water Corporation has a draft greenhouse abatement strategy and policy and the elements include:

- Aspirational target of greenhouse neutrality by 2030 with linear annual transition targets;
- Corporate sustainability principles;
- Responsibility extending to every employee;
- Membership of Greenhouse Challenge Plus;
- Emissions included in the scope are all staff, all assets, all activities and services according to operating licence.

Development and implementation of the strategy and policy is overseen by a General Manager – level steering committee with broad representation from across the organisation.

7.2.3 Community Consultation

To help develop the strategy and business case and clarify the need to act, Water Corporation undertook a survey of its customers in 2006 in relation to the attitudes and perceptions on climate change and greenhouse gas abatement. The key findings of the survey were:

- Water shortage, global warming and greenhouse gases are amongst the environmental issues of most concern to the community; and
- Using renewable energy is the preferred abatement initiative for most, with energy efficiency improvements and water demand management also seen as important.
- Eighty-one percent of those surveyed were prepared to pay an extra \$6.00 on their bill for the increased use of renewable energy compared to 55% four years ago. An additional finding was that that two thirds would be prepared to pay over \$20 per year for full abatement of Water Corporation's greenhouse gas emissions.

7.2.4 Incorporating Carbon Costs

Water Corporation are proposing shadow carbon pricing in the decision making process. At a policy level, an agreed shadow price for carbon is essential to get greenhouse gas impacts inside the minds of those making the investment decisions by giving them something tangible to work with. It becomes another element on the economic side of sustainability assessments.

The WA Government has also provided guidance on the carbon pricing that businesses should use in long term planning decisions

Water Corporation is also moving towards consideration of embodied energy in investment decisions, but further development of the modelling is required before it is feasible to implement.

7.2.5 Abatement Activities

Abatement decisions have been based on sustainability principles, hierarchy of preferences (see Figure 10 above) and cost effectiveness. There is to be an annual review of abatement pathways and opportunities.

There is to be a portfolio rather than project approach to meet annual abatement targets, and as 90% of the emissions come from electricity, there is a finite amount that can be done internally through energy efficiency alone. Carbon intensity of energy sources has the greatest potential to reduce emissions, such as through increasing use of renewable energy. Currently the split between abatement options being considered to meet the interim 2016 target are:

Renewable energy

- The Perth Seawater Desalination Plant is powered exclusively by renewable (wind) energy from a wind farm at Emu Downs. The WA Government has committed to also running the (next) Southern Seawater Desalination Plant on renewable energy.
- Cogeneration from WWTPs. Woodman Point WWTP already saves \$0.9 million in energy costs and 50,000 t CO₂-e. A new project at Beenyup WWTP would have an abatement cost of \$15/tonne CO₂-e.
- Solar power at head office is being investigated but at current prices would have an abatement cost of \$250/tonne CO₂-e.
- Existing renewable energy purchases and exploration of new avenues such as mini-hydro.

7 Water Case Studies Continued

Energy efficiency

- Pumping efficiency activities will focus on the highest energy consuming bores and pump stations. They will include: a pump monitoring, testing and overhaul; reduced flow rate and/or head; and incorporating energy intensity into investment decisions. Marginal cost of greenhouse reductions is below \$1 per tonne of CO₂-e.
- Other energy efficiency gains will be made in building energy performance improvement, staff behaviour changes and waste water treatment efficiency.

Water demand management

- Reducing urban water use from 180 to 155 kL per person per annum already delivers emissions savings of 30,000 tonnes of CO₂-e. Further initiatives are expected to save another 16,000 tonnes.

Offsets will make up the balance of the abatement

- Biosequestration on landholdings can potentially deliver 6,000 t CO₂-e per year. Plantation forests near WWTPs will provide a use for treated wastewater.
- Offsets are likely to be purchased from external sources to make up the shortfall between annual emissions targets and actual emissions. Only sources certified by the AGO will be considered, and assessed against internal assessment criteria.
- Current offset policy and accounting uncertainty presents a significant risk to any commitments to purchase offsets.

7.3 SA Water

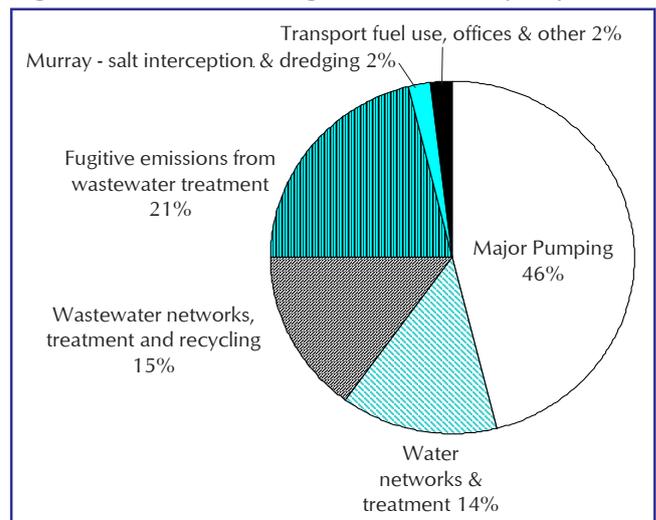
7.3.1 Climate Change Impacts

Bureau of Meteorology data show a decadal decline in rainfall in South Australia like much of Southern Australia. Temperature records over the past 50 years also show that annual average temperature has been increasing and these trends have strengthened during the past 55 years and in the most recent decade.

Temperature is predicted to continue to warm by 2030 with additional increases by 2070 with inland areas of the state experiencing more of an impact. Rainfall is predicted to progressively decline in 2030 and 2070 in most regions with significant changes in rainfall across the seasons.

7.3.2 Current Greenhouse Inventory

Figure 12 Greenhouse gas emissions by key activity



7.3.3 Greenhouse Gas Management

SA Water is being guided by South Australian policy to assist in the setting of targets. The South Australia Strategic Plan (SASP) has the objective of achieving the Kyoto target by limiting the state's greenhouse gas emissions to 108% of 1990 levels during 2008-2012. This is designed to be a first step towards reducing emissions by 60% by 2050. Recent draft legislation included an additional interim target of decreasing emissions to 1990 levels by 2020 (since dropped).

In addition the SA Government has made commitments of achieving 20% use of accredited GreenPower by 1st January 2008, although this excludes Government Business Enterprises such as SA Water.

7 Water Case Studies

Continued

SA Water has set a 10% target for achieving 10% use of renewable energy for 2006-07. The challenge SA Water has in managing any target is that pumping is inversely related to the rainfall at Mount Lofty. In dry years, the quantity of purchased electricity can more than double from 200,000 MWh to 440,000 MWh. To smooth out this variability the SA Water's annual renewable energy purchase is based on renewable energy used in 06/07 divided by 5 year rolling average of total electricity use. SA Water first counts the use of its own self generated renewable electricity at its wastewater treatment plants and then quantifies the balance to be purchased from the market. May forecasts included

- 10,000 MWh from biogas self generated and used electricity
- 25,000 MWh of accredited GreenPower purchased in December 06
- 5,000 MWh of accredited GreenPower to be purchased within weeks

SA Water's sale of accredited Greenpower from its mini hydro electric scheme is not reported as a reduction but as an influencing activity because it is sold to others (and the AGO will not allow SA Water to make an internal transaction of its own accredited Greenpower due to conflicting boundary and trading rules).

In relation to new biogas power generation systems SA Water does not intend to create and sell renewable energy certificates to others for renewable energy that it will be using and claiming for itself as there is concern that this would be effectively be double counting the renewable electricity and the associated greenhouse benefits.

7.3.4 Incorporating Carbon Costs

SA Water does not currently avoid or offset greenhouse costs of new infrastructure. However carbon price scenarios and higher standard electricity cost assessments are being run on a trial basis to consider the impact and to prepare for future carbon constraints.

7.3.5 Abatement Activities

SA Water are taking a portfolio approach to reducing emissions.

- A budget has been allocated for 2006-07.
 - SA Water is planning to achieve the Kyoto commitment of capping emissions by 108% for 2008 - 2012 covering its own activities.
 - 10% use of renewable electricity in 2006-07
 - There is a key performance indicator requiring reductions of 75,000 tonnes in 2006-07.

The difficulty arises when attempting to account for non-claimable activities such as:

- Efficiency gains against business as usual
- Influencing actions (reductions in water usage translating to less pumping)
- Establishing future carbon benefits from revegetation

The following elements are the main areas of focus of abatement activities.

Pumping Efficiency

A performance management program has been established for approximately 25 years. Pump improvements have been made with low friction coatings and mechanical seals. Technical and trades staff achieve and maintain 5-7% higher efficiency from typical large pumping units compared with performance when they were new.

One mini hydro scheme was established in 2003 in the network replacing a pressure reduction valve. This achieves approximately 6,000 MWh of GreenPower generation each year. SA Water has a 50% joint venture with Hydro Tasmania and is seeking approval from the AGO to retain its share of GreenPower and claim it as a direct offset.

Use of Biogas

Up to 15,500 MWh of electricity can be generated from biogas each year at the Glenelg and Bolivar WWTPs. All electricity is used on site and claimed as zero emissions. There are upgrades planned for Bolivar and Christies beach.

The Christies Beach upgrade includes options for a combination of natural gas and biogas. The endorsed option will commence the project with sufficient units to consume all biogas with foundations and housing for future expansion and connection to natural gas.

7 Water Case Studies Continued

Revegetation

SA Water's Goal is to undertake 135 hectares/year for carbon capture, water quality, land management and biodiversity benefits.

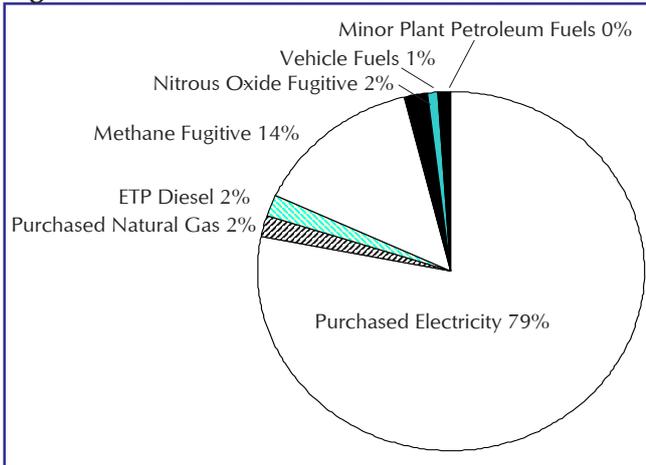
7.4 Melbourne Water

7.4.1 Current Greenhouse Inventory

Melbourne Water has been investigating the issues of energy and greenhouse since 1996 when the electricity market deregulated in Victoria. As a result Melbourne Water has very good baseline inventory data, with records dating back to 1995.

Melbourne Water used the historical data to develop a 15 year projection of emissions for each site. The forecast allowed for the effects of population growth, operational changes, major projects and energy efficiency

Figure 13 - Greenhouse Emission Sources 2005-06



measures. Major projects that result in increasing emissions include:

- Desalination (would increase energy use by 100% although state government has announced new proposed plant would be powered by renewable energy)
- Tertiary treatment
- Re-commissioning of a reservoir requiring a new water treatment plant
- Sugarloaf pipeline for water from the Goulburn River (to be powered by renewable energy)

7.4.2 Greenhouse Gas Management Policy

Melbourne Water has an Energy and Greenhouse Steering Committee overseeing the identification and implementation of energy efficiencies and greenhouse gas emission reductions. The Manager of Corporate Strategy chairs the committee and there is representation from all areas of Melbourne Water's business amongst the members.

Key performance indicators have been developed namely:

- Greenhouse emissions reduction from the 2000/01 baseline. In 2005/06 Melbourne Water had achieved a 35% reduction.
- Increased renewable energy use or export. In 2005/06 over 40% of the energy used or exported was from renewable energy generation.
- Board approved future targets to achieve zero net greenhouse gas emissions and 100% renewable energy use or export by 2018.

Melbourne Water has conducted a joint CSIRO study into climate change impacts. The key conclusions of the study were that:

- Australia is particularly vulnerable to climate change;
- Climate change poses major risks for Melbourne Water; and
- Reducing global greenhouse emissions would reduce the rate and magnitude of climate change.

7.4.3 Incorporating Carbon Costs

Major project options are assessed using the price of GreenPower in the electricity supply assumptions. This ensures that the long term target costs are incorporated into major infrastructure investment decisions.

7.4.4 Abatement Activities

Abatement decisions have been based on a hierarchy of preferences (see Figure 10 above) and cost effectiveness. Abatement activities are summarised below.

Energy Efficiency

Control changes to sewage pumping stations has made efficiency gains improvements without requiring pump replacement or other significant capital expenditure.

- At Hoppers Crossing SPS savings of 3.2% have been achieved saving 700 MWh, \$43,200 and 980 tonnes CO₂_e per year.

7 Water Case Studies

Continued

- At Brooklyn SPS savings of 1.7% has been achieved saving 160 MWh, \$13,900 and 225 tonnes CO₂-e per year.

The biggest energy consumption at Eastern Treatment Plant is the aeration blower. Preliminary results from efficiency improvements indicate savings of 2,460 MWh, over \$160,000 and 3,440 tonnes CO₂-e per year.

Replacement motor drives at Yering Gorge pumping station will save approximately 1,000 MWh per year.

Waste Utilisation

Melbourne Water undertook a multi-criteria decision making assessment to determine the optimum renewable energy solutions both internal and external to the existing infrastructure.

Biogas generation occurs at both Eastern and Western treatment plants, generating a combined total of over 80,000 MWh of renewable energy per year. The lagoons at WTP were covered and the resulting generation covers 60% of the energy required to operate the treatment plant.

A further 40,000 MWh per year is expected to be generated from the installation of mini hydro generation at pressure reduction valves around the system.

Since the assessment on generation options was undertaken, a number of companies have approached Melbourne Water with other renewable energy alternatives. As a result there are preliminary investigations on the use of algae as a renewable energy fuel. Melbourne Water will continue to identify opportunities in pioneering technologies, as projects such as the use of algae are potentially eligible under the federal Low Emissions Technology Demonstration Fund (LETDF).

Sequestration

There are minimal opportunities in sequestration due to time scales and risks. There is some stream frontage rehabilitation but it is not of a commercial scale. There is potentially suitable land at WTP however the land use strategy characterised large scale tree planting as having lower value.

Offsets

Melbourne Water prefers to contribute to reducing greenhouse gases through investment in sustainable energy sources rather than through purchasing offsets. Once internal opportunities have been exhausted however, there are benefits of increasing market demand for offsets to drives new investment. As such the balance of Melbourne Water's target is to be met through the purchase of GreenPower.

7.5 Sydney Water

7.5.1 Greenhouse Gas Management Policy

Sydney Water have a goal of becoming carbon neutral for energy consumption by 2020, with a 60% reduction by 2012. The Board believes that Sydney Water should be taking a leadership role but required a firm business case to justify the expense to the pricing regulator.

There are multiple benefits that Sydney Water has identified:

- Lower energy bills
- Reduced carbon risk
- Leadership in reducing climate change impacts
- Reduced environmental impact of energy use
- Regulator & community perception
- Improved staff attraction and retention, which is particularly important given the tight employment market for water industry professionals. Sydney Water have also estimated that it costs \$200,000 per loss of staff member.
- Shareholder/Government Benefits – helping the state government show leadership.

7.5.2 Incorporating Carbon Costs

There is greater scrutiny of the consideration given to climate change impacts in future development applications as demonstrated in the Anvill Hill Coal Mine Case (2006).

Options to reduce the greenhouse gas emissions from electricity required to power the desalination plant were incorporated into the project budget from the feasibility stage. There is now a commitment to power the plant with 100% renewable energy.

There are several cogeneration projects planned for the Sydney Water STPs and the business cases were built on accounting for the income from trading the greenhouse gas reductions from the projects.

7.5.3 Abatement Activities

Sydney water has implemented abatement activities as outlined below.

7 Water Case Studies

Continued

Renewable Energy

By 2009 Sydney Water will generate 20% of its annual electricity consumption internally through biogas cogeneration and hydro stations.

Energy Efficiency

Demand has been reduced through energy efficiency actions in the pumping network. The energy efficiency projects delivered net savings in expenditure terms as well.

Residential Demand Management

- Retrofitting of low flow showerheads in houses with electric hot water systems in NSW results in over 4 4 tonnes of greenhouse gas abatement over the life of a showerhead installed on an electric hot water system,
- Water efficient washing machine receive a \$150 rebate and also result in greenhouse savings of between 1.5 and 3.5 tonnes per machine over the life of the machine.

7.5.4 Achieving Carbon Neutrality

Sydney Water has built a two tiered methodology for achieving carbon neutrality to achieve it at no net increase in cost to the consumer. The total cost is expected to be less than 1% of annual revenue.

Identification and Incorporation of Existing Requirements

The first step was to identify any requirements that Sydney Water already needed to comply with in its operations. The NSW Government Greenhouse Energy Management Policy has targets that required government agencies to purchase 6% GreenPower with the possibility of substantial increases in the future.

Identification of Internal Abatement Options

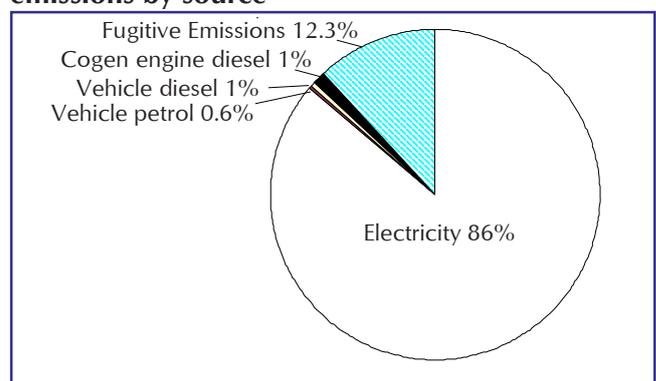
A decision was taken that Sydney Water would forego revenue from the sale of RECs, GreenPower and NGACs, and retain these instruments to count as greenhouse gas reductions internally. Internally generated carbon credits are expected to meet Sydney Water's targets until 2018 (depending on the treatment of fugitive methane under a national emissions trading scheme).

7.6 Brisbane Water

7.6.1 Current Greenhouse Inventory

Brisbane Water's greenhouse gas emissions breakdown by source is shown in the figure below. The greenhouse gas emissions are for the 2005-2006 financial year. It has been assumed that emissions from well managed aerobic plants are zero.

Figure 14 - Brisbane Water's greenhouse gas emissions by source



7.6.2 Greenhouse Gas Management Policy

Brisbane Water is a commercialised business unit of Brisbane City Council, and so the greenhouse reduction targets are driven largely by the council's policy.

Brisbane City Council targets are:

- 45% greenhouse gas reduction from 1990 Levels by 2010 (227,304 tonnes CO₂-e of which 110,727 tonnes is attributable to Brisbane Water).
- 10MW renewable energy generation by 2010.
- Brisbane and BCC carbon neutral by 2026 with reductions of direct emissions by 50%.

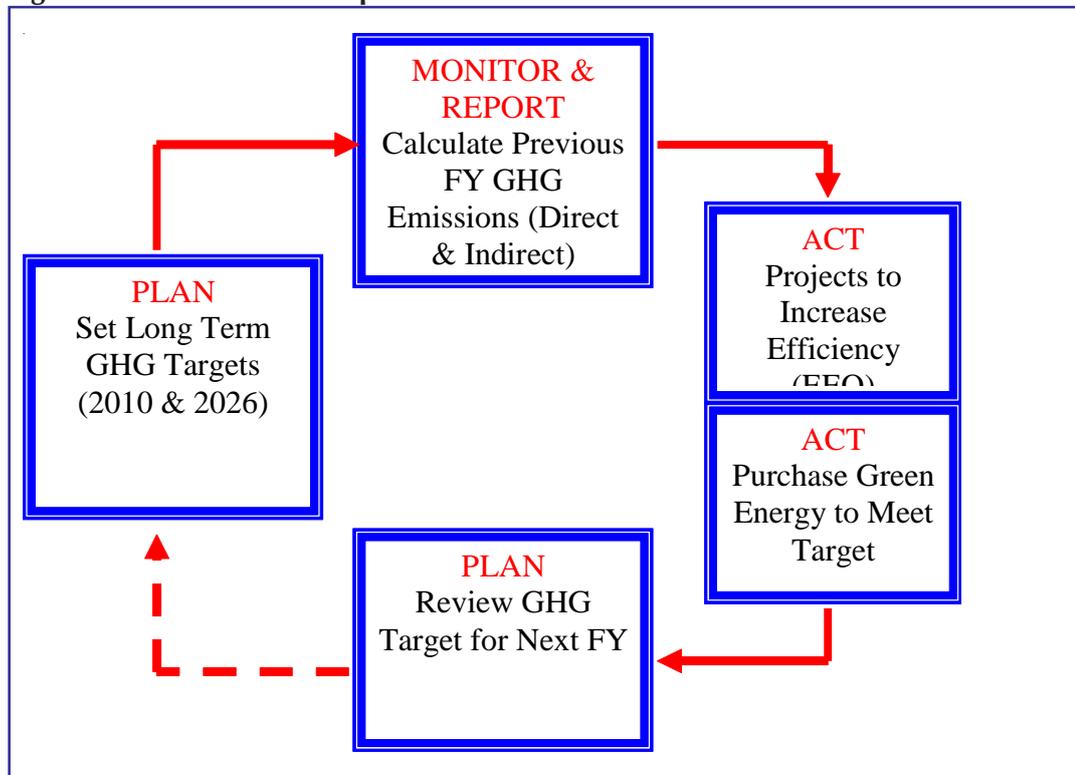
Brisbane Water has quarterly reporting on energy use to the senior management team. The energy team meet once a month and look at performance against the KPIs. Energy density calculations for each catchment are used to determine the optimum level of inter-catchment transfers.

The Brisbane Water plan is summarised in Figure 15.

7 Water Case Studies

Continued

Figure 15 - Brisbane Water plan



7.6.3 Incorporating Carbon Costs

Every time new assets are assessed the energy component is built into operating costs and NPV. Brisbane Water will not include a price on carbon until the market has been legislated.

7.6.4 Abatement Activities

Biogas Cogeneration

Brisbane water operates cogeneration plants at Luggage Point and Oxley. Both sites are operating at a low capacity due to the drought.

CAMBI

In 2006 Brisbane Water commissioned a CAMBI plant at Oxley. CAMBI uses thermal hydrolysis as a pre-treatment to anaerobic digestion. This increases the biological degradation of organic volatile solids and biogas production considerably. Electricity is purchased to power the hydrolysis.

The plant has delivered the following benefits:

- Extra 0.25MW of renewable energy from increased biogas production (\$475k / year energy savings in 2007);

- 68% reduction in sludge output delivering savings in transportation and disposal costs as well as emissions from transportation;
- Odourless process (particularly noticeable when compared to Luggage Point).

Natural Water Treatment

Rocks Riverside (sewer mining plant) extracts sewage from the nearby pressure main and uses a submerged wetland to treat the water. The water is then used to irrigate the park. The energy density is approximately 170 kWh/ML with sand filtration and UV adding an additional at 591 kWh/ML. By comparison reverse osmosis energy requirements are 1,180 kWh/ML

System Pressure Reduction

Pressure reduction is mainly being driven by the leakage reduction program but this has an add-on benefit in energy reduction.

Variable Speed Drive (VSD) Pumps

Fixed speed pumps are being retrofitted with variable speed drives. Brisbane Water have found that there are not the same advantages in sewage as is the case with water. VSDs are standard in new booster installations (except for special cases)

7 Water Case Studies Continued

- Brisbane Water have an ultimate goal to retrofit all remaining fixed speed booster pumps
- Approximately 45% of water booster stations currently have VSDs.
- Tied in to Pressure Reduction Program: with approximately \$300,000 for 3 new sites annually up to a total of 16 sites.
- 27 sewage pump stations have VSDs.

Many pump stations (especially small reticulation pump stations) have small motors and run only several hours a day. The energy improvements associated with VSD operation would be negligible. Water boosters, on the other hand, run for most of the day and savings are substantial.

Flow Smoothing

Brisbane Water are currently conducting flow smoothing trials at Eagle Farm, the largest pump station in the system. Instead of matching outflow with inflow they use an algorithm and the sewage is stored in the sewer upstream. The flow smoothing strategy switches more energy to off-peak times at the pump stations, and provides energy savings at the downstream reclamation plant (Luggage Point) through

- Blowers be running more continuously
- Digester operation is further stabilised through a more consistent active bacteria population death rate
- More continuous biogas production leading to fewer cogeneration engine shut-downs. The engines use diesel to start up (and at a much higher consumption rate than biogas) and so fewer shut downs lead to reductions in fuel costs and emissions..

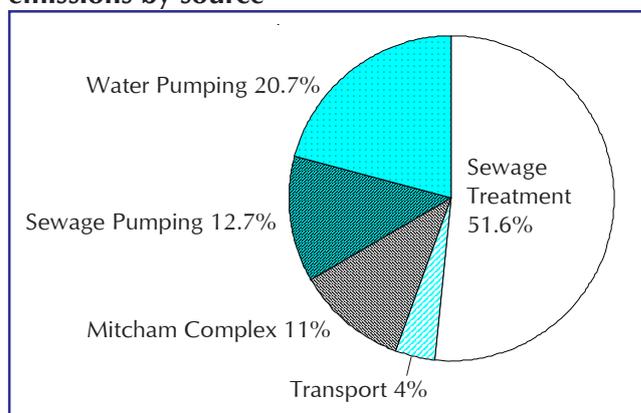
There are concerns with odour and corrosion in the mains upstream where the sewage is stored. The operating regime was only trialled in March 2007 and is yet to be hasn't been implemented.

7.7 Yarra Valley Water

7.7.1 Current Greenhouse Inventory

Yarra Valley Water's (YVW) greenhouse gas emissions split by source are shown in the figure below. Yarra Valley Water's greenhouse gas emissions have increased from 21,082 tonnes CO₂-e in 1990 to 24,700 tonnes CO₂-e in 2003/04.

Figure 16 - Yarra Valley Water's greenhouse gas emissions by source



YVW expects that its greenhouse gas emissions would increase by a further 40% over next decade (unless significant mitigation measures are undertaken) as additional sewage treatment plants come on line and system expansion occurs into areas where more water and sewage pumping is required.

7 Water Case Studies

Continued

7.7.2 Greenhouse Gas Management Policy

Yarra Valley Water's environmental policy states that the organisation is committed to providing services to customers within the carrying capacity of nature. This commitment was driven from Board level. The business has established a Greenhouse Gas Reduction Team with members from strategy and communications, operations, and planning.

YVW are putting in place an overall strategy, monitoring systems, energy awareness for existing assets, and are taking a detailed look at new assets to ensure they are optimised for both operational requirements, and electricity consumption.

To meet its goal of becoming a sustainable organisation, Yarra Valley Water has a target of reducing greenhouse gas emissions by 10,500 tonnes CO₂-e by 2008, which is 50% of the 1990 level of emissions. This target aligns with the desired goal from Kyoto, where it was recognised that the world needs to halve its greenhouse gas emissions from 1990 levels if long term sustainability is to be achieved.

Other environmental targets include:

- Water consumption levels to below 306 litres per person per day, which is 80% of the 1990's total
- Waste to landfill reductions by utilising at least 90% of solid waste
- Targets for nutrient levels from sewage waste are to be quantified.

7.7.3 Community Consultation

Surveys have been conducted to assess the willingness of the customers to pay for cleaner energy sources in the YVW system.

In 2004, 84% of our customers either strongly or partially in favour of our green energy purchases and 94% were prepared to pay the additional extra costs of around 7 cents per quarterly bill to reduce emissions by 50%.

In 2007, 76% of customers were prepared to pay the additional extra costs of 18 cents per quarterly bill to reduce emissions by 100%. The overall lower figure is a reflection of tighter pressure on household budgets.

7.7.4 Incorporating Carbon Costs

Yarra Valley Water have used lifecycle costing in selection of pipelines and included the cost of GreenPower in NPV calculations.

Lifecycle assessment ensures that all environmental impacts are adequately considered, such as the embodied energy in equipment.

Using LCA it has been proven that it is far more efficient from an energy perspective to supply potable water from the system than to use domestic water tanks with individual pumping.

7.7.5 Abatement Activities

YVW is using the greenhouse gas management hierarchy in the development of abatement options.

- Deliver Energy Awareness Training Course
- Install variable speed blowers at Brushy Creek by March 2005
- Planning Policy – design of stations - "Motor System Efficiency Policy"

Whilst the use of Green Energy results in zero emissions (zero GHG Intensity), it was considered critical that our energy use be minimised as much as possible, prior to the purchase of Green Energy. It is considered that the upfront purchase of Green Energy would not provide the same motivation for improved energy use.

7 Water Case Studies

Continued

Energy Efficiency

YVW have found that avoiding the use of electricity is more applicable to the design of new infrastructure, as opposed to existing infrastructure. At the infrastructure design stage, options for avoiding electricity use are considered, for example:

- The design of gravity rather than pumped systems;
- Assessment of treatment processes based on energy usage; and
- Incorporation of green building initiatives such as the use of natural light and movement sensors.

YVW will be specifying efficiency criteria in the pumping policy. Specific guidelines will be set around:

- Criteria for more efficient pump units
- Efficiency standards for pumps for developers
- Criteria so pumps are maintained and replaced on an efficiency basis
- Variable speed blowers
- Replacement of fixed speed motors with variable speed where effective

YVW have found that installing variable speed drives didn't automatically reduce energy consumption, and changes to the manifold as well as a reduction in pumping pressure were required before savings were achieved.

At Maserati Drive an upgrade costing \$13,000 per pump resulted in savings of 116 tonnes of CO₂-e per year and \$12,000 in reduced electricity costs. Each pump was fitted with stainless steel impellers with adjustable clearances and a high efficiency motor.

Monitoring

YVW are using the Entrack system to track electricity use across the sites. Attention is then focused on poor performing pumping stations, with adjustments made to the preventative maintenance schedules based on the data. The energy monitoring system will enable YVW to define a methodology for project selection through the calculation of KPI's such as kWh/ML. Monitoring also assists in determining where power factor correction can be used efficiently.

There is also a trial energy monitoring program at STPs to determine consumption of all processes through the installation of sub-metering.

Greenhouse Gas Offsets

YVW has developed criteria for the selection of offsets. Offsets are selected from projects based in Victoria, preferably from a local source.

YVW also purchased 10% GreenPower for the Mitcham Office.

Showerhead exchange program

This initiative is a program for households whereby an old showerhead is exchanged for 3-star efficient (9L/min) showerhead. The aim is to generate greenhouse gas abatements to offset internal emissions.

Assumptions used for calculating abatements:

- Each showerhead saves 200kg CO₂-e per year
- Abatement term of 7 years (consistent with NSW GGAS however the AGO has since issued guidelines on showerheads that only allow abatement to be claimed up until 31 December 2009).
- The 2006/07 aim is to replace 26,000 showerheads resulting in 5,200 tonnes of abatement.

Accreditation options include the Australian Greenhouse Office's Greenhouse Friendly™ program or Origin Energy's Carbon Reduction Scheme.

7 Water Case Studies

Continued

7.8 Sustainability Victoria

Sustainability Victoria has a role to facilitate environmental change in Victoria.

The water industry is a major electricity user in Victoria and by 2012 consumption levels are expected to increase to 50% above 1990 levels. The industry was responsible for 840,000 tonnes CO₂-e in 2005/06. The sector has been identified as particularly vulnerable to climate change.

The Victorian Water Plan has a requirement for water authorities to include greenhouse gas actions. The different authorities are at different stages in developing their greenhouse policies.

7.8.1 Greenhouse Reduction Working Group

In late 2005 a workshop was hosted by Sustainability Victoria and VicWater on issues relating to greenhouse. An outcome was the formation of the Greenhouse Reduction Working Group. There is membership and participation from all Victorian water authorities.

The working group has developed the following charter:

- Demonstrate leadership in greenhouse gas reduction;
- Set realistic stretch greenhouse gas reduction targets;
- Influence behaviour change based on communication and education;
- Influence adoption of a whole of system method to infrastructure design and operation;
- Incorporate an industry wide collaborative and cooperative approach.

The working group has made a series of recommendations for the industry.

1. Include a statement on reduction of greenhouse emission in the Statement of Obligations (SOO).
 - SOO is one of the main factors underpinning the actions in the water plan
 - No direct focus on greenhouse in the existing SOO
 - Provided direction to the Water Authorities
 - Sitting with the ministers office
2. Water authorities to adopt targets for greenhouse emissions reduction and renewable energy.

To progress to the setting of targets Sustainability Victoria, EPA and VicWater have been providing assistance to the water authorities to assist them with:

- Measurement and reporting of greenhouse gas emissions;
 - Determination of a baseline year without disadvantaging those organisations that have good data and have been working on reducing emissions;
 - Identification of existing measures in place to reduce greenhouse gases;
 - Other abatement or reduction opportunities;
 - Identification of any renewable energy projects;
 - Beginning the preparation of a prioritised action plan which also has emphasis on engaging water business staff.
3. Based on the information collected construct a 5 year action plan that is aligned with the water plan.

The action plan is to take a similar for to the carbon abatement hierarchy in Figure 10. Action plans will be reviewed by the EPA to ensure that they will meet future Victorian regulatory requirements. The Essential Services Commission (ESC) has not mandated a target but has indicated that they expect energy reduction and energy efficiency actions in the new water plan. Water authorities need to prove they have a mandate for the chosen options such as customer support.

7 Water Case Studies

Continued

4. VicWater to report yearly on greenhouse, energy and renewable energy KPIs.

The 2005/06 Victorian Water Review published by VicWater include data on greenhouse emissions and energy use for each water business.

- Breakdown for each business including: water treatment and supply; wastewater treatment; and water delivery.
 - Renewable energy used and produced.
5. Sustainability Victoria, VicWater and Water Authorities to provide practitioner support and education programs.

The task group meets four times a year as well as communicating regularly through an email network; sharing learnings and solutions. Some specific training has also been provided on topics such as improving pump efficiency and influencing change from the ground up.

7.8.2 Case Study: Opportunity Identification

Following the process outlined in Recommendation 2, consultants were engaged to conduct opportunity studies with the individual water authorities leading to the development of a prioritised action plan..

The first steps involved collection and collation of data for sites and whole of business. Existing information was used where possible including previous audits, identified opportunities and desired focus areas. The plans needed to include:

- Greenhouse and energy savings
- Simple paybacks
- The case to take to management /board
- Solutions outside the norm

Most organisations have focused on energy use and not methane and fugitive methane emissions capture opportunities.

Examples of actions identified are in the table.

Site Name	Description	Saving (GJ/y)	Reduction (t CO ₂ -e /y)	Saving (\$)	Implementation Cost (\$)	Reductions cost (\$/tCO ₂ -e/y)
Site 1	Demand mgmt	40 kVA	-	6,552	10,000	-
Site 2	VSD on aerators	315GJ	116	9012	20,800	179
Site 3	VSD on river pumps	50GJ	18.4	1,526	5000	272
	VSD on transfer pumps	500	184	15,260	50,000	272
Site 4	VSD on aerators	429GJ	158	13709	95,000	601
Site 5	Demand mgmt	100kVA	-	5160		
	Power factor	31 kVA	15	1600	6500	433
	VSD on aerators	551.7 GJ	203	17932	110,000	542

8 Principles for Water Industry Members

In May 2007, at the Energy and Greenhouse Mitigation Workshop, WSAA Members considered and debated the following principles and recommendations with a view to developing a consistent approach and future accounting development.

Principle 1

WSAA Members will set high standards for reporting and managing greenhouse gas emissions

If WSAA is exemplary in the standards it sets for greenhouse action and how it accounts for its greenhouse performance, this will provide the greatest certainty for long term decision making.

OUTCOME: WSAA members agreed in principle to this aspiration.

Principle 2

Annual energy and greenhouse gas emissions reporting should occur through a single reporting framework

Suggestion 1 WSAA Members utilise the AGO reporting framework (using AGO Factors and Methods Workbook and OSCAR) and propose that this also have the capacity to deal with less comprehensive reporting requirements (EEOA, ABARE etc) as sub-reports.

OUTCOME: WSAA general agreement however, not all members may be covered by AGO reporting or Energy Efficiency Opportunities Act mandatory reporting requirements.

Suggestion 2 WSAA members strive to report a complete picture of their emissions including significant Scope 3 emissions and fugitive emissions as water industry methodologies are improved.

OUTCOME: Agreed by most. Smaller utilities sought additional guidance in Scope 3 emissions reporting. Some is mandatory under the Greenhouse Challenge, some is voluntary and some is not easy or possible to measure. Future work may include a supplementary guide that covers Scope 3 reporting.

Suggestion 3 WSAA Members support research to develop better methodologies for reporting fugitive greenhouse gas emissions

OUTCOME – Agreed. WSAA's has commenced a project to review fugitive emissions methodologies and will be provided further advice to the AGO and WSAA Members.

Suggestion 4 WSAA members use product specific greenhouse gas emission factors where practicable and with consent from the AGO. Where this is not practicable, AGO state aggregated emission factors would be used.

OUTCOME : Agreed where there is a need

Suggestion 5 WSAA members recommend to the COAG Working Group on A National System for Streamlined Greenhouse and Energy Reporting/AGO to adjust state aggregated emission factors to net out renewables sold separately to standard electricity and correct for interstate trades of renewables.

OUTCOME: This was a significant issue for some utilities and due to the complexities of contractual arrangements with power companies. It was noted that this is a wider issue that just the water industry. The AGO may be releasing a discussion paper in the near future.

Principle 3

Renewable electricity should only be claimed once

OUTCOME: Agreed, however, there are different interpretations about what constitutes double accounting and it is recommended that members seek clarification from the Australian Greenhouse Office on interpretations in specific circumstances.

Principle 4

Greenhouse friendly products utilised by the water industry should be to 1) an accredited standard and 2) provide additional greenhouse benefit.

OUTCOME: Agreed as a best practice approach to minimising any risk to reputation and cost exposure.

Suggestion 6 WSAA should agree on a register such that offsets are 1) accredited to an approved standard and 2) that they provide additional greenhouse benefit.

OUTCOME: WSAA Members supported individual utilities considering and self managing the merits of offset products.