



# RESOURCE EFFICIENCY OPPORTUNITIES PROJECT

NOVEMBER 2008

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## List of acronyms and abbreviations.

Acronym	Definition
BOD	Biochemical Oxygen Demand
CCRC	Corporate Community Reference Group
CH <sub>4</sub>	Methane
CMA	Catchment Management Authority
CO <sub>2</sub>	Carbon Dioxide
CPP	Cleaner Production Partnership
DE	Diamond Energy
DSE	Department of Sustainability & Environment
EIP	Environmental Improvement Plan
EMS	Environmental Management System
EPA	Environment Protection Authority
EREP	Environment and Resource Efficiency Plans
ESC	Essential Services Commission
GAP	Greenhouse Action Plan
GVW	Goulburn Valley Water
N <sub>2</sub> O	Nitrous Oxide
O&M	Operations & Maintenance (manual)
SAP	Sustainability Action Plan
SAT	Sustainability Assessment Tool
SIP	Sustainability Improvement Plan
SOC	Shepparton Operations Centre
SPS	Sewer Pump Station
SS	Suspended Solids
WCS	Water Conservation Strategy
WELS	Water Efficiency Labelling Scheme
WMF	Wastewater Management Facility
WSAA	Water Services Association of Australia
WTP	Water Treatment Plant

# Resource Efficiency Opportunities Project

## 1 Introduction

In November 2007 Goulburn Valley Water (GVW) was the first organisation to sign a Corporate Licence with the Victorian EPA. The Corporate Licence amalgamates 26 EPA Licences, and streamlines the environmental monitoring and reporting requirements to deliver business efficiencies.

The Corporate Licence contains two sections:

- Part 1: Sustainability Commitment - contains GVW's and EPA's public commitment to work in partnership to increase the sustainability and resource efficiency of GVW's business operations. This section sets out immediate actions to reduce Goulburn Valley Water's global and local environmental impacts, and a process to identify and prioritise future actions
- Part 2: Environmental Performance Conditions - contains the legally enforceable environmental performance conditions Goulburn Valley Water must comply with, such as the *Environment Protection Act 1970* and relevant State Environment Protection Policies and Waste Management Policies.

Part 1 of the Corporate Licence is further divided into two parts:

- Part 1A details the sustainability commitment made by GVW and the EPA during development of the Licence. The sustainability commitment is based on the four goals detailed in GVW's Sustainability Improvement Plan, and is expressed as seven opportunity areas where GVW can act to minimise its environmental impact. Each opportunity also includes several actions to be undertaken by GVW and EPA to achieve the intent of the opportunity. A summary of the sustainability opportunity areas is shown in Figure 1.

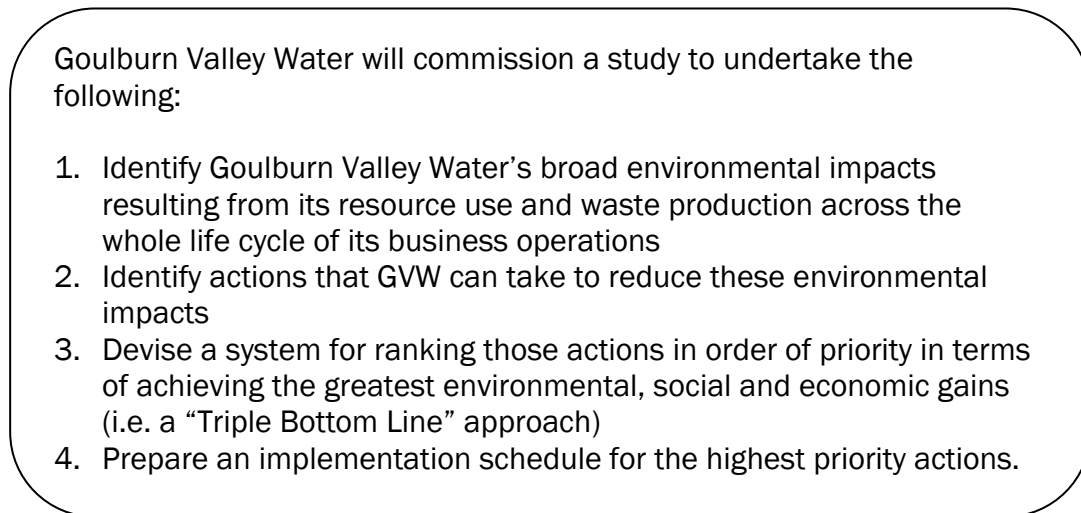
### Sustainability opportunity areas

1. Substantially reduce greenhouse gas emissions, with a long term goal of carbon neutrality
2. Reduce the water use of and trade waste produced by Goulburn Valley Water's customers
3. Improve management of the sewerage system
4. Optimise wastewater reuse
5. Minimise the impact of discharges to land and water
6. Use offsets to deliver greatest environmental gains in a cost-effective manner
7. Successfully engage the community

**Figure 1** Sustainability opportunity areas in the Corporate Licence

- Part 1B details the requirement to identify and prioritise future actions to minimise GVW’s environmental impact. The identification and management of additional environmental risks and opportunities fulfils the continuous improvement aspect of GVW’s Environmental Management System. The working title ‘Resource Efficiency Opportunities Project’ has been given to this part of the Licence.

A framework for the resource efficiency opportunities project is detailed in the Licence, and is summarised in Figure 2.



**Figure 2** Framework for resource efficiency opportunities project

## 2 Project objective

The objective of this Resource Efficiency Opportunities Project is to identify GVW's broad environmental impacts, and identify and prioritise actions that GVW can take to reduce its environmental impact across the whole life cycle of its business operations. An implementation (action) plan will be prepared for those actions assessed as a priority, and progress reported as part of the Annual Environmental Performance Report.

### 3 Project outline

A project steering committee made up of representatives from GVW and EPA was formed to guide the development of the Resource Efficiency Opportunities Project.

An initial meeting of the steering committee was held in mid June 2008 to discuss the scope of the Resource Efficiencies Opportunities Project and agree on a methodology for how the project would progress. At this meeting the following project outline was agreed:

- Develop a model of the resources consumed and/or produced by GVW
- Identify priority areas within this model which will form the scope of the Resource Efficiency Opportunities Project
- Collate strategies and action plans that relate to scope of the project
- Identify gaps between the action plans and the scope of the project
- Inform the Corporate Community Reference Committee about the Resource Efficiency Opportunities Project
- Develop a draft Resource Efficiency Plan
- Consult the EPA and internal stakeholders about the draft Plan
- Update the Plan based on consultation with the EPA and internal stakeholders
- Present the Resource Efficiency Plan to the GVW Board for approval
- Publish the approved Plan
- Commence implementation of the Plan.

This report is the result of the above process, and contains GVW's Resource Efficiency Action Plan (as Table 2).

## 4 Identifying and prioritising resource efficiency opportunities

The following sections describe in detail the steps that the project steering committee has made to complete the project outline and develop a resource efficiency action plan.

### 4.1 GVW resource model

At the initial project steering committee meeting, Sean Shiels (EPA) presented the GVW Life Cycle Map. The Map showed the resources consumed (inputs) and produced (outputs) by GVW during 2006-2007, and the interaction between each of the resources and GVW's customers. The Map also included an estimation of the quantity of the resource and, in some cases, its quality. A copy of the GVW Life Cycle Map is included as Figure 3.

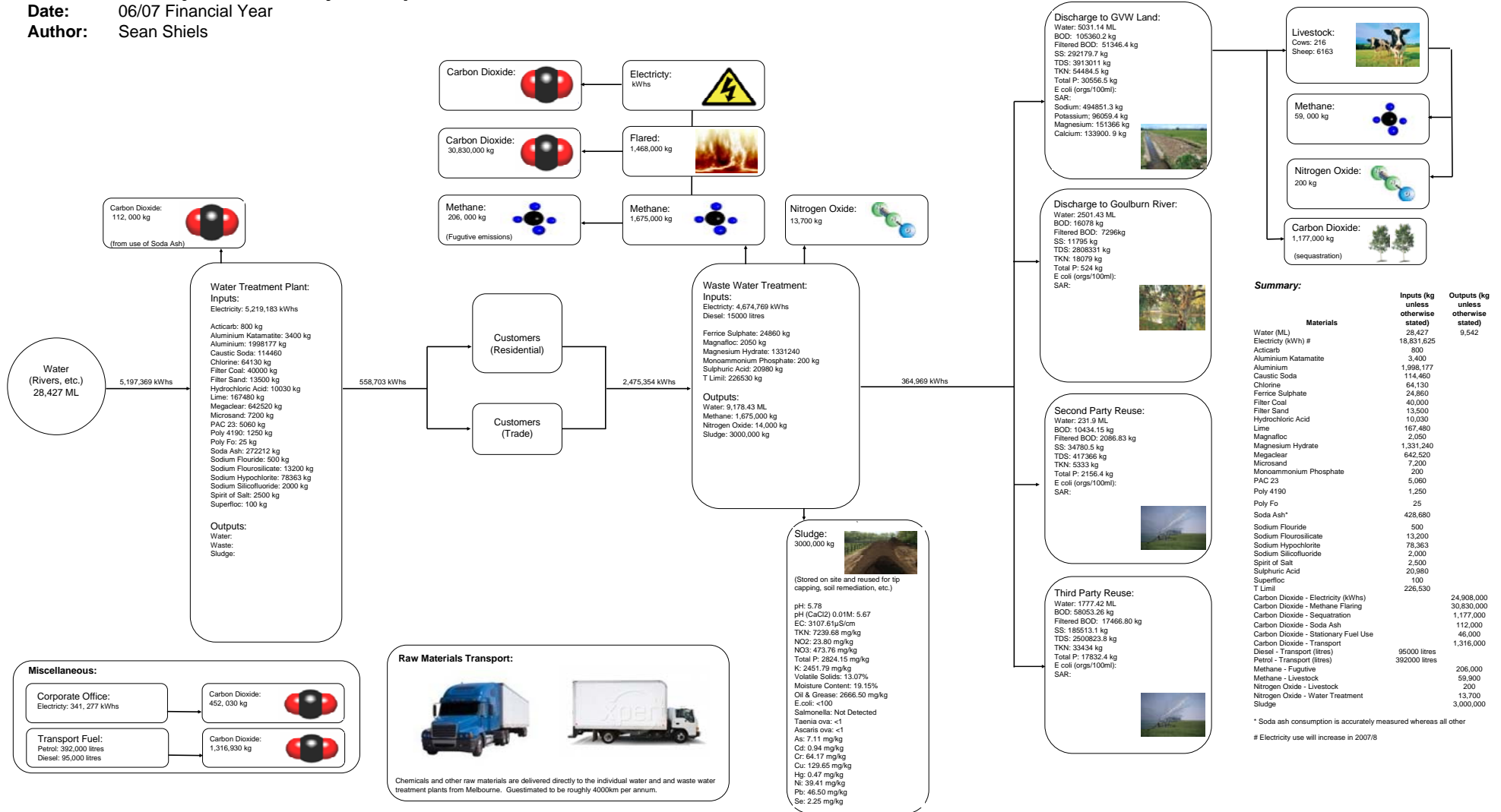
It was decided to reinterpret this Life Cycle Map to broaden the definition of resources, and include some resources that were not shown in the Life Cycle Map. The new model is more holistic and considers GVW as a 'black box', where resources enter (inputs), leave (outputs) or remain within the box (accumulate).

Refer Figure 4 for a representation of the GVW Resource Map.

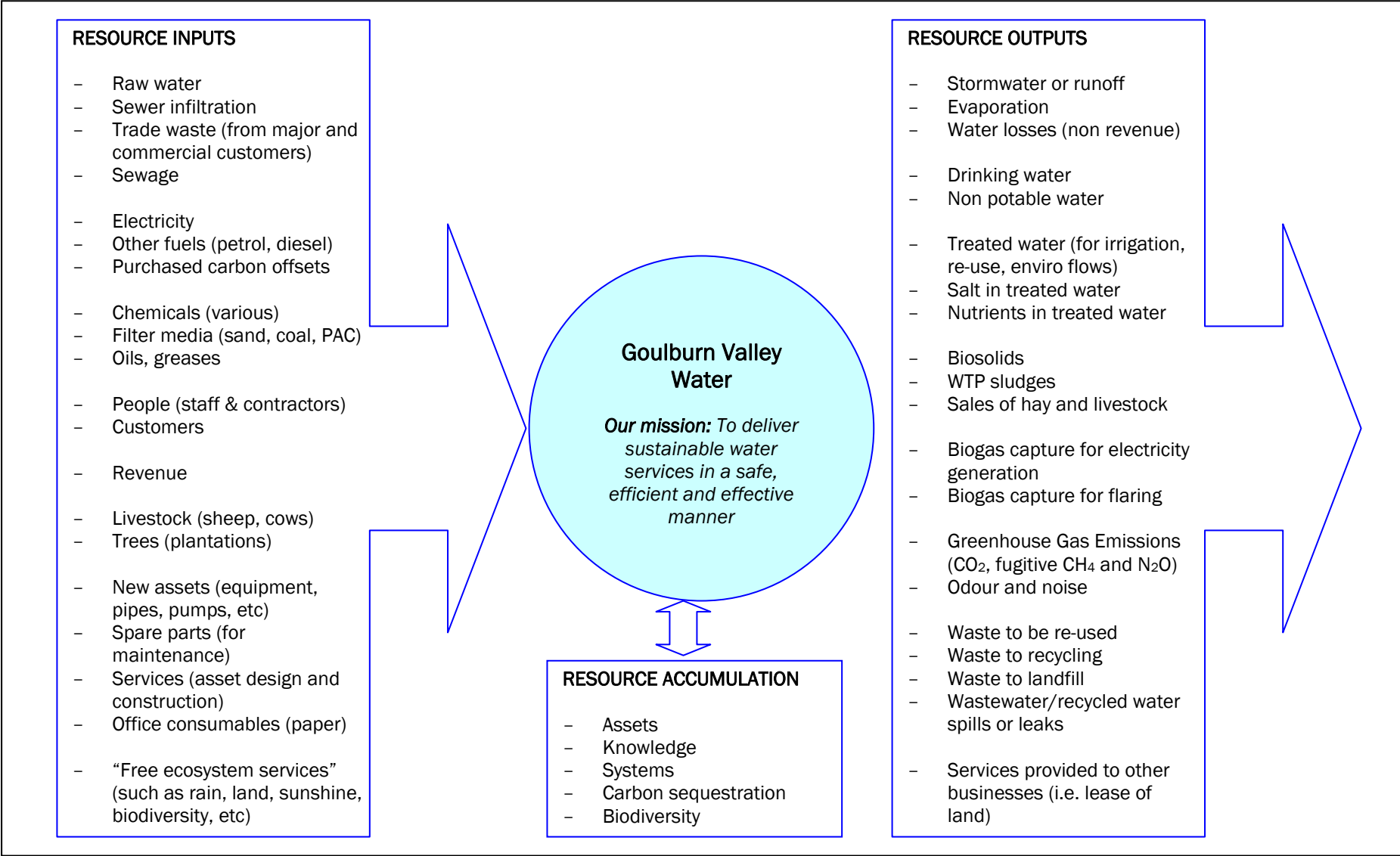
Figure 3 GVW Life Cycle Map

**Goulburn Valley Water Life Cycle Map**

Date: 06/07 Financial Year  
 Author: Sean Shiels



**Figure 4** GVW Resource Map



The Resource Map in Figure 4 summarises GVW's resource inputs, outputs and accumulation.

Some resource inputs are 'wastes' from our customers (i.e. trade waste or sewage), and are thus part of the wastewater collection and treatment service we provide to the community and local businesses.

Some resource inputs accumulate over time, such as assets, corporate knowledge and management systems.

Some resource outputs are GVW's 'products' (drinking water, treated wastewater) and are thus part of the service we provide to the community and local businesses.

Other resource outputs are by-products that are produced as a result of GVW's operations and have (or potentially have) an economic or environmental value, such as biogas (methane) and biosolids.

Other resource outputs are wastes that are produced as a result of GVW's operations but which do not have a value, and may even incur a cost for appropriate disposal or further treatment, such as materials sent to landfill or greenhouse gas emissions.

## 4.2 Priority areas

During the initial project steering committee meeting, four priority areas for resource efficiency were identified:

1. Water reduction (covering both water supplied and wastewater treated).  
Decided to target four specific areas:
  - Major (industrial) customers
  - Residential customers
  - Leakage
  - Sewer infiltration
2. Salt reduction, targeting two specific areas:
  - Major customers
  - Sewer infiltration
3. Greenhouse gas emission reduction, targeting five specific areas:
  - Shepparton water treatment plant (WTP)
  - Shepparton waste management facility (WMF)
  - Fugitive emissions from wastewater treatment
  - Energy intensive sites
  - Biogas production and flare optimisation

4. Examine the potential for environmental offsets to be used in both water and wastewater treatment.

The GVW Resource Map in Figure 4 includes these resources and priority areas.

### 4.3 Collate existing strategies and action plans

It was identified during the initial project steering committee meeting that GVW has several existing strategies and action plans in place to manage many of the resources, particularly those identified as priority areas.

The following strategies were identified as addressing GVW's priority resources of water, energy and greenhouse gas emissions:

- Greenhouse Action Plan
- Water Conservation Strategy.

Other GVW strategies, plans and internal documents were also identified that act to underpin and support the above strategies:

- Sustainability Improvement Plan
- Sustainability Assessment Tool
- Community Engagement Strategy
- Biosolids Management Strategy
- Biodiversity Strategy
- Human Resources Strategy
- Asset Management Improvement Plan
- Knowledge Management Plan
- Trade Waste Agreements with major customers
- Cleaner production partnership programs with major customers and EPA
- WaterMAP program for non-residential users with a water consumption greater than 10 ML/year
- Operations and Maintenance (O&M) Manuals
- Environmental Management System (certified to ISO 14001)
- OH&S Management System (certified to AS 4801).

There are plans to update or develop the following plans during the 2008-2009 period:

- Environmental Management Strategy
- Irrigation Management Plan

- Wastewater Discharge Monitoring Plan
- Sewerage System Management Plan.

Other programs were identified as supporting the above strategies, but which are administered externally to GVW:

- EPA's Environmental Resource and Efficiency Program (EREP) for sites using more than 120 ML/year of water and/or 100 TJ/year of energy, which will require many major customers to prepare a plan that identifies actions to reduce energy and water use and waste generation (including trade waste)
- Grow Me The Money program for small to medium businesses seeking to reduce water, energy and/or waste
- EPA's Corporate Licence program, where major customers may seek to improve efficiencies by combining all their licensed sites in the one corporate licence (as GVW has done)
- EPA's Sustainability Covenants program, where businesses enter into a voluntary agreement with the EPA and seek new means to reduce their environmental impact and increase the resource efficiency of their products or services
- Sustainable Water Use Plans for local councils who have participated in the DSE program to reduce their water use.

#### **4.3.1 Greenhouse Action Plan**

The Greenhouse Action Plan was published in November 2007. The objectives of the Greenhouse Action Plan are to:

- Clearly identify and report GVW's emissions
- Reduce greenhouse emissions through water conservation initiatives, improved methane management, energy efficiency and operational improvements
- Map a pathway to carbon neutrality
- Increase the generation and use of renewable energy
- Embed sustainability into the Corporation's culture.

The Greenhouse Action Plan sets specific greenhouse gas emission targets to be achieved, and a summary of these targets is shown in Figure 5.

The Greenhouse Action Plan also details 29 actions which will assist to achieve the greenhouse targets during the 2008-2013 Water Plan period.

**Greenhouse emissions target**

- Reduce emissions to 35,300 tonnes CO<sub>2-e</sub>/year by 2020, or 63% below 2002 emissions of 94,500 tonnes CO<sub>2-e</sub> per annum

**Carbon neutrality target**

- Based on our customers' willingness to pay, commence purchasing suitable carbon offsets in 2014 and achieve full carbon neutrality by 2020

**Renewable energy target**

- Facilitate the generation of 5,000 MWh of renewable energy from biogas by 2010
- Commencing 2008, purchase 100% GreenPower certified electricity for the Regional Administration Centre

**Figure 5** Targets in the Greenhouse Action Plan

#### **4.3.2 Water Conservation Strategy**

The Water Conservation Strategy was published in October 2007. The objectives of the Water Conservation Strategy are to:

- Achieve significant water savings in the residential, industrial and commercial sectors
- Achieve internal savings at water treatment plants and in distribution systems
- Improve water accounting via enhanced metering, reporting and data management
- Up-skill GWV staff to optimise participation and outcomes
- Build knowledge, skills and enthusiasm in local trades and turf/grounds professionals
- Continue inspiring cultural change in the community towards lower water use.

The Water Conservation Strategy sets specific targets to be achieved, and a summary of these targets is shown in Figure 6.

The Water Conservation Strategy also details 33 actions which will assist to achieve the water conservation targets during the 2008-2013 Water Plan period.

**Overall target**

- Reduce total water consumption to 31,001 ML in 2020, or 8% below 2002 consumption of 33,830 ML

**Residential target**

- Reduce per capita water consumption to 337 L/pp/day in 2015 and 336 L/pp/day in 2020 (to give residential consumption of 15,410 ML/year in 2020)

**Commercial target**

- For commercial organisations using more than 10 ML/year, reduce water consumption by 1% each year from 2009 to 2020 (to give commercial consumption of 4,441 ML/year in 2020)

**Industrial target**

- Reduce water consumption by 18% by 2015 and 20% by 2020, based on 2002 consumption of 7,651 ML/year (to give a industrial consumption of 6,103 ML/year in 2020)

**Non revenue water**

- Maintain headworks non revenue water at 8% for large systems and 7% for small systems (to give headworks losses of 2,711 ML/year in 2020)
- Reduce distribution non revenue water in large systems to 9% in 2015 and 8% in 2020, and in small systems to 21% in 2015 and 16% by 2020 (to give distribution losses of 2,337 ML/year in 2020)

**Figure 6** Targets in the Water Conservation Strategy

#### **4.4 Identify gaps between the action plans and the scope of the project**

As detailed in Section 5.3, GVW has already developed several strategies and action plans which address various aspects of resource efficiency. These primary strategies are the Greenhouse Action Plan and the Water Conservation Strategy, both of which are supported by other plans such as the Sustainability Improvement Plan, Cleaner Production Partnerships with major customers and the Environmental Management System.

To identify potential actions that GVW could take to reduce its environmental impact across the life cycle of its business operations, a gap analysis was undertaken by comparing those resources identified in the GVW Resource Map (Figure 4) with the existing strategies and action plans (i.e. those identified in Section 5.3).

The gap analysis takes the form of a table, which examines each resource and considers whether it is addressed by an existing action plan or strategy. Those resources identified as priority areas in Section 5.2 were analysed in detail to ensure they were adequately addressed by the existing plans.

Where information is available about the amount of a resource (i.e. ML of water or MWh of electricity), this information is also included in the table to provide an indication of its contribution to GVW's resource consumption. All information is based on the 2006-2007 financial year, to match the data presented in the GVW Life Cycle Map (Figure 3).

Those areas or resources that are not addressed by an existing action plan or strategy, or where the project team felt further examination was required, are highlighted in the table as areas with further opportunities possible.

Refer Table 1 for the gap analysis and assessment of resource efficiency opportunities.

**Table 1** Gap analysis - assessment of resource efficiency opportunities

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
<b>INPUTS</b>				
<b>Water</b>	Raw water	28,427 ML	The Water Conservation Strategy should reduce total drinking water consumption and thus lead to reduced raw water extraction	No
<b>Wastewater</b>	Trade waste from major customers	3,474 ML  Refer ESC report for data re BOD, SS, sodium, nitrogen and phosphorus loads	Water Conservation Strategy - section 5.5 and action 29 (Cleaner Production Partnerships, CPP)  Sustainability Improvement Plan - Action 3.1.4 (CPP)  Greenhouse Action Plan - section 4.3 and action 2 (CPP)  Major customers' forums (bi-annual)  Trade Waste Agreements - include a requirement to prepare waste minimisation plans and risk management plans	Need to develop specific plans re how water conservation or load reduction will be achieved.  Suggestions:  <ul style="list-style-type: none"> <li>- Potential to partner with EPA's EREP program to assist with actions related to water and wastewater</li> <li>- Development of focussed research programs to address specific issues</li> <li>- Trade Waste team review Wastewater Source Management Guidelines, and identifying actions required by GVW</li> <li>- Concentration targets and cleaner production goals (linked to EREP where applicable) should be included in Trade Waste Agreements</li> <li>- Audits of major customers to ensure compliance with Trade</li> </ul>

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
				Waste Agreement, and ensure that procedures are in place to manage the risks identified in the risk or waste management plans. Need to ensure this does not duplicate EREP audits (if any)
	Sewage from customers	~10,100 ML	Reduced residential water consumption should reduce sewage volumes (but not significantly)	
	Sewer infiltration	917 ML (av. 7.7%)	Reported in Annual Environmental Performance Report	Develop a program to identify areas of sewer infiltration so it is reviewed on a regular basis
<b>Energy</b>	Electricity	Water: 10.98 MWh  Wastewater Treatment: 7.52 MWh  Corporate: 0.34 MWh	Greenhouse Action Plan, sections 4.3 and 4.5 and actions 17 (motor efficiency), 19 (power factor correction), 20 (office audits) 27 (GreenPower for Corporate Office) and 28 (support regional renewable power schemes)  Sustainability Improvement Plan – action 2.1.3 (complete Operations Review and review treatment processes at highest priority WTPs and WMFs)  <b>Shepparton WTP</b> Greenhouse Action Plan - actions 10 (energy monitoring system) and 13 (audit)  <b>Shepparton WMF</b> Greenhouse Action Plan - action 14 (audit)  <b>Energy intensive sites</b> Greenhouse Action Plan - action 15 (audit)	Work with the Greenhouse Reduction Task Group to develop benchmarks for particular treatment plants and/or technologies. GVW can then use this information to identify and prioritise those sites with high energy intensity.  Opportunities for load shedding (and capacity sales during peak) were not fully considered in the Greenhouse Action Plan (note: this will not achieve energy savings, just cost reductions)

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
	Other fuels:  Transport (petrol, diesel, LPG)  Stationary (diesel, petrol)	Petrol: 392 kL Diesel: 95 kL LPG: 0 L  Diesel 15 kL	Greenhouse Action Plan – actions 21 (alternate vehicles and fuels) and 22 (use generators during peak load)	No
	Purchased (carbon) offsets		Greenhouse Action Plan – section 10 and action 6 (benchmark against carbon neutral cost)	Other environmental offsets were not considered in the Greenhouse Action Plan – where applicable for a specific project, explore opportunities for broader environmental offsets with the EPA
<b>Chemicals</b>	Chemicals (i.e. soda ash, alum, etc)  Filter media	Quantities listed in Figure 3	Water Conservation Strategy should reduce drinking water and wastewater volumes and lead to reduced requirement for treatment chemicals  Sustainability Improvement Plan – action 3.1.5 (work with CMA to improve quality of raw water sources)	No
<b>People</b>	Staff	~ 180 people	Sustainability Action Plan – actions 1.2.3 (culture change), 1.3.1 (strategic planning) and 2.2.1 (human resources strategy)  Water Conservation Strategy – actions 4 (staff training)  Greenhouse Action Plan – actions 3 (staff training), 4 (champions) and 16 (skills training)	No

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
	Customers and other stakeholders	~ 121,000 customers	<p>Corporate Licence – included development of a Community Engagement Strategy (completed)</p> <p>Corporate Community Reference Committee established. First meeting held late September 2008</p> <p>Sustainability Improvement Plan – action 4.2.1 (education program)</p> <p>Water Conservation Strategy – action 2 (public awareness). Also refer outputs: drinking water for residential customers</p> <p>Greenhouse Action Plan – action 26 (carbon neutrality) to be referred to CCRC for consultation</p> <p>Water Watch (or similar) programs with schools</p> <p>Training: Water Conservation Strategy – actions 11 (landscaper training) and 3 (trades training)</p> <p>Changes to government regulation: Water Conservation Strategy – actions 6 (showerheads in houses sold), 7 (WELS for washing machines), 8 (WELS for evaporative coolers) and 9 (BASIX for new houses)</p> <p>Sustainability Improvement Plan – commitments 1.4 (influencing regulators), 4.1 (active community leadership) and 4.3 (supporting water cycle partners)</p>	No

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
Revenue		\$46.6 million	No	No
Biological assets	Livestock (cows and sheep)	~ 6,400 head	No	No
	Trees	139 ha	Refer comments in accumulation: biodiversity	
Assets	New assets (capital projects)	\$19.7 million (capital)	Capital project plan	Need to consider energy efficiency during the design phase to ensure best practice technology is installed.
	Spare or replacement parts	\$5.8 million (maintenance expenses)	Developing Product Manuals, which detail preferred equipment and suppliers O&M Manuals and maintenance programs	Develop guidelines for when to install sub-metering of water, electricity, etc for new or upgraded assets.
	Services by consultants (design)	Included in capital projects amount	Sustainability Action Plan – action 3.2.2 (green purchasing requirements in project briefs)	Update existing tender evaluation tool to incorporate aspects from the Sustainability Assessment Tool for selection of preferred design or tender.  If consultants or contractors evaluating options to complete a project, ensure they are aware of and use the Sustainability Assessment Tool where applicable.
	Services by contractors (construction)	Included in capital projects amount	As above  EMS – environmental improvement plans developed by contractors for projects.  Environmental audits conducted by GVW during	Encourage contractors to re-use or recycle wastes

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
			construction work	
<b>Goods &amp; services</b>	Purchasing of general goods and services (i.e. paper, office equipment, cleaning services)	~ \$1 million (office and computer expenses)	Sustainability Action Plan – action 3.2.1 (green purchasing)	
<b>ACCUMULATION</b>				
<b>Assets</b>	Buildings WTP and WMF	\$497 million	Greenhouse Action Plan – action 20 (energy audits and retrofits for offices)  Asset Management Plan	Introduce policy of 5 star rated buildings for new offices.  Introduce minimum energy and water efficiency standards for new office equipment (whitegoods, multi function devices, PCs etc) as part of green purchasing program
<b>Knowledge</b>			Knowledge Management Plan	No
<b>Business Systems</b>			Sustainability Action Plan – actions 2.1.1 (data management review) and 2.1.2 (integrated management system)	No
<b>Carbon sequestration</b>	CO <sub>2</sub> absorbed by plantations	747 T	Greenhouse Action Plan – action 28 (assist regional renewable energy or carbon offsets)	Revise Biodiversity Strategy to include carbon sequestration as a beneficial outcome
<b>Biodiversity</b>		Not quantified	Biodiversity Strategy  Trust for Nature & Land for Wildlife sites	Review Biodiversity Strategy (>5 years since published).

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
			<p>Offset plantings may be required by Council planning permits for capital projects</p> <p>Exploring planting opportunities with GreenFleet</p>	<p>Expand scope to include work with community groups (Waterwatch), other sites (gardens at offices, depots, WTP, SPS, land not suitable for agriculture, etc) and other beneficial outcomes (sequestration, improved water quality, etc).</p> <p>The planned Environmental Management Strategy will review the Biodiversity Strategy and recommend changes.</p>
<b>OUTPUTS</b>				
<b>Water</b>	Storm/rain water	Not quantified	No	Use the Sustainability Assessment Tool to assess whether to install a rainwater tank or use water from the dam at SOC for garden watering
	Evaporation (from water storages and wastewater lagoons)	~7,000 ML	No	Periodically evaluate the performance of storage covers and chemical films that minimise evaporation from water storages for application by GVW
	Non revenue water (using 2005-6 data)	<p>Headworks: 2,266 ML (or 8%)</p> <p>Distribution: 3,160 ML (or 10%)</p>	Water Conservation Strategy, section 5.7 and actions 31 (water accounting improvement program), 32 (recycle WTP process water) and 33 (leak reduction in distribution systems)	No

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
	Drinking and regulated water supplies	25,852 ML	<p>All customers Greenhouse Action Plan – section 4.4 and action 1 (water conservation strategy)</p> <p><b>Residential customers</b> Water Conservation Strategy – sections 4 and 5.4 and actions 1 (data assessment), 10 (tune-up for &gt;1 ML/yr),</p> <p><b>Major customers</b> Water Conservation Strategy - section 5.5 and action 29 (CPP)</p> <p>Sustainability Improvement Plan – action 3.1.4 (CPP)</p> <p>waterMAP action plans</p> <p><b>Commercial customers –</b> Water Conservation Strategy - action 30 (waterMAPs)</p>	<p>Refer comments in inputs: major customer trade waste section</p> <p>Additional suggestions:</p> <ul style="list-style-type: none"> <li>- Promote and assist major customers with DSE cooling towers program. May be applicable to some commercial customers as well</li> <li>- Seek reporting of water efficiency (i.e. ML of water used per T of finished product) by major customers</li> <li>- Consider how to ‘add value’ to waterMAPS, such as hosting a workshop for a specific sector or providing signage or training.</li> <li>- Assist Councils with implementation of their Sustainable Water Use Plans.</li> <li>- Assist with other programs such as Schools Water Efficiency Program, Greening Our Hospitals where appropriate.</li> </ul>

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
<b>Treated water</b>	Treated water for irrigation, including 2 <sup>nd</sup> and 3 <sup>rd</sup> party re-users	6,700 ML	Environmental Improvement Plans (EIP) developed with users  Treated water users audited as part of EMS	No
	Treated water return to stream as enviro flows	2,500 ML	Corporate Licence - risk assessment for mixing zones in progress with stakeholder group, and program to undertake targeted monitoring  Sustainability Action Plan – action 1.4.2 (beneficial re-use definition)	No
	Salt loads in treated water (requiring shandyng)  Nutrients in treated water (reduced fertiliser use)	9,400 T TDS  Refer ESC report for data re nutrient loads	Refer comments in inputs: wastewater - trade waste from major customers section  Refer comments in inputs: wastewater - sewer infiltration section	No
	Spills/leaks of sewage or treated wastewater	58 spills (no volumes)	Reported in Annual Environmental Performance Report  Managed as per EMS procedures	No
<b>Biological products</b>	Biosolids WTP sludges	3,000 T	Sewage Sludge Management Strategy  Sustainability Action Plan – action 3.1.6 (re-use)	Maintain a watching brief on the carbon sequestration potential of biosolids
	Crops, hay	1,100 T hay	No	No, as minor quantity
	Livestock sales	~3,300 head	No	No, as minor quantity

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
<b>Fuel sources</b>	Methane for electricity generation	304 T which generated 1,300 MWh of electricity	Greenhouse Action Plan, section 5 and actions 23 (optimise HRAL performance) and 24 (DE cogen)  Sustainability Action Plan - action 3.1.6 (assist DE to set up cogen at Shepparton)	No
	Methane for flaring	1,468 T	Greenhouse Action Plan, action 12 (optimise flaring)	No
<b>Greenhouse gas emissions</b>	CO <sub>2</sub> from electricity use	24,948 T	Refer comments in inputs: electricity section  Sustainability Improvement Plan - commitment 3.3 (work towards carbon neutrality)  Greenhouse Action Plan - actions 26 (timeline to achieve carbon neutrality) and 29 (watch carbon offset and GreenPower markets)	Work with EPA to determine which scope 3 greenhouse gas emissions should be reported for the water industry, and how these quantities can be measured and calculated
	CO <sub>2</sub> from fuel use	1,362 T	Refer comments in inputs: other fuels section	No
	CO <sub>2</sub> from chemical use	112 T	Refer comments in inputs: chemicals section	No
	Fugitive emissions from flared biogas methane	Not quantified	Refer comments in outputs: methane for flaring section	No
	Fugitive emissions (CH <sub>4</sub> and N <sub>2</sub> O) from waste water treatment, sludge management and sewer systems	8,588 T	Greenhouse Action Plan, actions 7 (measure fugitive methane emissions) and 8 (measure fugitive nitrous oxide emissions)  WSAA fugitive emissions study (in progress) and possibly VicWater Greenhouse Reduction Task Force study (seeking funding)	Once results of WSAA (and other) research available, review anaerobic lagoons and if it is viable to capture and flare methane

Area	Resource	Quantity (2006-2007)	Addressed as part of an existing action plan?	Further opportunities possible?
	Fugitive emissions (CH <sub>4</sub> and N <sub>2</sub> O) from livestock	1,313 T	No  Under proposed Carbon Pollution Reduction Scheme, not required to be reported in greenhouse inventory until 2015	Use farm plans to evaluate the benefits of livestock or cropping or plantations on GVW farms for revenue (including carbon sequestration)
<b>Solid wastes</b>	Wastes for re-use, recycling, further treatment or landfill	Not quantified	No	<p>Review definitions of products and determine if resources (able to be re-used or recycled) or wastes (require treatment or disposal to landfill).</p> <p>Develop system to record volumes of resources and wastes re-used, recycled or disposed of (this information may be required for future greenhouse reporting as scope 3).</p> <p>Focus on segregation of resources from wastes and re-use or recycling where practical.</p>
<b>Services provided</b>	Lease of GVW land to other businesses	3, soon to be 4		<p>Assess the need for environmental audits of sites such as Cleanaway's prescribed waste facility, Diamond Energy facilities at Tatura and Shepparton, etc to ensure they are managing their environmental risks.</p> <p>The planned Environmental Management Strategy will review the environmental audit program and recommend changes.</p>

#### **4.5 Inform the CCRC about the project**

A Community Engagement Plan has been prepared to inform the Corporate Community Reference Group (CCRC) about the Resource Efficiency Opportunities Project.

#### **4.6 Develop a Resource Efficiency Plan**

During the process of completing the gap analysis, the team acknowledged that there were many opportunities available to increase GVW's resource efficiency, and that most of these opportunities were addressed in the existing action plans.

The gap analysis process identified several areas of improvement that were not sufficiently addressed in the current action plans. These additional resource efficiency opportunities have been listed in Table 2 – as a Resource Efficiency Action Plan. The action plan includes details about each action, such as whether it is an addition to an existing action plan, targets, costs, responsible person and timing.

Each action has been prioritised using the Business Excellence prioritisation matrix. The prioritisation matrix takes into consideration two factors – urgency and strategic impact – and ranks each of them as high, medium or low. The combination of the two ranks then determines the priority of the action.

#### **4.7 Monitoring progress towards resource efficiency**

Progress against the Greenhouse Action Plan, Water Conservation Strategy and Sustainability Improvement Plan will be tracked using the existing action plans.

Progress against the Resource Efficiency Action Plan will be tracked using a similar format to the other action plans. However, those actions which are an addition to an existing action plan will be reported as part of the original action plan, as it allows all water conservation or greenhouse gas emission actions to be reported together in a logical grouping.

A statement of progress against each action plan will be made annually as part of the Annual Environmental Performance Report.

**Table 2** GWV Resource Efficiency Action Plan

Action	Details	Target (benefit)	Priority	Cost	Timing	Responsibility
<b>Additions to the Water Conservation Strategy</b>						
<p><b>Major customers</b></p> <ul style="list-style-type: none"> <li>- Develop a specific action plan for major customers which is 'SMART'</li> </ul> <p>(WCS Action 29c)</p>	<p>Suggested actions could include:</p> <ul style="list-style-type: none"> <li>- Request reporting of a water use efficiency measure (i.e. ML of water per T of product), and assist them to set water use efficiency targets</li> <li>- Collaborate with EPA and major customers in the EREP program in relation to water and wastewater</li> <li>- Funding of focussed research programs to address specific issues (such as salt or sodium)</li> <li>- Concentration targets and cleaner production goals should be included in Trade Waste Agreements</li> <li>- Promote and assist applicable customers with DSE cooling towers program</li> <li>- Co-fund the installation of meters and/or equipment to allow for electronic collection of data from water flow meters (i.e. hospital)</li> <li>- Audit major customers for compliance with Trade Waste Agreement, risk and waste management plans</li> <li>- Review WSAA Wastewater Source</li> </ul>	Major customers tracking and reporting water efficiency and achieving 'best practice' efficiency	High	Existing CPP budget	Detailed plan developed by January 2009, implement 2009-2013	Brady Schmidt

Action	Details	Target (benefit)	Priority	Cost	Timing	Responsibility
	Management Guidelines to identify actions required by GWV					
Develop a program to identify and understand areas of sewer infiltration (WCS Action 34)	Develop a regular program to assess and understand sewer infiltration and reduce where viable	Minimise volumes and salt levels of infiltration	Medium	Staff time	2010-2011	Linus Tong
Review technology to minimise evaporation losses from reservoirs or storage dams (WCS Action 35)	Maintain watching brief on the performance of storage covers and chemical films to minimise evaporation	n/a	Low	Staff time	ongoing	Karin Harding
<b>Additions to Greenhouse Action Plan</b>						
Investigate load shedding potential of Shepparton and other large WTP and WMF during peak demand periods (GAP Action 30)	Use load shedding ability to reduce peak demand at these sites  Also discuss load shedding potential with AGL and agree on plan for load shedding on demand	Reduced network demand charges  Potential to earn income from load shedding	Low	Staff time	November 2009	Karin Harding
Develop guidelines for pump selection (GAP Action 17c)	Develop guidelines for when to install pumps – considering the trade off between operating costs and pump capacities, and allowance for future growth	n/a	Medium	Staff time	December 2009	Alan Tyson
Ensure best practice energy efficiency for new and upgraded assets (GAP Action 31)	Ensure energy efficiency best practice is considered during the design phase for new and upgraded assets	n/a	Medium	Staff time	September 2009	Glenn Bewicke

Action	Details	Target (benefit)	Priority	Cost	Timing	Responsibility
Develop guidelines for sub-metering (GAP Action 32)	Develop guidelines for when to install sub-metering of water, electricity, etc for new or upgraded assets	n/a	Low	Staff time	June 2009	Linus Tong
Develop energy efficiency benchmarks for treatment plants and technologies (GAP Action 33)	Work with the Sustainability Victoria Greenhouse Reduction Task Group to develop benchmarks for particular treatment plants and/or technologies.	n/a	Low	Staff time	2009-2010	Karin Harding
	Then use this information to identify and prioritise those sites with high energy use		Low		2009-2010	Linus Tong
Review carbon sequestration opportunities (GAP Action 34)	Maintain a watching brief on the carbon sequestration potential of biosolids	n/a	Low	Staff time	ongoing	Stuart Harris
Reporting of scope 3 greenhouse gas emissions (GAP Action 35)	Work with EPA and the Sustainability Victoria Greenhouse Reduction Task Group to determine which scope 3 greenhouse gas emissions should be reported for the water industry, and how these quantities can be measured and/or calculated	n/a	Low	Staff time	2010-2011	Karin Harding
Review covering of anaerobic lagoons to reduce fugitive greenhouse emissions (GAP Action 36)	Based on results of WSAA and (potentially) Greenhouse Reduction Task Group research programs, review the feasibility of covering anaerobic lagoons and flaring methane	n/a	Low	Staff time	2010-2011	Bruce Hammond

Action	Details	Target (benefit)	Priority	Cost	Timing	Responsibility
<b>New actions (not part of an existing action plan)</b>						
Implement sustainability factors in tender selection processes (REAP Action 1)	Update existing tender evaluation tool to incorporate aspects from the Sustainability Assessment Tool for selection of preferred design or tender	n/a	Low	Staff time	June 2009	Glenn Bewicke
Use of Sustainability Assessment Tool by consultants or contractors (REAP Action 2)	If consultants or contractors evaluating project options, ensure they are aware of and use the Sustainability Assessment Tool	n/a	Low	Staff time	June 2009	Glenn Bewicke
Use of environmental offsets (REAP Action 3)	Where applicable for a specific project, discuss opportunities for environmental offsets with the EPA	Project specific	Low	Staff time	ongoing	Ken Ellis
Improve waste management practices (REAP Action 4)	<p>Review definitions of products and determine if resources (able to be re-used or recycled) or wastes (require treatment or disposal to landfill).</p> <p>Seek information about volumes of wastes re-used, recycled or disposed of from GVW's waste contractors.</p> <p>Encourage segregation of resources from wastes and re-use or recycling where practical, both for GVW sites and by contractors</p>	Reduced volumes of waste to landfill, increased % of re-used or recycled resources	Low	Staff time	2009-2010	Linus Tong