

# GREENHOUSE ACTION STRATEGY



*"A sustainable high quality of life for all"*

2003

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## EXECUTIVE SUMMARY

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The greenhouse effect is a natural phenomenon, however human activities are increasing the level of greenhouse gases (with the exception of water vapour) in the atmosphere. It is now generally believed that this increase in concentration of greenhouse gases in the atmosphere is resulting in what is known as the enhanced greenhouse effect, or global warming. Global warming may have a profound effect on our planet by changing rainfall patterns, raising the sea level, modifying natural ecosystems and affecting agricultural conditions worldwide.

In response to the recognition of the important role local government can play in the reduction of greenhouse gases, Hastings Council joined the Cities for Climate Protection program in October 2001. As part of this program, Council created an emissions inventory and forecast in order to strategically identify what activities are contributing to greenhouse gas emissions and to determine the most appropriate strategic actions to reduce these emissions.

Greenhouse gas emissions resulting from the activities of the Council in 1999 produced around 14,000 tonnes of greenhouse gases and cost in excess of \$1.35 million for the supply of energy alone. It is predicted that if business was carried out as usual, that this figure would increase to over 21,000 tonnes and would cost over \$2.2 million in 'today's' dollars by 2010. Emissions resulting from the community produced over 550,000 tonnes of greenhouse gases in 1996, and this is predicted to increase to approximately 850,000 tonnes by the year 2010.

Reducing greenhouse gas emissions makes good economic, environmental and social sense, and there is considerable opportunity to reduce energy usage through promoting energy efficiency and the implementation of energy efficient devices. Hastings Council aims to reduce its corporate greenhouse gas emissions from 1999 levels by 20%, by 2010, and stabilise community greenhouse gas emissions at 1996 levels by 2010. These were targets adopted by Council in August 2002.

This strategy serves to assist Council in implementing effective and practical greenhouse abatement actions in order to achieve its emission reduction. The proposed corporate and community reduction measures outlined within this strategy have been evaluated in terms of their cost and their emissions reduction effectiveness. To obtain the greatest economic, social and environmental benefits of this program, this strategy should be seen as a 'living document', and as such, the '*Greenhouse Action Strategy*' is not seen as an action plan covering all possible actions that will be undertaken, as it is envisaged that further review of this document will occur throughout the implementation, monitoring and evaluation of the strategy.

## 1. Introduction

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### *What is the greenhouse effect?*

The greenhouse effect is a natural phenomenon needed to trap the sun's warmth, and maintains the earth's surface temperature at a level necessary to support life. Light energy emitted from the sun is radiated off the earth's surface in the form of heat. Most of this heat is re-radiated towards space, but some is trapped in the atmosphere by greenhouse gases. These gases maintain the heat balance of the earth and the natural greenhouse effect keeps the earth at approximately 33°C warmer than it would otherwise be. Greenhouse gases include water vapour, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), ozone (O<sub>2</sub>), nitrous oxide (N<sub>2</sub>O) and halocarbons.

Human activities are increasing the level of greenhouse gases (with the exception of water vapour) in the atmosphere. It is now generally believed that this increase in concentration of greenhouse gases in the atmosphere is resulting in what is known as the enhanced greenhouse effect, or global warming.

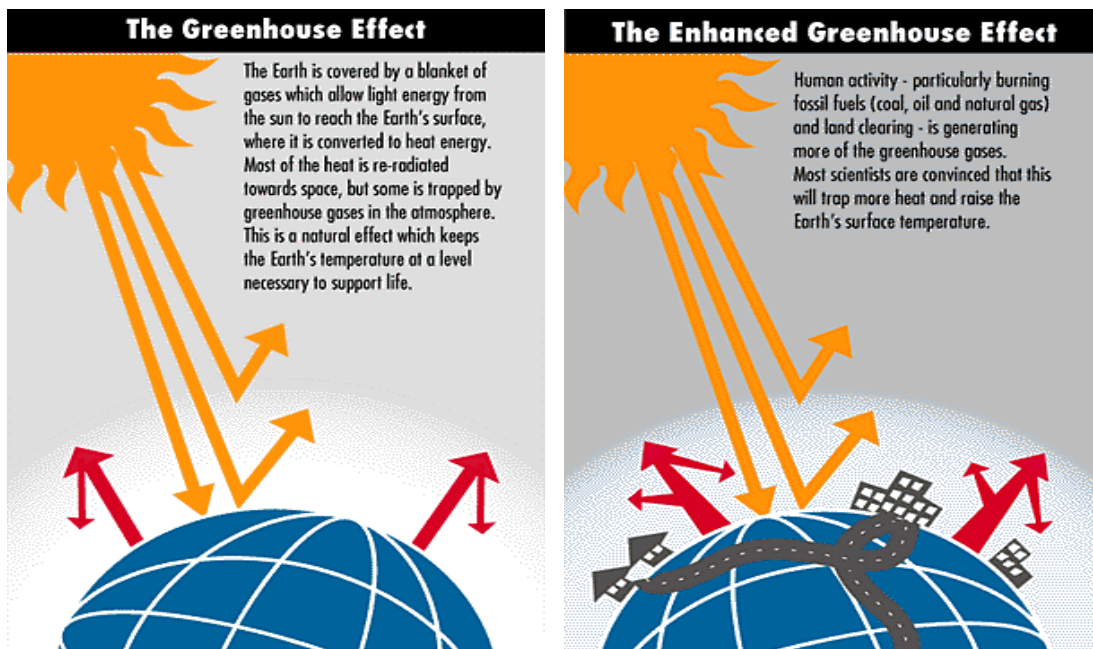


Figure 1: The Greenhouse Effect (Source: Australian Greenhouse Office).

### *What is causing the increase in greenhouse gases?*

Excluding water vapour, greenhouse gases make up approximately 1 per cent of the atmosphere but are very effective in trapping radiation. Each greenhouse gas has a different global warming, or heat trapping, potential. The global warming potential of each the major greenhouse gases, as well as the key sources of each gas, is shown in Table 1 below.

Table 1: Global warming potential of major greenhouse gases.

<b>Greenhouse Gas</b>	<b>Source</b>	<b>Greenhouse Warming Potential*</b>
<b>Carbon dioxide</b>	Burning of fossil fuels Land clearing Cement manufacture	1.0
<b>Methane</b>	Waste decomposition without air (e.g. when waste is buried in landfill) Coal-bed methane from coal mining Leakage of natural gas Grass digestion by grazing animals Burning of biomass fuels	21
<b>Nitrous oxide</b>	Soil, nitrogen fertiliser decomposition Burning of petroleum products	310
<b>Chlorofluoro-Carbons &amp; substitutes</b>	Leakage from refrigeration and air-conditioning systems Aluminium smelting	CFC-12 8,500 HCFC-113 93 HFC-134a 1,300

\* Greenhouse warming potential (GWP) (per kilogram of gas) in terms of equivalent kg CO<sub>2</sub>.

Balanced against the relative proportions of greenhouse gases in the atmosphere, the increase in the concentration of CO<sub>2</sub> is making the biggest contribution to the enhanced greenhouse effect (approximately 64%). The concentration of CO<sub>2</sub> in the atmosphere is now about 30% higher than it was 200 years ago. The major human activities associated with increased CO<sub>2</sub> atmospheric concentrations are the burning of fossil fuels (primarily oil, coal and natural gas) and land clearing. Terrestrial and marine vegetation absorbs CO<sub>2</sub> during the process of photosynthesis and acts as a store of carbon. Land clearing therefore reduces the ability of the earth to act as a carbon sink.

### *What are the potential impacts of the enhanced greenhouse effect?*

While there is general scientific agreement that human activities are causing changes in climatic patterns, there is still debate over the extent of these changes. Information at present indicates that there has been an average global warming of 0.6°C ±0.2°C and a sea level rise of 10 - 25 centimetres over the past century.

The International Panel on Climate Change (IPCC) brings together the world's leading scientists to report on climate change. In 2001 the Assessment Report of the IPCC recognised the possible effects of global warming as:

- An increase (between 1.4°C-5.8°C) in the global average surface temperature relative to 1990 by 2100,
- an increase in air turbulence (higher incidences of cyclones and storms),
- changes in rainfall patterns, and
- an increase in sea level due to warmer ocean temperatures. Average sea level is projected to rise about 0.09 meters above present levels by 2100.

The IPCC has projected changes in climate will result in significant, often adverse, impacts on many ecological systems and socio-economic sectors, including food supply, water resources and human health. In some cases the impacts are potentially irreversible - developing countries and small island countries are typically more vulnerable to climate change. The consequences on society from these effects may include: disruption to agriculture, flooding of low lying coastal areas, ecosystem stress due to rapid climate change, increased demand for fresh water and the spread of tropical diseases.

Changes in regional climate are more difficult to predict. The latest IPCC report notes a number of issues of concern for our region including:

- drying trends over much of the region, and a change to a more El Nino-like average state
- general increases in the intensity of heavy rains
- Restrictions of various habitats, threatening a number of species (habitats particularly susceptible to climate change impacts include coral reefs, arid and semi-arid land in south-west and inland Australia, alpine systems and freshwater wetlands).

CSIRO's Division of Atmospheric Research has produced a general scenario describing likely changes to Australia's climate. These include:

- a likely increase in Australia's average temperatures. Southern coastal regions may warm by up to 1.3°C by 2030. Inland areas are expected to warm slightly more than coastal regions. There is expected to be a marked decrease in the frequency of extremely low temperatures and a similar increase in the frequency of extremely high temperatures.
- Changes in rainfall are much harder to predict than temperature. By the year 2030, winter rainfall in south-east Australia may decrease by 4-8 per cent. Summer rainfall may increase by up to 8 per cent in some areas. In regions where rainfall increases this is likely to be in the form of more frequent or heavier rainfall events, and potentially more flooding. In parts of the country where rainfall remains the same or decreases, increased evaporation may lead to drier conditions.

Climatic changes of this magnitude would have enormous practical implications for water resources, urban infrastructure, agriculture and biodiversity. They will also have potentially significant effects on the balance of natural ecosystems.

## 2. Response to the Greenhouse Issue

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### *The International Response*

#### **United Nations Framework Convention on Climate Change**

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to review the present state of knowledge on climate change and produce an overall assessment. The first IPCC report was produced in 1990 and formed the basis for the development of the United Nations Framework Convention on Climate Change (FCCC). The IPCC has recently produced a third assessment report (2001), which synthesises 3000 studies of climate change impacts conducted since the late 1970s. The FCCC was signed by 155 countries, including Australia, in June 1993 and came into force in March, 1994. The primary aim of the Convention is to achieve:

- stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable world economic development to proceed in a sustainable manner.

To achieve this objective, the Convention contains a number of principles to guide the Parties' actions and a series of general commitments for the Parties, including requirements to:

- prepare national inventories of greenhouse gas emissions and sinks;
- develop, implement and report on national programs to mitigate climate change and develop adaptation strategies;
- cooperate in the development and transfer of technologies, practices and processes that control, reduce or prevent the emissions of greenhouse gases; and
- take climate change considerations into account in relevant social, economic and environmental policies and actions.

#### **Conference of Parties**

The Convention places particular onus on what are called Annex 1 Parties (OECD and east European countries, including Australia) to adopt policies and measures to reduce greenhouse gas emissions, and to report regularly to the annual Conference of the Parties (COP) on these policies and measures.

The Convention leaves many of the details of its implementation to be determined by the Conference of Parties. Of particular note is that the COP can adopt Protocols to the Convention that are subsidiary treaties that would legally bind the Parties to the Protocol. There have been six COPs so far, with the COP in Kyoto in December 1997 producing the Kyoto Protocol, which requires Annex 1 countries to collectively reduce their greenhouse gas emissions by at least five per cent below 1990 levels by the period 2008-2012. COPs since this have been dedicated to working out the detail of the protocol.

### The Kyoto Protocol

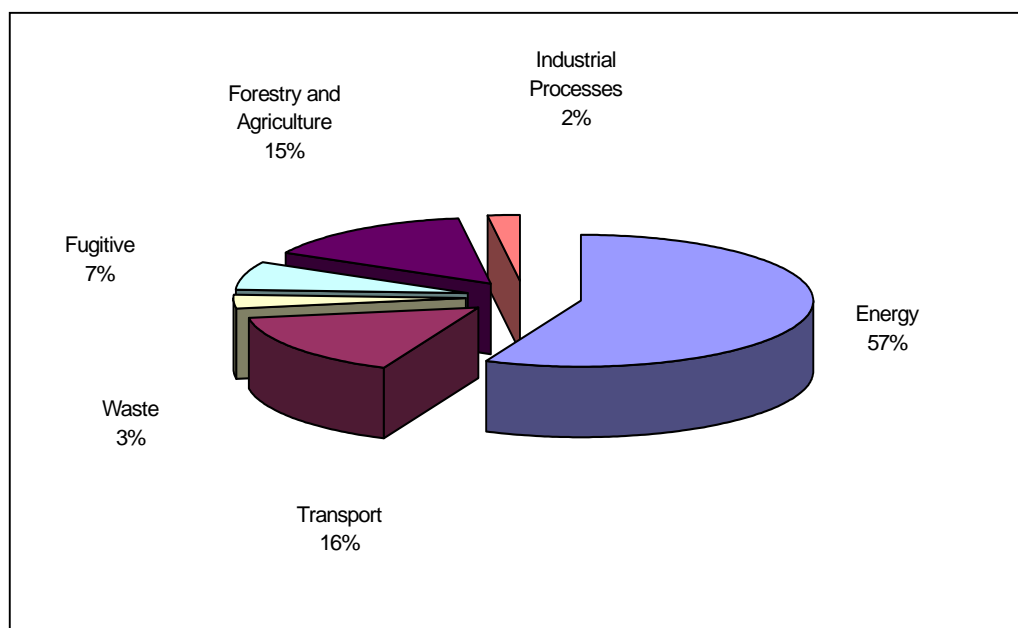
Within this target, individual countries have agreed to different targets ranging from an eight per cent reduction to a ten per cent increase, depending on their economic circumstances and differing capacities to make emissions reductions. Australia's target is to reduce its greenhouse emissions in the target period to no more than eight per cent above 1990 levels. In achieving their targets countries can take account of emission reductions, sink enhancement, and changes in land clearing.

Under the protocol, countries can use a range of flexibility mechanisms to meet their reduction requirements, including emissions trading, joint implementation of measures with other countries, emissions banking, and emission reduction credits for assistance to developing countries.

### The Australian Response

Although Australia only contributes to approximately 1.5% of the global greenhouse gas emissions, its per capita emissions are one of the highest in the world. On current projections there is likely to be substantial growth in Australian emissions in the next decade. If no further specific actions were taken to reduce greenhouse gas emissions, Australia's emissions were expected to grow around 28% from 1990 to 2010 (excluding the effects of land-use change). Recent work shows that emissions rose almost 17% between 1990 and 1998 (excluding emissions from land clearing).

Australia's emissions are a reflection of the country's economy and lifestyle. Fossil fuels supply most of our energy needs; our industries are energy intensive and we are a major exporter of energy intensive products; our population growth is relatively high; and with our widely separated and decentralised cities, transport use is high.



**Figure 2: The Major Sources of Australia's Greenhouse Emissions (1998) [not including land clearing].**

The Commonwealth, State and Territory Governments recognised the need for a nationally coordinated approach to the climate challenge some years ago and in 1992 endorsed a National Greenhouse Response Strategy (NGRS). The NGRS was intended to ensure Australia met its obligations under the FCCC. They also agreed to an interim planning target to reduce Australian greenhouse gas emissions by 20% by 2005, based on 1988 levels. However, this target has been superseded by the negotiations with the FCCC and the Kyoto Protocol.

The NGRS's goal was to contribute to effective global action to limit greenhouse gas emissions, to improve knowledge and understanding of the enhanced greenhouse effect, and to prepare for potential impacts of climate change. It contained a range of measures within a 'no regrets' framework, i.e. the measures had to have other benefits apart from reducing greenhouse gas emissions and not have adverse economic impacts.

Priority measures in the NGRS included:

- preparation of a national greenhouse gas inventory;
- micro-economic reform in the electricity and gas sectors to promote competition between suppliers and the promotion of greenhouse friendly energy sources;
- increased energy efficiency within the residential and commercial sectors through energy labelling and minimum energy performance standards; and
- more efficient transport systems through travel demand strategies and improved fuel consumption in the national vehicle fleet.

In 1995, the Commonwealth government announced additional greenhouse measures in a statement called '*Greenhouse 21C*'. A major new initiative was the establishment of the Greenhouse Challenge program to encourage businesses to voluntarily commit to reducing their greenhouse gas emissions.

In response to the need to outline Australia's position for the third COP at Kyoto, the Prime Minister released a Statement in November 1997 on '*Australia's Response to Climate Change*'. This included the provision of \$180 million over 5 years for a package of new greenhouse measures and the setting up of the Australian Greenhouse Office.

The NGRS contained a provision that it would be reviewed in the light of changing external circumstances. These external circumstances include:

- the strengthening of knowledge on greenhouse science;
- the development of the National Greenhouse Gas Inventory which has clarified the major sources of emissions;
- the progressive implementation of various Government policies and programs with direct or indirect bearing on greenhouse matters; and
- the strengthening of the international commitment to address climate change through the FCCC and the Kyoto Protocol

At the end of 1996, the Commonwealth, State and Territory Governments began work on a new National Greenhouse Strategy (NGS). The NGS, launched in November 1998, builds on the NGRS to provide a more focused and comprehensive approach to reducing Australia's emissions to meet Australia's

target under the Kyoto Protocol. It also incorporates the measures announced by the Prime Minister in November 1997.

Priority measures in the NGS include:

- improving the emissions data in the land use change and forestry sector to clarify its contribution to greenhouse gas mitigation
- reducing greenhouse gas emissions from government buildings and operations
- expansion of the Greenhouse Challenge Program for business
- a household greenhouse action program
- accelerating and monitoring energy market reform
- implementation of efficiency standards for power generation, residential and commercial buildings, and domestic, commercial and industrial equipment;
- strategic development of a renewable energy industry
- improving travel demand management systems
- development of an environmental strategy for the automotive industry
- expansion of forest plantations
- sustainable management of native vegetation
- minimisation of methane emissions from waste

The NGS provides a strategic framework and a broad menu of actions to achieve its objectives of reducing emissions. Some of these actions will be implemented by Governments acting individually, some by inter-governmental initiatives and some through partnerships between government, business and the community. The Strategy acknowledges Australia's regional diversity by noting that some measures are not applicable or relevant to all Governments and that Governments may pursue specific measures using different policy approaches and depending on their own budget priorities. A progress report was released in late 2000, which shows that nationally coordinated measures under the NSS suggest that they may deliver reductions in the order of 58-64 MT by 2010 (or about half the emission increase projected to occur between 1990 and 2010).

As part of the Government's new tax package, several new initiatives were announced as *Measures for a Better Environment*. These include an Alternative Fuel Conversion Program, an Alternative Fuel Grant Scheme and new renewable energy initiatives. The Australian Greenhouse Office plays the lead role administering such programs.

### *The State Government Response*

Climatic change and greenhouse gases are being tackled through a broad NSW State strategy, set in the context of the National Greenhouse Strategy, which is the key institutional driver for the development of renewable energy sources, research and development policy, and improved energy efficiency in the community (EPA 2001).

The effort is spearheaded by the NSW Sustainable Energy Development Authority (SEDA), which was established in 1996 (EPA 2001). SEDA facilitates and encourages broader take-up and commercialisation of sustainable energy technologies. This has resulted in a number of innovative programs that deliver improved energy efficiency and conservation for commercial, industrial and residential energy users (SoE 2000).

In NSW, SEDA has introduced a greenhouse rating for buildings to reduce overall energy use. Through the *Energy Smart Homes Program for Councils*, SEDA and local councils also offer energy-efficient design and building policies and guidelines for residential dwellings (*Energy Smart Homes*). Work is also being undertaken with the building industry to develop energy-efficiency codes and rating systems (SoE 2000).

The *Energy Smart Government Program* for NSW commits government agencies to design and implement cost-effective energy-saving devices in their offices. The *Government Energy Management Policy*, launched by the NSW Government in November 1998, makes commitments to achieving significant energy savings across the public sector. These savings are expected from improved energy management, greater use of 'green' energy technologies, and more energy-efficient purchasing by agencies (SoE 2000).

The NSW Government has recently increased its commitment to the purchase of renewable energies for State agencies from 5% renewable energies to 6%. In addition, an initiative of SEDA has resulted in power utilities offering 'green' power to businesses and households to encourage increased development of renewable energy sources (SoE 2000).

In NSW, licence conditions under the *Electricity Supply Act 1995* require electricity retailers to develop strategies to reduce greenhouse gases. Licence holders must develop 1-, 3- and 5-year plans for energy efficiency and demand management, as well as strategies for purchasing electricity from renewable sources. They are required to report information on energy use, greenhouse gas emissions and implementation of demand management (SoE 2000).

The NSW Government's 25-year air-quality management plan, *Action for Air*, will have a positive impact upon greenhouse gas emissions and improve urban and regional air quality. Increasing public transport use is a core element of *Action for Air* and is being addressed through an ambitious program of transport infrastructure development including rapid bus-only transitways, cross-regional bus services, extensions to the rail network and road improvements. The *Action for Transport 2010* plan involves a \$4-billion government investment in transport infrastructure to 2010 (SoE 2000).

NSW has also begun initiatives in emissions trading. In November 1998, the *Carbon Rights Legislation Amendment Act 1998* was passed in NSW to facilitate private sector investment in plantation forestry by recognising property rights associated with carbon sequestered by trees and forests (SoE 2000).

### ***The Local Government Response***

In response to the recognition of the important role local government can play in the reduction of greenhouse gases, the Federal Government allocated \$13 million to the Cities for Climate Protection™ Program Australia. The Cities for Climate Protection (CCP) Program is a global campaign to reduce greenhouse gas emissions at the local government level, which is initiated by and for local government through the Australian Greenhouse Office and the International Council for Local Environmental Initiatives (ICLEI). There are now 168 councils

participating in the CCP Program, representing over 65% of Australia's population.

The CCP program operates on a milestone framework, with 5 milestones set out to allow councils to work strategically to identify the level and sources of both community and corporate emissions and then prioritise action areas and follow up with locally relevant reduction actions. The five milestones are:

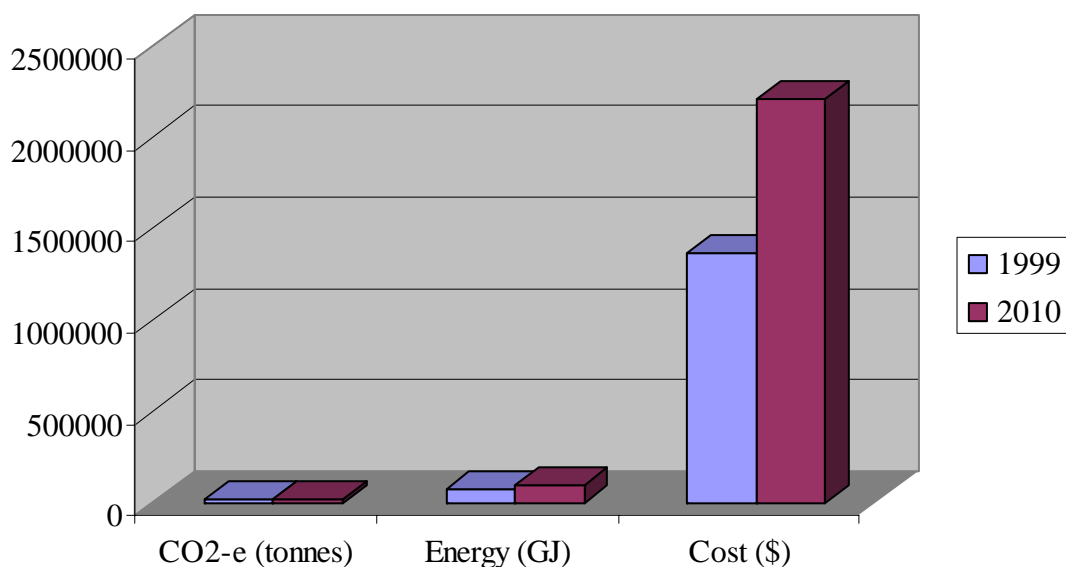
- 1) Conduct an emission inventory of both council and community activities and prepare a forecast of emissions growth in the future
- 2) Establish an emissions reduction goal
- 3) Develop and adopt a local action plan
- 4) Implement the local action plan
- 5) Monitor and report on implementation of the local action plan.

Hastings Council joined the CCP program in October 2001, completing Milestone 1 in July 2002, and Milestone 2 in September 2002. This document summarises the results of the emission inventory, details the emission reduction goals set by the Council, and provides the strategic directions that Hasting Council will take to reduce greenhouse gas emissions within the local government area, thus fulfilling the requirements of Milestone 3.

### 3. Greenhouse Gas Emissions

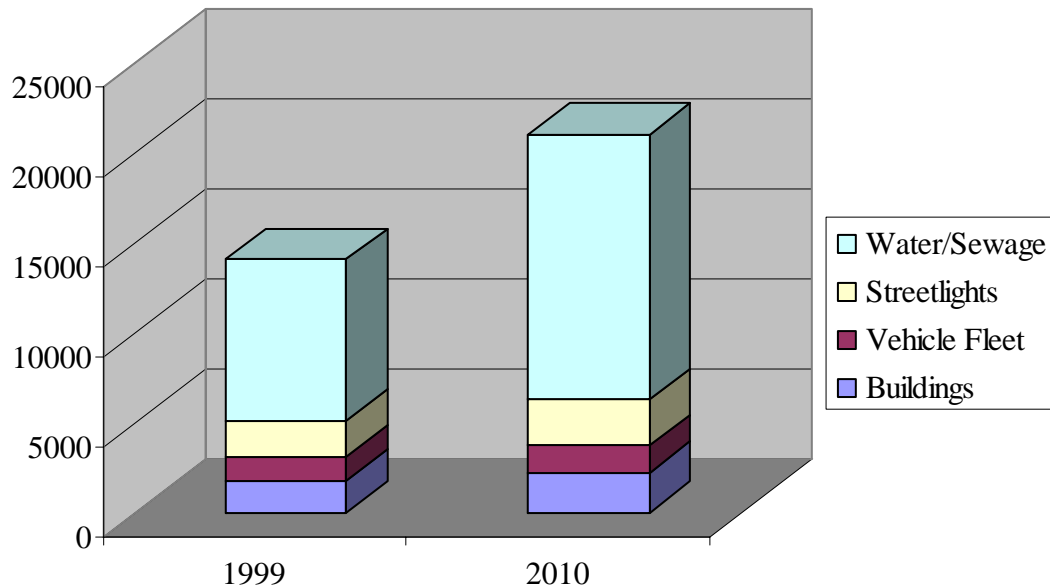
#### *Hastings Council Emissions*

Hastings Council produced 14,126 tonnes CO<sub>2</sub>-e in 1999 and this figure is predicted to increase to 21,057 tonnes CO<sub>2</sub>-e in 2010 (refer Figure 3). This equates to a 49.07% increase on 1999 levels. The dominant source of these emissions is from electricity consumption, with Council spending just under \$1 million dollars on electricity use alone in 1999. Electricity expenditure is expected to increase to over \$1.7 million in 'today's' dollars by 2010 if business was carried out as usual and no greenhouse gas reduction measures were put in place. The predicted increase in costs is actually likely to be higher given that these predictions do not take into account price increases in the power industry over the next 5 - 10 years.



**Figure 3: Hastings Council Corporate Emissions, Energy Usage and Cost.**

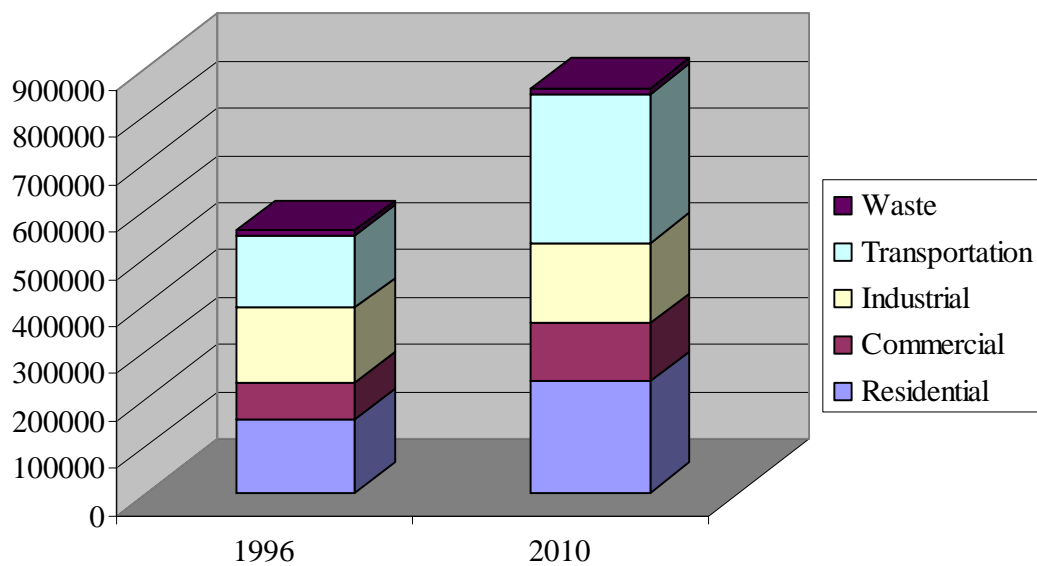
When looking at Councils emissions on a by sector basis, the Water/Sewage sector is by far the biggest producer of greenhouse gas emissions (refer Figure 4). It is also predicted that this sector will have the highest percentage increase in emissions from 1999 to 2010, with a 64.6% increase being predicted, this is followed by 27.9 % for Streetlights, 25.5% for Buildings, and 9.3% for Vehicle Fleet/Plant.



**Figure 4: Greenhouse Gas Emissions (tonnes CO<sub>2</sub>-e) generated by the various sectors within Hastings Council.**

### *Hastings Community Greenhouse Gas Emissions*

The three main sources of community generated greenhouse gas emissions in 1996 were the industrial, transportation and residential sectors, with 157,155 tonnes, 154,578 tonnes and 153,974 tonnes CO<sub>2</sub>-e being produced respectively (refer Figure 5). Greenhouse gas emissions are predicted to increase between 1996 and 2010 in all sectors with the highest growth area for emissions expected to be the transportation sector (emissions are predicted to more than double between 1996 and 2010 for this sector), being closely followed by the residential sector. Overall, emissions from the community are expected to grow by about 54.4%, even though the residential population is forecast to grow by 38.8% between 1996 and 2010.



**Figure 5: Greenhouse Gas Emissions (tonnes CO<sub>2</sub>-e) generated by the various sectors within the Hastings Community.**

#### **4. Greenhouse Gas Emission Targets**

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There is considerable opportunity to reduce energy usage through promoting energy efficiency and the implementation of energy efficient devices, enabling council to significantly reduce its greenhouse gas emissions and overall expenditure on energy. Hastings Council aims to reduce its corporate greenhouse gas emissions from 1999 levels by 20%, by 2010.

For the Hastings community, the stabilisation of greenhouse gas emissions at 1996 levels by 2010 was chosen due to the high population growth within the local government area. These reduction goals are considered achievable and realistic based on the experience of other councils involved in the CCP program, and were adopted by Council on 19 August 2002. These greenhouse gas reduction targets demonstrate a strong commitment from council, and will raise community awareness about greenhouse issues.

## 5. Existing Measures, Actions and Policies

Hastings Council has already implemented a number of projects that achieve direct and indirect greenhouse gas emission reductions in both the corporate and community sectors. A summary of the measures undertaken by Council since 1996 is contained in the tables below. In addition to these actions, a Greenhouse Gas Abatement Working Group has been established. This Group consists of representatives from various Council divisions and sections, and will ensure ownership by those in the best position to influence outcomes.

### *Hastings Council*

Table 2: Existing Corporate Measures, Actions and Policies.

<b>Project</b>	<b>Benefits</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Office waste reduction measures	Contributes to the reduction of energy use in making office paper, helps conserve natural resources	1991	All sections	Substitution of virgin office paper with recycled paper, the provision of recycling bins for waste paper.
Purchasing energy-efficient office equipment	Reduction in GHG emissions, reduced energy costs	2000	Information Technology	The purchase of energy efficient office equipment, such as computers and photocopiers, has reduced Councils GHG emissions whilst also reducing the amount of money spent on electricity used for this equipment.
Town Beach Solar Lights	Community awareness, electricity cost reduction	1999	Parks and Gardens Section	The lights at Town Beach are powered completely by solar energy and therefore do not produce any GHG emissions. These lights cost approximately \$40,000.
Kingfisher Road Landfill Capping	Minimises GHG (methane and CO <sub>2</sub> ) emissions	2000 - 2002	Waste Management and Building Section	The capping of the Kingfisher Road Landfill has minimised the GHG emissions resulting from this site. It has also lead to the opportunity for gas extraction and energy generation, which is detailed in the proposed corporate measures section of this report.

<b>Project</b>	<b>Benefits</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Lighting Replacement in Council Administration Offices	Minimisation of GHG emissions, reduced energy costs, longer globe life	1995 - ongoing	Waste Management and Building Section	The replacement of energy inefficient lighting within the Council administration offices with more energy efficient lighting will lead to reduced energy costs and GHG emissions.
Power Factor Correction in Administration Offices/PMQ Library	Improved efficiency of electricity supply to major Council buildings, minimisation of GHG emissions, reduced energy costs	1999	Waste Management and Building Section	The installation of power factor correction units at these sites has ensured that all the electricity that is supplied to these buildings is being productively used.

## Hastings Community

Table 3: Existing Community Measures, Actions and Policies.

Project	Benefits	Time-frame	Section Responsible	Additional Information
Energy Efficient Water Wise Residential Buildings DCP	Baseline energy, water efficiency in new dwellings/units, promotion of GHG abatement and energy conservation in the community	March 2001 and 2003	Building and Environment Section	Council plays a key role in the residential sector, administering planning and building codes that lead to reduced GHG emissions. This DCP provides detailed guidelines for the assessment of new developments, and aims to promote and create homes that use less energy and water, and contribute positively to an overall reduction in GHG emissions.
Waste Management and Minimisation Strategy	Minimises waste generation and reuses resources, reduces GHG emissions from decomposing waste, community education	1999 - ongoing	Waste Management and Building Section	This strategy has facilitated a reduction in the amount of waste going to landfill by providing opportunities for recycling, composting and the recovery of wastes in the residential, commercial and industrial sectors.
Water Wise Programs	Reduction in energy use, reduction in GHG emissions, community awareness	2001-ongoing	Water Section	The 'AAA' Rated Shower Head Rebate reduced GHG emissions by reducing water use (2001). Reductions come about through reduced utility water pumping, less overall water heating, and reduced sewage treatment. Examples of other strategies that are currently being implemented include the installation of rainwater tanks in urban areas for external use, advice to residents/audits of businesses to promote reductions in water use and the investigation of a tertiary treated effluent reuse system.

## 6. Proposed Measures, Actions and Policies

The tables below detail proposed corporate and community measures that will be undertaken to reach the nominated greenhouse gas emission targets by 2010, and include a description of the benefits, priorities, timeframes, and responsible departments.

### *Hastings Council*

Table 4: Proposed Corporate Measures, Actions and Policies.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Use High Profile Sites that have been targeted for GHG action to increase public awareness and support for reducing GHG emissions	Increased community awareness of GHG issues	High	2003-ongoing	All sections	This would allow Council to increase public understanding of the environmental impacts of producing and using electricity and its contribution to the greenhouse effect, whilst also enabling Council to show leadership in environmental initiatives. Possible sites include the Administration foyer, the PMQ pool, and public BBQ areas.
Green Power Purchasing	Zero GHG emissions from electricity consumption, lead to establishment of minimum green power purchasing for Council activities	Medium	2003/2004	All Sections	By purchasing all or part of our power from renewable energy suppliers, Council can reduce its greenhouse gas emissions at very little cost. Each Section of Council shall analyse electricity needs/costs and convert to green power where feasible. Once cost savings increase from energy efficiency gains across Council, 100% of Council's electricity should be purchased from renewable sources.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Energy audits of selected council buildings and facilities	Identify reductions in GHG emissions, energy and associated costs	Medium	2003-ongoing	All Sections	Energy audits of the facilities listed in Appendix 2 are needed to highlight and identify areas where GHG emission reductions can be made. This will also ensure that Council is not spending money on any unnecessary electricity costs.
Replacement of power supply to low energy use facilities with photovoltaic (PV) systems and disconnection from the grid	Community awareness, reduction in GHG emissions and energy costs	Low	2003-2005	All Sections	The sites contained within Appendix 1 have very low energy usage and for simple financial reasons could be supplied solely from PV systems and disconnected from the power grid. The use of PVs would also provide an immediate focus to promote energy efficiency, especially at facilities such as BBQ areas. By using the figures provided in <i>Energy Management Report Prepared for Hastings Council</i> it is estimated that by installing PV systems and disconnecting these facilities from the grid would save Council \$14,763 p.a. in electricity costs and 39.98t.p.a. GHG emissions. This project would have a payback period of 2-3years.
Energy Audit of all motors and pump associated with Council infrastructure	Identify GHG and energy savings for motor and pump infrastructure	High	2003 - 2005	Electrical Services	Audits are required to determine potential efficiency gains and expected capital costs. It is expected that actions carried out as a result of these audits could result in a 770t – 3850t.p.a. reduction in GHG emissions and savings of between \$102,000 and \$510,000 p.a.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Green Purchasing Policy/ Tender Standards	Facilitate ongoing and holistic approach to efficient and clean plant/ products/ services	High	2003 - 2004	Finance Section/ Environment Section/ Infrastructure Division	This policy will ensure that energy efficiency is considered as a priority when purchasing equipment and when tendering for development of Council infrastructure and buildings.
Development of Standard Electricity Consumption Monitoring System	Monitoring electricity use and efficiency, cost reductions, GHG reduction	High	2003	Finance Section/ Environment Section	An accurate Electricity Consumption Monitoring System is needed in order to quantify the success of any GHG reduction measures that are implemented and therefore to ensure the long term success of this strategy. This may require the cooperation of Country Energy.
Efficient Vehicle Fleet Project Review	Reduction in fleet GHG emissions, reduction in fleet running costs by buying fuel efficient vehicles	High	2003/ 2004	General Works (Plant) Section/ Environment Section	Investigating options for improving the efficiency of the fleet and reducing greenhouse gas emissions. This would involve looking at the feasibility of vehicle substitution, alternative fuel options, and the encouragement of car-pooling by offering incentives such as dedicated car-pooling parking spaces.

Project	Benefits	Priority	Time-frame	Section Responsible	Additional Information
Alternative Fuel Trial for selected high profile plant	Reduction in GHG Emissions, community Awareness	Biodiesel – Medium  CNG and LPG - Low	2003 - 2004	General Works (Plant) Section/ Environment Section	<p>This trial would involve looking at the applicability of using Biodiesel and LPG or CNG. Biodiesel can be used directly in the unmodified diesel engines of garbage trucks and other heavy vehicles, resultant emissions are considerably cleaner than conventional diesel and it is a greenhouse-neutral fuel.</p> <p>Conversion to CNG would provide a 23% reduction in CO<sub>2</sub> emissions compared to petrol, and LPG would provide an 8% reduction. The feasibility of obtaining grants (of up to 50% of the eligible costs to council to purchase CNG or LPG vehicles or convert or upgrade existing vehicles) from the Alternative Fuels Conversion Program (AFCP) through the Australian Greenhouse Office should be investigated.</p> <p>If this trial is successful further conversions of Council plant would then be undertaken.</p>

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Computers – Activation of Energy Star Power Management System	Reduced energy consumption, GHG emission reduction, longer screen life	High	2003	Information Technology Section	<p>This initiative makes both good environmental and financial sense. A computer which works to the Energy Star power management system changes to low energy demand mode when it has not been used for a preset time, and returns to normal operation as soon as the user touches the keyboard or mouse. However, these features only save energy when they are activated.</p> <p>Using energy audit data collected by the City of Adelaide, it was estimated that the Council's computers cost \$25,136 p.a. to run and the energy used produced 183.7t.p.a. GHG. By enabling the Energy Star features it was estimated that the running costs would be \$12,470 p.a., this represents a saving of \$12,666 p.a. and approximately 90.8t p.a. GHG.</p>
Replace CRT computer screens with flat TFT screens	Reduced GHG emissions, reduced electricity costs	Meduim	2003-2006	Information Technology Section	If CRT computer screens were replaced with flat TFT screens, it is estimated Council could save \$21,553 p.a. and 156.2t.p.a. in GHG emissions once all Council's computer screens have been replaced.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
PMQ Sewage Treatment Plant Photovoltaic Electricity Generation Project	Renewable Electricity Generation for use at the facility, reduced costs and emissions/ community awareness	Low	2004-2006	Sewerage Section/ Environment Section	The use of photovoltaic (PV) panels could significantly reduce energy costs and the resulting GHG emissions, especially given the current high power consumption of this facility. The Sustainable Energy Development Authority (SEDA) in NSW offers rebates of up to 40% for the purchase PV devices. The opportunity for funding should be investigated.
Streetlighting Review and Upgrade Program	Reduction in GHG emissions, reduction in energy costs, improvement in lighting	High	2003-2007	Technical Services/ Environment Section	There is the potential for significant monetary savings to be made in this area, and it is expected that the review and upgrade program will deliver large reductions in GHG emissions due to the large number of inefficient lighting devices currently being used. These changes could save Council approximately \$9,500 p.a. and would deliver a 310.5t p.a. reduction in GHG emissions. However, any changes that are made must comply with the Australian Standard. Technical advice and the cooperation of Country Energy will be required to ensure the most effective options are implemented.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Administration Building Energy Conservation Project (energy efficient lighting/ lighting timers/ air conditioning modifications)	Reduced GHG emissions, reduced electricity costs, lead to audit and upgrade of all other building installations (libraries, depots, branch offices, etc)	High	2003-2004	Waste Management and Building Section	Significant cost savings can be achieved through office retrofits, as well as substantial reductions in GHG emissions. The results of this pilot program will be used to stimulate change in other Council buildings. Councils of similar size to Hastings (Tweed/Maroochy) have estimated savings of approximately \$11,000 p.a. and 100t.p.a. in GHG emissions, with a payback period of 4-5 years for similar projects. The possibility of funding from the Australian Greenhouse Office for an office lighting retrofit should be investigated.
Kingfisher Road Landfill Gas Recovery Project	Electricity generation landfill gas, GHG emission reduction	Medium	2003 - 2004	Waste Management and Building Section	When organic material decomposes in a landfill it produces landfill gas, methane produced by this waste decomposition is an available and reliable source of energy at many landfill sites. This project aims to recover landfill gas and therefore reduce GHG emissions (the actual savings are yet to be quantified). This project to be funded, implemented and operated by LMS.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Bonny Hills Caravan Park Hot Water System Upgrade	Reduction in GHG emissions, reduction in energy costs	Low	2003 - 2005	Waste Management and Building Section	Upgrading this system would result in electricity use being cut by 75% and create a saving of 7.1t.p.a. and approx. \$1000 p.a.
Wind Turbine Project	Renewable electricity generation for water supply plant, community awareness	Low	2004 - 2006	Water Section	The implementation of a wind turbine power generator will see Council enter into the renewable energy market, generate power to run Water Supply infrastructure and raise community awareness towards the integration of renewable energy infrastructure within the urban environment.

## Hastings Community

Table 5: Proposed Community Measures, Actions and Policies.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Promote the use of Greenpower purchasing in the community	Greater community awareness, reduced GHG emissions	High	2003 - ongoing	Environment Section	Australia's emissions of greenhouse gases are amongst the highest, per person, of any country in the world. The promotion of the purchase of Greenpower (energy sourced from renewable sources such as solar, wind, biomass and hydro power) is one way that community emissions could be reduced. Increased usage and support of Greenpower will also help to drive investment in new renewable energy projects.
Household Greenhouse Action Information Package	Community education, GHG emissions reduction in residential sector	High	2003/2004	Environment Section	This would focus specifically on encouraging householders to reduce their energy consumption and greenhouse gas emissions and would lead to greater awareness of greenhouse gas issues. Just by ensuring the use of energy-efficient products in the home energy-generated greenhouse gas emissions could be reduced by 43 to 54%. The AGO may provide assistance in funding this program through the Household Greenhouse Action Grants.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Establish community partnerships	Increased community support for greenhouse action	Medium	2003 - ongoing	Environment Section	The establishment of effective partnerships is needed to ensure greater community involvement and ownership. This would result in mutual benefits to both parties and create a more efficient approach to GHG reduction. Partnerships should be established within all sectors including business, industry, and transport. Council should provide motivation for local entities to reduce their energy consumption, and thus their GHG emissions by highlighting the significant financial savings that can be made.
Tourism Greenhouse Action Information Package	Community education, GHG emissions reduction in tourism industry	Medium	2003/2004	Environment Section	This package should be targeted at the operators of tourism facilities in the LGA. It is needed to ensure that these facilities are aware of current technology and resource energy efficiency practices and the advantages of adopting such practices and equipment. The possibility of involving the Tourism Taskforce in such an action should be investigated.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Switch-Off Campaign	Community education and awareness, GHG emission reductions	Medium	2004/2005	Environment Section	Switching off unnecessary equipment is the simplest and easiest thing that can be done to reduce energy waste. This campaign would aim to encourage school children to take action to reduce GHG emissions. In order to ensure that this campaign is as effective as possible it would need to have the support of the school community, sponsors, Council staff and elected representatives.
Free trees days	Increase the volume of carbon sinks in the LGA, increased aesthetic value of the area, increased habitat for native fauna	Low	2004/2005	Parks and Gardens	Trees to be provided free of charge to the community on an annual basis. Increased vegetation in the LGA would play an important role in carbon sequestration, which is an important greenhouse mitigation strategy among other benefits.
Energy/Water Efficient DCP for Non-Residential Buildings	Baseline energy efficiency in new commercial and industrial buildings, promotion of GHG abatement and energy conservation in the community	High	2003/2004	Planning Section	Prepare an Energy/Water Efficient DCP to promote the benefits of energy and water efficiency for non-residential buildings. This should also look at regulatory and other mechanisms to ensure new developments maximise resource energy efficiency.

<b>Project</b>	<b>Benefits</b>	<b>Priority</b>	<b>Time-frame</b>	<b>Section Responsible</b>	<b>Additional Information</b>
Community Transport Strategy	Decrease the dependence on cars, increased use of public transport, reduced GHG emissions	Low	2005	Technical Services Section/ Environment Section	The highest growth area for emissions in the community is expected to be the transportation sector. In order to reduce this predicted increase a transportation strategy needs to be developed. This strategy should focus on promoting the use of public transport, alternative fuel options, vehicle substitution, and encouraging car pooling and the use of bicycles as a mode of transport. Incentive such as travel vouchers and parking spaces dedicated to car pool vehicles could be introduced.
Energy Efficient Lighting and 'AAA' Rated Shower Head Promotion Project	Reduction in GHG emissions from electricity consumption in residential buildings/ community awareness	Medium	2003/ 2004	Water Section/ Environment Section	Energy Efficient Lighting (such as compact or tube fluorescent, and sensor lights) and 'AAA' rated shower heads should be promoted to increase usage within residential households in the community. This would ensure reduced energy and water usage.

## **7. Implementation, Monitoring and Evaluation**

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The '*Greenhouse Action Strategy*' serves to assist Council in implementing effective and practical greenhouse abatement actions in order to achieve its emission reduction goals by 2010. To obtain the greatest economic, social and environmental benefits of this program, this document should be seen as a 'living document', and as such, the '*Greenhouse Action Strategy*' is not seen as an action plan covering all possible actions that will be undertaken in this 7 year period. It is envisaged that further review of this document will occur throughout the implementation, monitoring and evaluation of the strategy. In particular, many actions detailed in section 6 of this report are considered to be pilot projects that will lead to ongoing action following successful implementation.

Effective implementation of this action plan requires participation and cooperation from many Council divisions and sections. In this respect, the establishment of the Greenhouse Gas Abatement Working Group, in August 2002, will help to ensure ownership by those in the best position to influence outcomes.

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## 8. References

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EPA (2001) *Actions for Air* <  
<http://www.epa.nsw.gov.au/air/actionforair/index.htm>>.

Howard D (2003) *Energy Management Report for Hastings Council*. Partners Energy Management.

SoE (2000) *NSW State of the Environment 2000*. Chapter 3: Atmosphere. <<http://www.epa.nsw.gov.au/soe/soe2000/ca/>>.

\* all information used for the introductory section of this report (excluding the State Government Response section) was sourced from ICLEI/CCP, provided as part of their support for this program.

**Appendix 1 - Council Buildings and Facilities to be supplied with PV systems  
and disconnection from the power grid**

<b>Facility</b>	<b>Service</b>	<b>KWh</b>
FS Henry St Long Flat	service no. 2640340/1	2516
FS Pappinbarra Rd Beechwood	service no. 2537800/1	2134
FS Bulli Crk Rd Byabarra	service no. 2606120/1	571
FS Stewarts River Rd Lorne	service no. 2837020/1	466
Bushfire Shed Bellangry Rd B/W	service no. 7008189/2	313
FS Moroko Park Pembroke	service no. 2491700/1	241
FS Hollisdale Pappinbarra	service no. 2569810/1	164
Cathodic Protection Rectifier	service no. 7570008/1	130
Fire Control Huntingdon Rd Hun	service no. 7028222/1	21
Bridge, Ocean Dr, L/C	service no. 7006030/1	0
2 River St Dunbogan	not used anymore	0
BBQ Lake Reserve L/C	service no. 3402130/1	3557
Settlement Point Park PMQ	service no. 7006344/1	3039
Sancrox Reserve Sancrox	service no. 2410220/1	2815
Music Centre Gordon St PMQ	service no. 4112450/1	2705
Dunbogan Tip Dunbogan	service no. 7005729/1	2410
BBQ Area Rainbow Beach B/H	service no. 7000364/1	2308
Bain Park Oxley Lne Wauchope	service no. 2318610/1	2251
BBQ McInherney Prk PMQ	service no. 5551760/1	2140
Toilet Block Town Green	service no. 3988000/1	1943
Hall Ocean Dr N/H	service no. 3182800/1	1868
Macquarie Park Bridge St PMQ	service no. 3837400/1	1659
Hockey Fields Cameron St Wauch	service no. 7005438/1	1533
Recreation Ground Rollands Pla	service no. 5823900/1	938
The Wall Reserve Laurieton	service no. 7006245/1	905
Lady Nelson Wharf PMQ	service no. 7592119/02	866
BBQ Haven Res, Ocean Dr N/H	service no. 3178100/1	684
BBQ Electric Dunbogan Reserve	service no. 3113620/1	531
BBQ Ocean Dr N/H	service no. 3183000/1	530
BBQ Aqua Park	service no. 7588653/01	454
BBQ Area The Parade N/H	service no. 7002065/1	386
BBQ Area Bartlett Beach B/H	service no. 7000363/1	368
Kendall Park Amen & Grounds	service no. 2755104/1	355
Macquarie Park Gordon St PMQ	service no. 3837200/1	313
BBQ Stennetts Rd Comboyne	service no. 3510400/1	309
BBQ Apex Park Laurieton	service no. 2980450/1	236
Andrew Park Amen Wauchope	service no. 2066200/1	218
Johnathon Dickson Reserve L/C	service no. 7596426/01	213.6
BBQ River St Wauchope	service no. 2056850/1	194
BBQ Lasiandra Park Wauchope	service no. 7011186/1	63
Settlement Point Rd PMQ	service no. 5574000/1	51
Town Beach Park Clarence St PM	service no. 7570147/1	46
Historic Cemetry Gordon St PMQ	service no. 7016389/1	0

## Appendix 2 - Council Buildings and Facilities Requiring Energy Audit

<b>Facility</b>	<b>Service</b>	<b>KWh</b>
Library Gordon St PMQ	service no. 7576260-1	237035
Wauchope Office 47 High St	service no. 2367600/1	199817
Emergency Operations Centre	new facility	82007
PMQ Workshop Koala St	service no. 2020060/1	76470
Wauchope Depot Commerce St	service no. 2082300/1	51927
Laurieton Depot Castle St	service no. 3074200/1	8200
Jungarra Crs B/H (fire)	service no. 3344400	3509
Tool Shed Boundary St PMQ	service no. 5639400/1	2768
SES Norman St Laurieton	service no. 3008220/01	2623
High St Old Parsons Depot Wauc	service no. 2355601/1	2517
Lake Innes Dr Wauchope (fire)	service no. 2423210/1	2147
River Gauge Moonee St Tele Pt	service no. 5761700/1	1990
FS North Shore	service no. 7000944/1	1751
Bushlands Dr via Waucho (fire)	service no. 5712960/1	1287
FS Parry St L/C	service no. 3427000/1	1239
Camden Haven Bush Fire Brigade	service no. 2771600/01	1114
Tuffins Lane PMQ	service no. 5616600/1	1018
Water Pond Pump Kendall	service no. 2715000/1	1017
FS Narran Cl Wauchope	service no. 2454460/1	962
FS 839 Pappinbarra Rd Upper Pa	service no. 2575701/1	760
Sea Rescue Shed Buller St PMQ	service no. 3756200/1	360
FS Hill St Comboyne	service no. 2860800/1	293
Office & Library Laurieton	service no. 3028300/1	82007
Regional Gallery Clarence StPM	service no. 2015250/1	53740
Stuart Park Wood St	service no. 5634800/1	19457
Bain Park 224 Beechwood Rd Wau	service no. 2392400/01	15804
Ammenities Block Wood St	service no. 7002157/1	14234
Cairncross Waste Mgt TelePoint	service no. 7587284/01	12843
Soccer Field Fairmont Dr Wauch	service no. 2098600/1	10775
Findlay Park Hastings River Dr	service no. 5356100/1	9387
PMQ Tip Kingfisher Rd	service no. 7005499/1	4733
Wauchope Tip Oxley Hwy	service no. 7006235/1	3700.6
Camping Ground The Parade N/H	service no. 2008600/1	119143
Crematorium Oxley Hwy PMQ	service no. 5699600/1	30204
Hibbard Sport Stad Tuffins Lne	service no. 7002025/1	19717
Kew Info Centre Pacific Hwy	service no. 2779600/1	14932
School of Arts Laurieton	service no. 2971400/01	14860
Bus Terminal Amenities PMQ	service no. 7029152/1	11121
Old Court House Hay St PMQ	service no. 4014801/1	4618
Rotary Youth Centre Wauchope	service no. 2318450/1	3247
Hanger 1 Airport Boundary St	service no. 7023826/1	1524
Amenities School of Arts	service no. 7593150/01	401
Airport Boundary St PMQ	service no. 5639410/1	229
KK SPS4 Kew Rd Kendall	service no. 7590780	809
KK SPS6 Pacific Hwy Kew	service no. 7590782	788
Sewerage Works Bain St Wauchope	service no. 7017496/1	745
Supply Booster Lochinvar PI PM	service no. 4341100/1	745
PMQ SPS60 Livingston Rd	service no. 4333990/1	745
PMQ SPS23 Hastings River	service no. 5614101/1	744.5

<b>Facility</b>	<b>Service</b>	<b>KWh</b>
PMQ SPS13 Lake Rd	service no. 4353600/1	718
C/H SPS2 Bay St Dunbogan	service no. 3091000/1	703
PMQ SPS20 Matthew Flinders Dr	service no. 5116200/1	687
C/H Booster N/H Primary School	service no. 3151300/1	685
PMQ SPS37 Racecourse The Jib	service no. 5464500/1	674.4
Kew/Kendall Boost Ocean Dr Kew	service no. 2902450/1	656
Sewer Ponds Lake Rd PMQ	service no. 4377200	624
Sewer Ponds Lake Road	service no. 4377200/1	575
PMQ SPS53 Lincoln Rd	service no. 5682750/1	570
Transit Hill Booster Orr St PM	service no. 5208680/1	556
PMQ Dam Pump Station	service no. 2020200/2	554
PS6 Ocean Dr B/H	service no. 3335190/1	544
PS2 Cathie Rd B/H	service no. 3383390/1	537
River Intake Comboyne	service no. 2869200/1	534
SP2 Nelson St, Wauchope	service no. 2197800/1	505
C/H SPS12 Sirius Dr Lakewood	service no. 2909240/1	494
Innes Peninsula BPS & Reservoir		484
Intake Telegraph Point	service no. 5805200/1	438
C/H SPS5 Bridge St N/H	service no. 3221000/1	414.86
SPS4 Flobern Ave, Wauchope	service no. 2165220/1	411
Small towns sewerage program		394
Pump Station Ocean Drive W/H	service no. 2931790/1	394
PMQ SPS3 Sunset Parade	service no. 4031800/1	388
PMQ SPS17 Short St	service no. 3929800/1	374
PMQ SPS6 Hindman St	service no. 3603200/1	315
SPS1 Cameron St, Wauchope	service no. 2003760/1	315
SPS8 Hill St PMQ	service no. 2010450/1	296
SPS10 Moruya Dr PMQ	service no. 2010440/1	290
Sewage Treatment Kew	service no. 7590233	279
Pumping Station 1 Tallong Dr	service no. 3498440/1	243
Booster Pump Station Lake Rd	service no. 7010611/1	239
SPS8 Blackbutt Dr, Wauchope	service no. 2003900/1	234
W/H SPS15 Ocean Dr West Haven	service no. 2938850/1	210
SPS9 Swift St PMQ	service no. 2010100/1	202
SPS21 Marbuk PI PMQ	service no. 7001707/1	167
N/H Booster Ocean Dr	service no. 331380/1	159
C/H SPS1 Wharf St Laurieto	service no. 2007500/1	157
Stoney Crk Backfeed PS	service no. 2025250/1	153
SPS18 Chestnut Rd PMQ	service no. 2021310/1	150
SPS1 Munster St PMQ	service no. 2012610/1	143
Tacking Pt Sewerage Works	service no. 2009640/1	78
PS1 Wharf St Laurieton	* new facility	76
SPS64 Yaluma Dr PMQ	service no. 7001708/1	75
Sewerage Holding Pond Lake Rd	service no. 7007465/1	72
Facilities for Area 13 develop		62
SPS7 Hastings River Dr PMQ	service no. 2023895/1	34
Comboyne WTP	* new facility	24
Long Flat WTP	* new facility	3
Telegraph Point WTP	* new facility	3
B/H Treatment Works, Cathie Rd	service no. 2008900/1	0
C/H Treatment Works, Bay St	service no. 2007680/1	0

<b>Facility</b>	<b>Service</b>	<b>KWh</b>
Wauchope STW, Bain St	service no. 2002470/1	0
Koree #3 Pump Station		0
Wauchope and Rosewood WTP	* new facility	0
New and Old Koree Island	service no. 2000400/2	0
Cowarra Dam	* new facility	0
New Treatment Works Cnr Koala	service no. 2020000/2	0

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