WATER SERVICES ASSOCIATION
of Australia

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Greenhouse Horizons Report

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Contents

Executive Summary

Water Services Organisations (WSOs) in Australia contribute an estimated 2.3 million of the 450 million tonnes of greenhouse gases released nationally each year. This represents around 0.5% and is a significant amount for a single industry.

This report is designed to highlight the major risks and opportunities for the Water Services Association of Australia (WSAA) associated with these emissions in view of the current regulatory and market climate for greenhouse gas emissions.

Greenhouse issues impact on a wide range of activities of the Water Industry. The key areas being:

- high use of electricity - (Total industry spend up to $150 million),
- direct methane emission - (Methane has 21 times the global warming potential of CO_2),
- prominent environmental profile - (Public commitments to sustainable practices), and
- future plans for growth and improved environmental performance.

The industry is therefore likely to be impacted on by most greenhouse mechanisms measures introduced either by government or through market forces.

Policy and regulations from international to local government level are having an increasing impact on the operations of greenhouse emitting organisations including WSOs. Governments that undertake measures to reduce greenhouse gas emissions are being actively supported by the wider community.

Currently in Australia there are few measures directly regulating or taxing greenhouse gas emissions. There are however a number of economic instruments now in place and under development that will financially penalise those organisations that do not seek to improve their greenhouse performance. Greenhouse also needs to be addressed in many regulatory approval processes.

Already many in the Water Industry have taken positive and strategic steps towards making the most of a carbon constrained future. Through public reporting some WSOs have made commitments to improving greenhouse performance (including those with and without Greenhouse Challenge Agreements).

To support the commitments made some have implemented energy management programs to reduce greenhouse gas emissions and energy costs. Some have also taken advantage of renewable energy available from biogas and from mini hydroelectric generation.

The key areas of interest for WSAA highlighted in this report are:

- the contribution from WSOs to Australia's greenhouse emissions is significant for a single industry, particularly in view of the many areas where greenhouse issues impact on WSOs and the total energy expense of the industry,
- for WSOs in Australia the key impact of international greenhouse measures is how these will be taken forward by the Federal, State and Local Governments,
- the Federal Government has taken measures that favour organisations that take action to reduce greenhouse gas emissions. They have also introduced regulations and policies that encourage the development and use of renewable energy,
- emissions trading or other form of taxation would have a major impact on WSOs. This however is unlikely to be implemented in the short to medium term (e.g. 3 years),

Executive Summary
Continued

- State Government Regulations and Policies are increasingly requiring operators and developers to address greenhouse issues in approval processes. State governments are also introducing their own greenhouse reduction targets and seeking support from WSOs to guide action in the area of waste and wastewater management,
- the community has an expectation that service providers such as WSOs will act in a sustainable manner. They also have greater access in determining the performance of these organisations in meeting their obligations and commitments,
- Greenhouse Challenge is currently the principle mechanism for WSOs to publicly state their commitment to improving greenhouse performance. Four WSOs have signed agreements with a number of others proposing to do so. There is an opportunity for WSAA to join Greenhouse Challenge on behalf of its members. A number of associations have supported members in this manner,
- there are a number of opportunities for WSOs to generate power through the application of renewable and "green" technologies. These not only reduce greenhouse emissions and the need to purchase power externally they are also able to attract an income stream. This green premium may be sufficient to make projects viable that have previously been rejected on economic grounds. It also allows WSOs to consider new projects,
- WSOs may be a partner for third parties seeking to invest in renewable or greenhouse gas abatement projects. These third parties may be seeking to invest in wind farms or plantations on WSO property. They may also seek investment in joint greenhouse gap abatement projects.

The report highlights many issues that should addressed further by the association and individual members. In particular estimates of emissions and emission profiles should be assessed using industry data.

There is growing consensus that the future business environment will introduce additional costs on the greenhouse emissions of WSO's. Unlike many other businesses, however, WSO's have a unique opportunity to significantly contribute to Australia's greenhouse gas reduction efforts. In many cases, their operating position may be simultaneously improved through active participation in the emerging markets for greenhouse gas reductions.

International Greenhouse Status

Kyoto Protocol

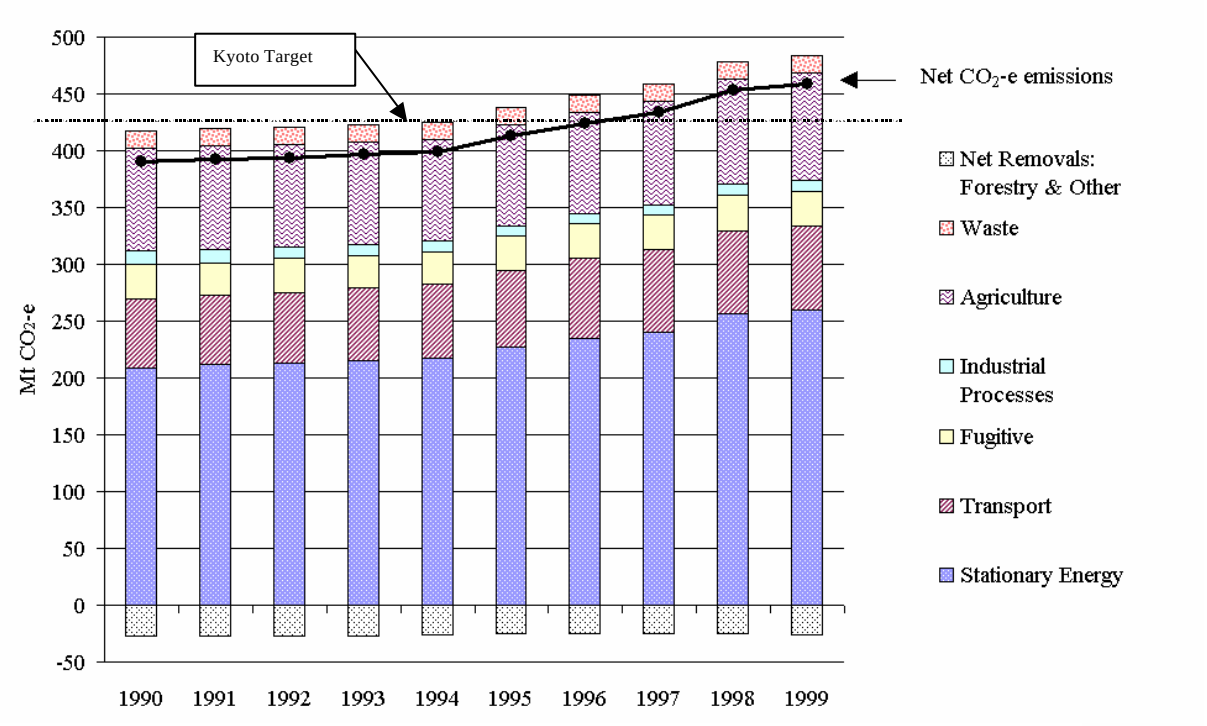
The Kyoto Protocol has been established under the United Nations Framework Convention on Climate Change (UNFCCC). It contains mandatory greenhouse targets for developed countries and provides for a range of mechanisms for achieving them. The protocol has been signed by 38 developed nations but is yet to be ratified.

Under the Kyoto Protocol, Australia would need to reduce emissions significantly from the business as usual projection to achieve a level of 108% of its 1990 emissions inventory by the first Kyoto measurement period of 2008 – 2012.

The Australian federal government, incorporating contributions from some industries and industrial groups, is implementing a range of actions to reduce Australia's greenhouse emissions. It is however, likely that without significant further action there will be a gap between what can be delivered under domestic response measures and our international commitments.

Should the Kyoto Protocol be ratified, emission caps (such as those proposed under the Kyoto Protocol) may be absolute and would require business growth to be managed within an allocated level of greenhouse emissions. This means that business will need to find ways of reducing emissions including lower emission energy sources, more energy efficient materials, improved energy efficiency and technology, and better management processes.

Achieving the greenhouse reductions that are required to minimise future environmental impacts will require significant restructuring in energy supply, economic markets and business operations on both a domestic and global scale.



Source: National Greenhouse Gas Inventory:1990 to 1999 Summary and Analysis of Trends and Indicators, AGO Website Emissions and removals by sector (excluding F&GC), 1990–1999

COP 7 Marrakech – November 2001

There has been intense international debate over the framework of the Kyoto Protocol in recent years. The Seventh Session of the Conference of the Parties to the UN Framework Convention on Climate Change (COP 7) has resulted in the adoption of the Marrakech Accords, the rules for the operation of the Kyoto Protocol.

The negotiations covered several key areas including flexibility mechanisms and accounting, compliance, sinks and developing nation involvement. The Protocol is now in a position to be ratified by countries, with Japan, Canada and New Zealand planning to ratify by September 2002, coinciding with the tenth anniversary of the Rio Earth Summit. Australia has not yet committed to ratification.

Mechanisms and Accounting

The Protocol establishes three market based mechanisms aimed at reducing the cost of achieving emission reductions: Emissions Trading; Clean Development Mechanism (CDM) and Joint Implementation. Some opportunities exist for WSO's to assist other countries in developing CDM or JI projects.

Sinks

The Protocol establishes the principle that countries may receive credit toward their emissions target for carbon sequestered by forests, soils and other sinks.

Compliance

Failure to meet an emissions target will require the restoration of tonnes at a rate of 1.3 to 1 in the next target period plus suspension of eligibility to sell credits and the requirement to develop a compliance action plan. A decision on whether the compliance regime will be legally binding was deferred.

The major impacts on WSOs from international action on greenhouse is how these actions are taken forward in Australia by the Federal Government. Irrespective of the Federal Government's position WSOs involved in international forums may see impacts on their business.

Government Policy and Directions

Federal Government

The Australian Federal Government has remained committed to international action to reduce greenhouse emissions in accordance with the UNFCCC on the basis that commitments and processes are:

1. Equitable and include developing nations
2. Do not disadvantage Australia's trade competitiveness
3. Recognise the contribution of sinks to meeting any international commitments
4. Supportive of mechanisms that promote least cost abatement including international emissions trading

The Government has yet to make a decision on implementing a national emissions trading system, however, it has announced that such a system will proceed only if the Kyoto Protocol is ratified by Australia and has entered into force (i.e. Kyoto commitments become legally binding); and there is an established international emissions trading regime in place. This effectively means that a "national emissions trading scheme" will not appear in the immediate future.

Importantly, the Government has announced that it will take great care to avoid greenhouse policies that disadvantage companies who have moved early (i.e. before any mandatory obligation) in undertaking emission abatement actions or that discriminate against new industry entrants.

The major outcome for WSOs is the commitment to the negotiations over the Protocol that has been made by Australia and the reinforcement of Greenhouse as a priority issue.

Additional issues/outcomes that are relevant to WSOs are:

- the Special Climate Change Fund or Kyoto Protocol Adoption Fund may offer some opportunity for WSOs. The opportunities that may exist include helping developing countries to reduce emissions from wastewater, as well as forestry activities that also improve conservation of bio-diversity and sustainable use of natural resources. This may represent a business opportunity, while also assisting Australia or other developed nations to achieve its emission targets if the projects are conducted as part of the CDM,
- general afforestation or reforestation activities will continue to be accepted activities under the Kyoto Protocol. Further land management activities involved with the use of bio-solids may now also be accepted. The emissions reductions associated with this are likely to be complex and an initial evaluation of the benefit and costs to WSOs needs to be carried out.

National Greenhouse Strategy

The National Greenhouse Strategy (NGS) is the framework under which the federal government has formulated its response to climate change. The Federal Government programs are delivered through the Australian Greenhouse Office (AGO) and various Federal and State departments and agencies.

Of the greenhouse management mechanisms developed, seven currently have the potential to significantly impact WSO's over the next ten years:

- global emissions control using economic instruments and its flow-on effect to Australian business (proposed),
- **Mandatory Renewable Energy Target** (MRET) of 9500 GWh applying to large electricity purchasers on grids greater than 100 MW (in existence),
- **Green Power** program operated by the National Green Power Accreditation Steering Group,
- voluntary **Greenhouse Challenge** program (in existence),
- Government support for the international **Cities for Climate Protection Program**,
- the **Greenhouse Friendly Program**, enabling industries to 'sell' emissions offsets, and
- implications of the National Greenhouse Strategy for State Government policies.

Several funding programs such as the Greenhouse Gas Abatement Program (GGAP) and Remote Renewable Generation Rebate Program (RRGRP) have been established to support the NGS. Other areas of potential significance to WSOs are Remote Area Power Schemes (RAPS)

Modules three and seven of the NGS are the key modules with respect to the any new projects. Module three deals with the need to incorporate greenhouse issues into planning and decision making and to ensure that potential greenhouse emissions from projects are addressed through the environmental assessment process. Module three also includes the Greenhouse Challenge Program, Emissions Trading and the role of local Government in the Cities for Climate Protection Program. Module seven addresses Greenhouse Best Practice in Industry.

Government Policy and Directions

Federal Government
Continued

Mandatory Renewable Energy Target

One of the most significant policy initiatives of the Federal Government has been the establishment of targets for the inclusion of renewable energy in electricity generation from April 2001, called the Mandatory Renewable Energy Target (MRET).

The objective of this initiative is to increase renewable energy generation in Australia to approximately 12.7% of total energy supply by 2010 (from 10.7% in 1990). This represents an additional 9,500 GWh of renewable energy being supplied. The target is often referred to as the "2% Target", or MRET.

Under the measure, all electricity retailers and wholesale buyers of electricity on supply grids exceeding 100 MW capacity are legally required to acquire renewable energy certificates to meet their target obligations.

The measure will be gradually introduced using a series of phased targets. The gradual introduction of the 2% target is intended to allow the renewable energy industry to respond to the measure and to help achieve cost-effective implementation and avoid energy market shocks. The Office of the Renewable Energy Regulator has been established to administer the target.

Parties that are liable under the measure will be required to acquire Renewable Energy Certificates (RECs) to a value in line with the legislation, as a proportion of their electricity purchases.

A financial penalty will be imposed on any liable party that does not meet their allocated purchases and therefore hold the required quantity of renewable energy certificates. The penalty is $40 for each MWh gap between the certificate holding and the respective target. Penalties will be redeemable if an annual shortfall is made up over the following three years. Some senators (Democrats and Greens) and green power generation companies (Stanwell) are arguing for higher penalties, up to $80 /MWh and increased targets.

Eligible renewable energy sources include:

Solar	Wind	Geothermal
Ocean, wave & tidal	Hydro	Bio-fuels
Solar water heating	Renewable RAPS	Co-firing
Fuel cells	Pump storage hydro	Specified waste *

* Specified waste sources of renewable energy include biomass wastes from agricultural crops (such as sugar cane bagasse), forest wastes, biomass from food production and processing (and by inference beverage manufacturing), sewerage sludge and biomass from solid municipal waste.

The retail energy organisations and wholesale energy purchasers may acquire certificates through direct ownership of renewable energy generation or through the purchase and assignment of certificates from an independent renewable energy generator (including potentially WSOs).

It is important to note that the market for trading renewable energy certificates is separate to the market for trading carbon credits or permits under the Kyoto Protocol or some other domestic or international system. It is also separate from the physical sale of electricity.

The extra capital investment that is required to meet the target for renewable generation has been estimated at between $1.8 - $3 billion over the period to 2010. The expected share of Australian investment is expected to be around 75 percent.

MRET represents a major opportunity for WSOs. Projects that qualify will not only provide electrical power for internal use or sale back to the grid; they will also gain revenue through the sale of RECs. The value of the REC could be as much as the value of the power generated.

MRET means that WSOs can now consider projects for power generation that would otherwise have not been economically viable including sludge gas, mini-hydro projects and remote renewable projects.

Greenhouse Challenge

The Greenhouse Challenge Program is a Federal Government initiative aimed at meeting Australia's commitments to the international community for the reduction of greenhouse gas emissions. The Australian Greenhouse Office (AGO) administers the program.

Currently the program is voluntary. Compulsory involvement at a later stage is a possibility, at least recommended if participation in emissions trading is planned.

Data collection, inventory development and the identification of abatement actions are a cornerstone of the Greenhouse Challenge program.

Companies that are actively involved in the Greenhouse Challenge Program could be given some lenience if emission caps are established as a precursor to a more stringent government policy on greenhouse mitigation.

There are presently four Australian WSOs that are members of Greenhouse Challenge. A number of other WSOs have committed to joining.

The Greenhouse Challenge Program is also open to industry associations. This may prove an effective mechanism for the industry and for WSOs not prepared to individually commit to Greenhouse Challenge to put their "hat in the ring".

Government Policy and Directions

Federal Government
Continued

GreenPower

The National GreenPower program is a collective state government program, co-ordinated by the Sustainable Energy Development Authority NSW (SEDA). Accreditation of generators occurs through the National GreenPower Accreditation Steering Group. It requires voluntary participation by both electricity retailers and end-use customers.

Power is purchased by a licensed retailer from a renewable energy generator (including WSOs) or broker and sold to business or residential customers at premium prices. The way in which GreenPower is sold varies significantly between Retailers. Some of the options include charging premium prices on every kWh sold to a GreenPower customer, or requesting fixed contributions ($/annum).

Power purchased by electricity retailers for GreenPower purposes may not be included in their MRET requirements. This ensures that Retailers cannot use a customer's voluntary GreenPower purchase to meet their government-imposed requirement (MRET).

Since no requirement is placed on retailers to sell GreenPower, the market for GreenPower is in part determined by the community, and in part determined by the marketing efforts of Retailers. The physical electricity must be sold to a retailer.

WSOs may purchase Greenpower from retailers to reduce greenhouse emissions. They may also be involved in the generation and sale of Greenpower.

Remote Area Power Schemes (RAPS)

A number of government incentives exist to replace high cost diesel power generation in remote areas with renewable energy. These could be explored where WSOs have remote diesel pumping and monitoring stations.

It should be noted that the Renewable Remote Power Generation Program (RRPGP) specifically excludes involvement from state government agencies not involved in power generation. This may impact on the eligibility of some WSOs.

Greenhouse Friendly Program

In 2001 the AGO launched the Greenhouse Friendly Program. The program is an initiative of the Commonwealth Government through the Australian Greenhouse Office. The Program is designed to achieve the following broad objectives:

- to engage consumers on climate change issues and greenhouse gas abatement,
- to broaden the basis for investment in greenhouse gas abatement,
- to enable product manufacturers or service providers to market a product or service differentiated by offsetting the cradle to grave greenhouse gases generated by a product or service, and
- to give consumers the confidence to make choice based on accurate and reliable information.

WSO's can participate in a number of ways:

- they can offer Greenhouse Friendly products or services by offsetting all of the "cradle to grave" emissions associated with that product or service. For example a WSO could offer Greenhouse Friendly Water by offsetting all emissions associated with the water supply. The WSO would have to pay someone to offset those emissions at the prevailing rate – currently $3-7 per tonne CO_2e,
- alternatively a WSO could undertake greenhouses offset projects on behalf of somebody else, and sell the right to claim the offset. The criteria for such projects are set out below.

'Abatement Projects will be accepted under the Certification Program if it can be demonstrated that the projects will achieve additional greenhouse gas abatement which:

- is financially additional to the company's normal or required investment in greenhouse gas abatement,
- occurs within Australia, and
- has an identified number of offsets that will be used for "Greenhouse Friendly" Certification purposes and that these identified offsets will be retired once certified under the program.

Abatement will not be accepted under the program if:

- the abatement was implemented to meet regulatory compliance obligations related to greenhouse gas emissions under Commonwealth or State legislation;
- the abatement was financed through another Commonwealth or State measure; or
- the abatement project results in shift of emissions to other locations within Australia or overseas.'

State Government

The States and Territories have a significant role to play in the implementation of the National greenhouse Strategy (NGS). Two key modules of NGS for State and Territory action are Module 3, Partnerships for Greenhouse Action (Governments Industry and the Community) and Module 7. Greenhouse Best Practice in Industrial Processes and Waste management. Within module 3, Section 3.3, Environmental Impact Assessment is a key initiative whilst within module 7, Section 7.1, Industry Emissions is key.

Each State or Territory has either addressed or is in the process of addressing Module 7, Sections 3.3, as part of their role in implementing the NGS. Module 7, Section 7.1, is less advanced and is more closely tied to Commonwealth programs. Most State and Territory governments are addressing section 3.3 by releasing guidelines for the treatment of greenhouse in environmental impact assessments.

Victoria

The Victorian Government is developing a broad based Greenhouse Strategy to encompass all existing and planned greenhouse measures. Within this context the Victorian regulatory framework with respect to greenhouse is about to undergo a significant change. The Victorian environmental assessment procedures are being updated to include requirements to address the greenhouse impacts of developments. Also, the Victorian EPA is updating the State Environment Protection Policy (Air Quality Management) to require greenhouse management be addressed in applications for works approvals and licences. WSO's will therefore need to address the greenhouse management requirements of both the EPA and Department of Infrastructure.

EPA currently requires an Environment Improvement Plan (EIP) to be submitted as part of an application for a licence, accredited licence, a licence amendment or a works approval. The EIP will need to include consideration of greenhouse and energy issues. This will include:

- an estimate of the projected gross annual energy consumption by energy type and the associated greenhouse gas emissions, covering: use of fuels on site and consumption of electricity that is generated off site,
- an estimate of the annual levels of other greenhouse gas emissions – ie, carbon dioxide, methane, nitrous oxide, HFC's, PFC's and sulfur hexaflouride – associated with the proposed processes or activities, and
- the identification of eco-efficient practices and technologies that will be implemented as part of the proposed operations. These should be the best practicable options for minimisation of wastes (including emissions) and resource consumption (including energy use) at each stage of the production process.

Note: If the operator is part of the Federal Greenhouse Challenge Program they will not have to undertake duplicate reporting. The GCP reporting is more rigorous than that required under the draft SEPP.

South Australia

The South Australian Government greenhouse strategy is set out in the document South Australia: Reducing the Greenhouse Effect. Energy SA is running a number of state government programs. These include the government "Agency Greenhouse Targets" program, of which WSOs is a part. Under the Greenhouse Targets Program, staff of the Office of Energy Policy work with each government agency to set targets, and then provide advice and information on the most effective methods of achieving them. SA Water has some reporting requirements under the program.

New South Wales

In 1998 the NSW Government released the NSW Greenhouse Action Pan 1998, aimed at reducing greenhouse gasses across a range of sectors.

The NSW Department of Planning has released a discussion paper on Energy and Greenhouse Guidelines for Environmental Impact Assessment. The guidelines aim to present a clear and comprehensive statement on energy and greenhouse issues that need to be addressed when preparing an EIS under the Environmental Planning and Assessment Act 1979 (EP&A Act). The guideline provides tools to assist in:

- the identification of relevant energy and greenhouse features of a proposal,
- the development of potential energy reduction and greenhouse gas mitigation opportunities,
- determining the level of energy and greenhouse assessment required, and
- conducting energy and greenhouse assessments.

More recently, the Ministry of Energy Utilities (MEU) has introduced penalties to support legislation that requires energy retailers to report and reduce greenhouse emis-

Government Policy and Directions

State Government
Continued

sions associated with their energy supplies. The greenhouse targets are significant and are going be difficult to achieve.

Queensland

The Queensland Government has released a number of energy and greenhouse policy documents in recent years. In 1999 it released the Queensland Implementation Plan in response to the NGS. In May 2000 it released the Queensland Energy Policy: A Cleaner Energy Strategy. In 2001 it released the Queensland Greenhouse Policy Framework: A Climate of Change.

As part of the Greenhouse Policy Framework the Queensland EPA is developing guidelines for addressing greenhouse emissions in the environmental impact assessment process.

Western Australia

The WA Government released the WA State greenhouse Strategy in 1995.

In 1998 the WA Government released a document entitled Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection ACT 1986) for Minimising Greenhouse Gas Emissions. This Interim measure was the first in Australia to provide guidance on addressing Greenhouse emissions in the Environmental Assessment Process. The purpose is to: ensure best available efficient technologies are used in WA to minimise greenhouse emissions; ensure that potential greenhouse gas emissions emitted from proposed projects, where greenhouse is considered to a relevant environmental factor are adequately addressed; and to protect the environment.

Tasmania

In 1999 the Tasmanian Government released the Tasmanian Greenhouse Statement, which sets out the governments response to the Kyoto Protocol. The Tasmanian Government has also released the NGS Implementation Plan.

The Tasmanian Government has included greenhouse gas emissions in the Department of Primary Industry Water and Energy environmental assessment procedures. The guidelines have been updated for Development Approval and Environmental Management Plans for all level 2 activities where there is significant potential greenhouse gas emissions as outlined in the Environmental Management and Pollution Control Act 1994 and also for all Projects of State Significance.

Australian Capital Territory

The ACT Government has outlined its response to the NGS in the ACT Greenhouse Strategy released in January 2000. The ACT Government is updating their planning approval process to take greater account of energy efficiency and greenhouse impacts of new developments.

Northern Territory

The Northern Territory Government has developed the Northern Territory National Greenhouse Strategy Implementation Plan.

The NT Government has conducted a review of the effectiveness of its current environment impact assessment guidelines in dealing with potential greenhouse impacts.

Local Government

Cities for Climate Protection

Cities for Climate Protection (CCP) is an international program that empowers local governments to take action on greenhouse. CCP Australia is an International Council of Local Environment Initiatives (ICLEI) program in conjunction with the Australian Greenhouse Office (AGO).

CCP provides local governments with a strategic framework to reduce greenhouse gas emissions by assisting them identify the emissions of their council and community, set a reduction target and develop and implement an action plan to reach the target.

Council action might include reducing the energy used in facilities owned by local government, capturing methane from landfills / wastewater and incorporating energy efficiency in purchasing policies.

Local governments signatories to CCP that have a responsibility for managing water and/or wastewater will have a number of requirements that relate to water and wastewater to move through the staged program.

A number of combined local councils and WSO's have joined the program in Australia.

Water Industry Greenhouse Profile

The National Greenhouse Gas Inventory (NGGI) prepared by the Australian Greenhouse Office shows that for 1999 Australia's total emissions were 458 million tonnes of CO_2 equivalent.

Greenhouse gas emissions from the Water Industry can be classified into the following major categories:

1. CO_2 emissions associated with the use of electricity (generally occurring off-site)
2. CO_2 emissions associated with the combustion of fuel (diesel, methane, petrol, LPG)
3. Methane (CH4) emissions from decomposition of organic matter

The NGGI does not separately identify total emissions from the Water industry. It does however estimate annual methane emissions from wastewater handling to be 1.4 million tonnes (CO_2e) (0.3% of all emissions). This figure excludes emissions associated with the use of electricity and fuels and excludes any carbon sinks from tree plantations and re-vegetation. It does include wastewater handling by industry other than WSOs.

Using public information available from WSOs (e.g. annual reports and Greenhouse Challenge Agreements) and from Energetics own investigations it is estimated the total greenhouse gas emissions for WSOs is around 2.3 million tonnes.

This is around 0.5% of Australia's total greenhouse emissions.

To place this in perspective the contribution of the total emissions from the Australia's plastics and chemical industry is around 2% and from operations of Australia's railway is about 0.3%. The emissions from the Water industry are about the same as those from the management of manure across Australia!

As noted above, greenhouse gas emissions for the water services industry are made up of a number of sources. The main sources are:

- Electricity — *Power generated mostly off site from fossil fuels*
- Natural Gas — *Heating and engines*
- Diesel — *Vehicles and engines*
- Petrol — *Vehicles*
- LPG — *Vehicles and heating*
- Methane — *Direct from sewage or converted to CO_2 after combustion*
- Agriculture — *Livestock on land*

N_2O — *Application of raw sewage to land*

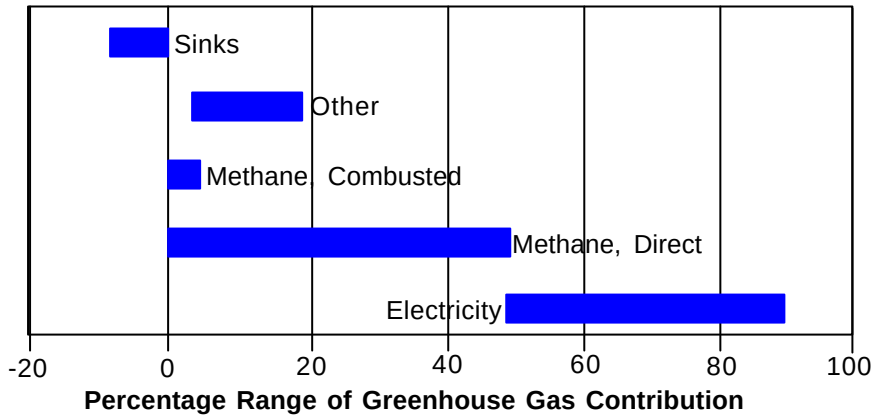
A number of WSOs also have greenhouse sinks associated with plantations of trees and re-vegetation, particularly in catchment areas.
When assessing risks and opportunities for the Water Services industry as a whole and for individual operators it is important to understand the relative contribution of each of the above.

The chart below shows the relative spread of contribution (or reduction in the case of sinks) from each source.

Water Industry Greenhouse Profile

Continued

Figure 2 – Greenhouse Gas Contribution in WSOs



There are many factors that will affect the profile of a specific WSO. The main factors are:

- geography of water supply (e.g. some WSOs have extensive pumping requirements for raw water supply others can rely on gravity feed),
- integration of services (some WSOs complete only part service e.g. Melbourne Metro retailers),
- water treatment method (e.g. anaerobic v aerobic, methane capture technologies),
- availability of land for plantations, and
- weather patterns.

While the figures in the above chart would need to revised using specific inventory data from all WSOs, they show that electricity is the dominant greenhouse gas contributor for the majority of WSOs and that methane emissions show the greatest variance between different operators.

Water Industry Risks

Greenhouse gas emissions from WSOs are large enough to provide significant exposure to any legislated greenhouse mitigation measures introduced by governments.

Financial exposure to the industry may manifest direct or indirectly as a result of:

- increased costs for energy,
- additional costs for project approvals,
- additional costs for design and equipment,
- additional costs for administration and reporting, and
- potential costs for emitting methane.

Poor performance in greenhouse management may also negatively impact on an organisation in the areas of corporate profile and increased attention from regulators.

Cost of Energy

Energy is a major operating expense for many WSOs. Electricity costs for the industry are estimated by Energetics to be around $150 million per year. Sydney Water for example uses 1.2% of NSW's electricity supply (ref: Sydney Water web site).

Whether regulated costs associated with greenhouse management are applied directly to end users, energy generators, or to energy retailers, additional costs are likely to be passed to end-users.

The MRET 9500 GWh target, introduced in April 2001, applies to electricity retailers and large wholesale buyers on grids over 100 MW capacity. It is estimated that MRET will lead to an average price increase for electricity of approximately 1.3 – 2.5% or around 38 – 95 cents/MWh by 2010. When compared to current market prices for electricity at $60-80MWh the incremental price adjustment that may result from the 2% renewables target is minimal. However, the target may rise at a later date.

The impact of emissions trading or a form of carbon tax on WSOs is dependent upon the final models accepted for both international and national emissions control. It could range from:

- Option (a) - higher energy prices as primary energy producers pass on the costs of meeting their permit requirements, to
- Option (b) - a requirement for WSOs to enter the emissions trading market to secure permits covering portions of their existing and future emissions or trade sequestration credits / or pay a carbon tax.

Irrespective of the final models, it would appear that WSOs would not escape the impact of emissions trading or carbon taxes in any of its forms.

Modelling completed by Energetics shows the cost impact of a trading / taxing scheme would range from a low of 2.5% to 15%.

Water Industry Opportunities

WSOs are well placed to take advantage of opportunities presented by a carbon constrained future. These opportunities lie in traditional improvement areas and in areas unique to the water industry.

Where a strategic approach is taken to greenhouse management, WSOs may see improvements in operating costs, efficiencies, regulatory control and corporate profile that may not have manifested without greenhouse appearing as a business issue.

The key areas where greenhouse management can manifest as a benefit to WSOs are:

1. Energy Efficiency,
2. New Technologies and Fuels,
3. Renewable Energy and Carbon Market Mechanisms,
4. Sequestration,
5. Greenhouse offsets on behalf of others (Greenhouse Friendly Program).

Many of these opportunities could be introduced without compromising service or function of the water or service supplied. They can also deliver substantial cost savings to the organisation and in many cases require little or no capital investment.

Energy Efficiency

Energy use and more particularly electricity use are major contributors to WSOs greenhouse emissions and therefore energy efficiency becomes an important greenhouse reduction measure.

Experience from the WSOs and other industry shows that savings in energy of up to 15% are readily achievable through the application of energy management principles. While potentially less “exciting” than renewable energy and new technologies this is generally the most effective way of reducing greenhouse emissions and reducing costs.

Water conservation and waste reduction is an important business aim for many WSOs. These measures are often compatible with energy and greenhouse reduction measures.

Due to the energy intensive nature of Australian Water supplies, reducing per capita water consumption will have a direct impact on energy usage and greenhouse emissions. Water conservation measures involving the substitution of fresh water with tertiary-treated effluent, however, may also have an energy and cost penalty due to pumping requirements.

Renewable Energy

WSOs have a unique opportunity to capture and utilise renewable energy. Throughout the water delivery and waste treatment systems, potential sources of energy recovery and generation exist.

The viability of energy generation from renewable sources is improved under the Mandatory Renewable Energy Target. An additional revenue stream of $10-$40 / MWh can be included into renewable generation energy models. This represents the estimated price paid for the "green premium" over the standard power price for a Renewable Energy Certificate (REC).

Note that the non-compliance penalty value under the MRET legislation is $40/MWh (i.e. $57/MWh post-tax). This is assumed to be the ceiling value. The marginal cost of generation and hence the "green value" for many renewable projects is below this level.

The revenue attributable to the "green" component of the power may also come from a number of sources such as any market participant who places an additional value on the renewable energy.

Mini-Hydro

It is important to recognise that mini-hydro generation on pipelines where the water has been pumped to a high level may not be eligible for RECs. This needs to be confirmed for each specific site before full business-cases are completed. Nevertheless, reduction of grid-based electricity will still deliver the greenhouse reductions. Many similar systems have shown to be viable in their own right without the need of RECs.

Biogas Recovery

Biogas recovery has the potential for replacing existing natural gas usage and/or electricity consumption. Greenhouse benefits will depend upon fuel substituted for.

Diesel Substitution in Remote Areas.

It is likely that the greenhouse savings from replacing diesel with renewable energy schemes will be relatively small, but may be cost-effective due to the relatively high cost of diesel.

Examples of renewable energy generation for WSOs are shown in the following table. The potential for attracting a GreenPower or REC premium price is also shown.

Water Industry Opportunities
Continued

Table 1 - Renewable Energy Opportunities

Technology	Potential Application within Water Services Organisations	GreenPower Accreditation	Eligible for RECs
Hydro	Replace pressure reducing valves with turbines (although this may be "energy recovery" rather than renewable energy)	Maybe, need to net out fossil fuels	Maybe, need to net out fossil fuels used in pumping.
Specified waste *	- Maximise biogas capture and use - On-site industrial treatment - Green Waste program - Waste from forestry activities	Yes, although forestry wastes for energy is drawing public criticism.	Yes, although RECs from forestry waste are attracting lower prices than other sources.
Renewable RAPS	Remote pumping, monitoring, signalling stations, or diesel facilities.	Yes	Maybe, as long as RAPS replace diesel electricity.
Pump storage hydro	Transfer pipelines and storage reservoirs. May be an opportunity to maximise electricity pool revenues.	Where fossil fuel usage is netted out. Hydro not really attractive under GreenPower	Yes, where fossil fuel usage is netted out.
Solar	Remote pumping, monitoring, signalling stations, or diesel facilities.	Yes	Maybe, as long as RAPS replace diesel electricity.
Wind (small scale)	Remote pumping, monitoring, signalling stations, or diesel facilities. Particularly coastal sites	Yes	Yes
Wind (large scale)	Commercial size	Yes	Yes
Solar water heating	Replacement of domestic hot water in administration facilities with solar hot water.	No	Yes, where replaces electricity
Geothermal	Air conditioning systems	No	Unclear
Bio-fuels	Forestry plantations and thinnings	Yes, although accreditation for forestry wastes may be unpopular.	Yes, in certain circumstances
Co-firing	Sending biomass fuel to other power generators for co-firing with fossil fuels.	Yes, although accreditation for forestry wastes may be unpopular.	Yes, in certain circumstances

* Specified waste sources of renewable energy include biomass wastes from agricultural crops (such as sugar cane bagasse), forest wastes, biomass from food production and processing (and by inference beverage manufacturing), sewerage sludge and biomass from solid municipal waste.

Carbon Credits & Sequestration

Methane Emissions

Direct methane emissions are likely to be excluded from the allocation of permits to the energy sectors (since it is not an energy based emission), and represents a separate category for which an allocated emission limit may apply.

Since the method for allocating Australia's emission permits is not certain, and the trading rules yet to be determined, no conclusions can be made about the "credit value" of methane reductions in a domestic emissions trading scheme, or indeed any restrictions on methane emissions from the waste sector.

Reduction of direct methane emissions where practicable would, however, represent sound risk management strategy. Reductions may also have value in the Greenhouse Friendly program.

Sequestration

Similarly, for carbon sequestration, no firm conclusions can be made, although much more clarity is appearing on the role of carbon sinks in international negotiations of the Kyoto protocol (Australia successfully negotiated a wide ranging role for carbon sinks). Given the significance of the role of carbon sinks in Australia's negotiating position at Marrakech, it would appear likely that it would play a significant role in a domestic emissions trading system.

It appears likely that carbon sequestration using forestry activities show the greatest potential for establishing verifiable "carbon credits", or "emission reduction units". Indeed, some international firms have secured "rights" to "credits" from existing forestry activities in Australia, projecting that these may have a future value under an international emissions trading system. Since no such scheme currently exists, these firms have incurred a cost and taken a risk in securing of these rights. Activities falling into this category may include the afforestation/reforestation of land at WSO reservoirs.

Further credits may be available by changing agricultural, forestry or soil management practices, thereby increasing carbon retained by the soil and other products. Due to the complexity of the carbon transfers and interactions between biological systems, this form of sequestration is the subject of international and national debate, and is more complex to monitor and verify than forestry. Activities falling into this category would be the potential increase in soil carbon stocks and reduction in N_2O from fertiliser use, through application of bio-solids by WSOs.

For WSOs a suitable emission reduction project of reasonable size would need to be undertaken to justify involvement with emissions trading. Complexities and costs involved in verifying and trading these reduction units need to be considered.

Information from the State Forests of NSW suggests that a minimum investment of $3 million (equivalent to 1,000ha) is required. Investment is expected to return between 9% and 11% over 30 years.

Other Opportunities

Green Branding

The AGO has recently developed a "Greenhouse Free / Greenhouse Friendly" certification program. There may be an opportunity to brand water supplied by WSOs as "Greenhouse Friendly" or "Greenhouse Free". To do this, WSOs would have to undertake a number of greenhouse offset or efficiency activities that reduce or eliminate greenhouse emissions.

Alternatively, WSOs may be able to provide emission reduction projects for another company's greenhouse abatement scheme.

Greenhouse Gas Abatement Program

The Greenhouse Gas Abatement Program is designed to encourage large-scale (250,000 tonnes CO2e) abatement programs that are currently not viable. The program will provide funding of $100 million per year for four years from 2000-01 to 2003-04. Funding will be determined on the basis of greatest greenhouse abatement per dollar invested. There are four themes for the program: Technology deployment; Regional greenhouse partnerships; Built environment and infrastructure; and Greenhouse abatement facilitation.

First round funding attracted 107 projects to the value of $1.7 billion. Successful projects included: Ethanol plants, HFC reduction; Cogeneration; Generator turbine efficiency; Fuel conversion; and Methane to electricity.

Emissions Trading Offsets (Clean Development Mechanism, Joint Implementation, Sequestration)

The Special Climate Change Fund or Kyoto Protocol Adaption Fund may offer some opportunity for WSOs. The opportunities that may exist include helping developing countries to reduce emissions from wastewater, as well as forestry activities that also improve conservation of biodiversity and sustainable use of natural resources. This may represent a business opportunity, while also assisting Australia to achieve its emission targets if the projects are conducted as part of the CDM.

General afforestation or reforestation activities will continue to be accepted activities under the Kyoto Protocol. Further land management activities involved with the use of biosolids may now also be accepted. The emissions reductions associated with this are likely to be complex and the benefit and costs to WSOs would need detailed evaluation.

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