



**CITY OF MONASH**

**GREENHOUSE ACTION PLAN**

**NOVEMBER 2003**

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# 1 EXECUTIVE SUMMARY

The City of Monash has an important role to play in reducing greenhouse gas emissions, both as part of the growing international network of local councils committed to addressing this problem, and locally as a leader within the community. Council intends to encourage and assist Monash residents, businesses and industry to reduce greenhouse gas emissions and to do so, the City of Monash will lead by positive example.

The City of Monash is committed to and has been recognised for its environmental and greenhouse initiatives in the Sustainable Energy Authority 2001 Energy Smart Awards. Through the Cities for Climate Protection™ programme the City of Monash has agreed upon an Emissions Reduction Goal and developed this Greenhouse Action Plan.

This report outlines how the City of Monash will attempt to reduce greenhouse gas emissions by 2010 by 15% below the 2000 corporate (Council) greenhouse gas emission level and 10% below the 1996 community greenhouse gas emission level. Section 3 provides background information on the enhanced greenhouse effect and the international, national and local actions to control the effects of global warming. Sections 4-8 describe the actions Council has identified for achieving its Emission Reduction Goal.

In deciding on actions to reduce greenhouse gas emissions the main objectives were:

- Develop an understanding of the enhanced greenhouse effect and increase the participation of Council staff and the community in the measures necessary to reduce greenhouse emissions
- Promotion of efficient energy use in Council operations, the wider community, and business and industry
- Develop partnerships between the City of Monash, local business, neighbouring councils and community groups to facilitate the programme development and establish a collaborative approach towards greenhouse gas abatement
- Support and advocate for improved energy efficiency of residential buildings and use of energy efficient domestic appliances.
- Encourage the reduction in private vehicle use and promote the use of alternative forms of transport that produce less greenhouse gas, such as bicycles and public transport

The Greenhouse Action Plan has been developed with the assistance of staff from a diverse cross-section of Council departments at a Milestone 3 Facilitated Workshop and with the help of staff from the Cities for Climate Protection™ office.

When finalised and endorsed by Council, this Greenhouse Action Plan will meet the CCPT™ requirements of Milestone 3. The action plan also documents Monash's achievement of Milestones 1 and 2, and lays the groundwork for achieving Milestones 4 and 5.

## 2 COUNCIL PROFILE

The City of Monash was established in December 1994 through the amalgamation of the former City of Waverley and the majority of the former City of Oakleigh. The municipality is 20 km south east of Melbourne's CBD and covers an area of 82 km<sup>2</sup>. The municipality is made up of the suburbs of Ashwood, Burwood, Chadstone, Clayton, Glen Waverley, Hughesdale, Huntingdale, Jordanville, Mount Waverley, Mulgrave, Nottinghill, Oakleigh, Syndal and Wheelers Hill. The surrounding municipalities are the cities of Boroondara, Glen Eira, Greater Dandenong, Kingston, Knox, Stonnington and Whitehorse.

The City of Monash had 164,677 residents at the 2001 census, making it one of Melbourne's most populous municipalities. Monash has a multicultural population, in 2001 over 40% of the residents came from overseas countries – the United Kingdom, Greece, China and Malaysia being the most prominent. The main languages spoken are English, Chinese languages, Greek, Italian and Vietnamese. Over 50% of residents owned their own home in 2001. Almost half of the households in Monash have dependent children living at home (either couples with children or single parent families with children).

The City's leafy streetscapes are a feature of the area, as are the 600 hectares of parks, gardens and reserves including Jells Park. It has excellent sporting facilities catering especially for football, cricket, basketball, netball and golf. The Monash Aquatic and Recreation Centre was opened in December 2001 and has indoor and outdoor swimming pools, a wave pool, sauna, steam rooms and spas, along with extensive fitness facilities.

There are about 11,500 business establishments, including 2,800 home based businesses, in the City of Monash. These businesses provide around 90,000 jobs predominantly for the residents in the municipality and Melbourne's south-eastern region<sup>1</sup>. The main industrial areas are the Monash Science & Technology Park, Waverley Business Park, and Monash Technology Precinct. The commercial areas are located in enclosed shopping centres at The Glen, Century City Walk, Brandon Park, Waverley Gardens, Oakleigh Central and Wheelers Hill, and in strip shopping centres at Glen Waverley, Oakleigh, Clayton, Mount Waverley, Pinewood and Syndal. Monash University, Holmesglen Institute of TAFE (Waverley Campus) and the Victorian Police Academy are also based within the municipality.

A number of transport modes are available for travel within and through the City of Monash's boundaries, including private transport and public transport. Monash has an excellent arterial road network with many major roads providing linkages to arterial roads, the Monash Freeway and surrounding suburban areas. Monash is also well serviced by public transport with two rail services, the Glen Waverley and Cranbourne/Pakenham lines plus an extensive bus network and taxi service. However, over 87% of households in 2001 owned 1 or more vehicles, and 69% of residents travelled to work by car, compared to only 11.2% using public transport<sup>2</sup>.

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<sup>1</sup> City of Monash, First for Business – Economic Development Strategy 2003-2007

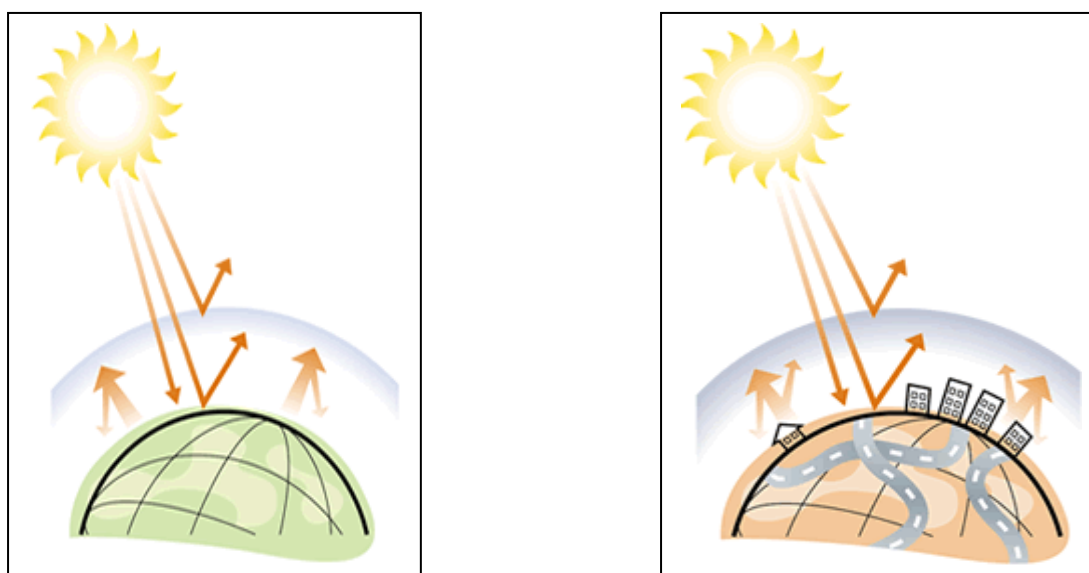
<sup>2</sup> Department of Infrastructure, based on 2001 census figures. <http://www.doi.vic.gov.au/DOI/knowyour.nsf>

### 3 BACKGROUND

#### 3.1 The Enhanced Greenhouse Effect

The Greenhouse Effect is the natural process that warms the earth to a habitable temperature. Sunlight passes through the atmosphere, warming the Earth's surface. The land and oceans release some of the heat received (called infrared radiation) into the atmosphere, balancing the incoming energy. Water vapour, carbon dioxide (CO<sub>2</sub>) and some other naturally occurring gases absorb part of this radiation and warm the lower atmosphere. This absorption of heat keeps Earth warm enough to sustain life and is called the greenhouse effect. Without the heat-trapping greenhouse gases, the average global surface temperature would be -18°C rather than the current global average of 15°C<sup>3</sup>.

Since the industrial revolution and the expansion of agriculture around 200 years ago, the concentration of CO<sub>2</sub> in the atmosphere has been increasing. Levels of other greenhouse gases have also increased due to human activities, such as the burning of fossil fuels, and vegetation clearance. Higher concentrations of greenhouse gases in the Earth's atmosphere have led to increased trapping of infrared radiation. This is called the Enhanced Greenhouse Effect. The lower atmosphere is likely to warm, changing weather and climate patterns. An illustration of the difference between the natural Greenhouse Effect and the Enhanced Greenhouse Effect is shown in Figure 1.



**Figure 1: Diagram of the Natural Greenhouse Effect (left) and the Enhanced Greenhouse Effect (right)<sup>4</sup>**

Greenhouse gases are composed primarily of water vapour, carbon dioxide, nitrous oxide and methane. Water vapour is responsible for about three-quarters of the natural greenhouse effect. The global warming potential's of these gases have been calculated by scientists and are based on factors such as their heat absorbing capabilities and atmospheric lifetime.

The Intergovernmental Panel on Climate Change (IPCC) has produced emissions scenarios of these greenhouse gas concentrations in the atmosphere to generate models of climate change. They have predicted that the global temperature will be 1.4 to 5.8°C warmer in 2100 compared to 1990<sup>5</sup>. Sea-level is predicted to rise by 9 to 88 cm by 2100, or 0.8 to 8.0 cm per decade, relative to 1990<sup>6</sup>. The effects of the enhanced greenhouse effect on the Australian climate, outlined below, are based on predictions and modelling by the CSIRO<sup>5</sup>.

<sup>3</sup> Holper, P. 2002. 'Greenhouse: questions and answers' CSIRO Research, [http://www.dar.csiro.au/publications/gh\\_faq.htm](http://www.dar.csiro.au/publications/gh_faq.htm)

<sup>4</sup> Australian Greenhouse Office, <http://www.greenhouse.gov.au/fuellabel/environment.html#estimate>

<sup>5</sup> Abbs, D. 2002. 'Climate Change and Australia's Coastal Communities' CSIRO, <http://www.dar.csiro.au/publications/CoastalBroch2002.pdf>

<sup>6</sup> Whetton, P. 2001. 'Climate Change – Projections for Australia' CSIRO, <http://www.dar.csiro.au/publications/Projections2001.pdf>

- Average annual temperatures will be warmer in 2030 by 0.4 to 2.0°C and 1.0 to 6.0°C by 2070. Table 1 shows expected changes to number of days below 0°C and above 35°C in Victoria.
- More severe local storms with hail, flash flooding and wind damage. These are likely to be associated with increased flooding and an increased risk of landslides in some areas.
- Moisture stress caused by the difference between rainfall and evaporation is likely to be greater.
- It is likely that global warming will enhance the dry periods associated with El Niño events.

**Table 1: Average number of winter days below 0°C and summer days over 35°C, at present, in 2030 and 2070<sup>s</sup>.**

<b>Number of days</b>	<b>Present</b>	<b>2030</b>	<b>2070</b>
<b>Winter days below 0°C (Tatura)</b>	15	6-13	0-9
<b>Summer days over 35°C (Melbourne)</b>	8	9-12	10-20

Climatic changes of this magnitude would have practical implications for water resources, urban infrastructure, agriculture and biodiversity, for example some crops require a certain number of days below 0°C to set fruit. Climate change in Australia may not necessarily result in negative impacts, but could create favourable changes, for example, through creating more favourable conditions for certain crops in particular locations. While these types of changes may not be regarded as negative, they would still involve costs as society adapts to the new circumstances.

Climate change will also affect natural ecosystems. The climate may change faster than species and ecosystems can adapt to and will place further survival pressure on species, which are already struggling to cope with habitat fragmentation. Weed problems in many ecosystems may increase, as weed species are highly adaptable and can rapidly exploit environmental stress. Pest infestations may also increase, for example, through extensions to the ranges of pests now confined to warmer northern regions. Forest productivity could be affected by shifts in climatic zones accompanying global warming, particularly where trees are growing at the limit of their climatic range. Increase in fire risk is also a potential additional hazard.

The impacts may have very broad and costly implications for the community. For example if there is less rainfall, reduced river flow is likely to exaggerate current water quality problems resulting in higher costs for residential, commercial and agricultural users. Snowfall is also likely to decrease which will result in a downturn in the ski tourism industry.

### **3.2 International Response to Climate Change**

Growing international concern over climate change and the enhanced greenhouse effect saw the establishment of the Intergovernmental Panel on Climate Change (IPCC) in the 1980's. The IPCC published extensive reports in 1990, 1996 and in 2001, *The Third Assessment Report*. These reports have been used in discussions and decision making regarding the enhanced greenhouse effect.

The United Nations Framework Convention on Climate Change (FCCC) arose from the mounting evidence towards human induced climate change. Australia signed the FCCC in June 1992 at the Rio Earth Summit and ratified it in December 1992.

The objective of the Convention was to achieve:

*Stabilisation of the 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 economic development to proceed in a sustainable manner.*

To achieve this objective the Convention contains a number of principles to guide the Parties' actions including requirements to:

- Prepare national inventories of greenhouse gas emissions and sinks
- Develop, implement and report on national programmes 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
- Take climate change considerations into account in relevant social, economic and environmental policies and actions

The countries party to the convention have met regularly since the Rio Earth Summit to determine the details of the Convention's implementation. These meetings are known as the Conference of Parties (COP). Of particular note is that COP can adopt protocols to the Convention which are subsidiary treaties which would legally bind the Parties to the Protocol.

The first COP met in Berlin early 1995, with the latest COP8 held in New Dehli, India October 2002.

COP3 in Kyoto in December 1997 agreed to the Kyoto Protocol, which requires Annex 1 countries (developed countries) to collectively reduce their greenhouse gas emissions by at least 5% below 1990 levels by the period 2008-2012. Within this target, individual countries have agreed to differentiated targets depending on their economic circumstances and differing capacities to make emissions reductions. Australia's target is to ensure its greenhouse gas emissions do not increase by more than 8% above 1990 levels.

Under the Protocol, countries can achieve their targets through emission reductions, sink enhancement and reduction in land clearance. Countries can also use a range of flexibility mechanisms to meet their reduction commitments, including emissions trading, joint implementation of measures with other countries, emissions banking and emissions reduction credits for assistance to developing countries.

COP6 in Bonn July 2001 reached a broad political agreement on the implementation of the 1997 Kyoto Protocol. COP6 has agreed that:

- Eligible carbon sink activities will include revegetation and the management of forests, crop lands and grazing lands
- Through the Clean Development Mechanism, developed countries can invest in climate friendly projects in developing countries and receive credit for the emissions avoided by those activities
- Through the international emissions trading regime, developed countries can buy and sell credits amongst themselves
- The above three mechanisms should be supplemented by domestic action
- A compliance mechanism will be enforced. For every ton of gas that a country emits over its target it will be required to reduce an additional 1.3 tons during the Protocol's second commitment period which starts in 2013.<sup>7</sup>

These operational details were finalised at COP7 in Marrakech, Morocco in November 2001, paving the way for ratification of the Protocol by governments.

The Kyoto Protocol will enter into force and become legally binding after it has been ratified by at least 55 parties to the Convention, including industrialised countries representing at least 55% of the total 1990 CO<sub>2</sub>-e emissions from this group. So far 97 countries have ratified and the protocol is expected to enter into force in 2003<sup>8</sup>. Throughout negotiations, Australia has emphasised that it will not ratify the Kyoto Protocol until the issue of how much credit developed countries could receive towards their Kyoto targets through the use of sinks has been resolved.

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<sup>7</sup> United Nations, 23/7/01. Press Release 'Governments adopt Bonn agreement on Kyoto Protocol rules'

<sup>8</sup> 'Report of the Kyoto Protocol Advisory Group', 2003, <http://www.greenhouse.vic.gov.au/files/kyoto.pdf>

### **3.3 Australia's Response to Climate Change**

Although as a country Australia only contributes just over 1% of global greenhouse gas emissions, its per capita emissions are among the highest in the world. This is due to a number of reasons including:

- 90% of Australia's electricity production being generated from the burning of coal
- extensive land clearing practices
- a large agricultural base
- high use of private cars for transport
- large number of energy intensive industries and export products

To achieve Australia's target under the Kyoto Protocol of an 8% increase on 1990 emissions level by 2010, it is expected that Australia, on current projections, will need to achieve an average 2% emissions reduction each year.

However, based on current projections there is likely to be substantial growth in Australia's greenhouse gas emissions in the next decade. The latest data from the Australian Institute, using figures from the United Nations, shows Australia's emissions increased from 26.7 tonnes per person in 1995 to 27.6 tonnes per person in 1998, while the average for industrialised countries has fallen from 13.6 to 12.9 tonnes per person<sup>9</sup>. Australia's current greenhouse gas emission levels are 17% above 1990 levels, which is double the Kyoto target of an 8% increase<sup>10</sup>.

Australia's commitment to greenhouse gas abatement began in 1992 with the endorsement of the National Greenhouse Response Strategy. An interim planning target to reduce Australian greenhouse gas emissions by 20% by 2005, based on 1998 levels was agreed. This agreement has been superseded by the Kyoto Protocol.

The National Greenhouse Response Strategy was replaced late 1996 by the National Greenhouse Strategy. This is now the major policy initiative of the Federal, State and Territory governments, providing a strategic framework for Australia's greenhouse response.

Under this strategy, a number of programmes have been launched. A major new initiative was the establishment of the Greenhouse Challenge programme to encourage business to voluntarily commit to reducing their greenhouse gas emissions. In November 1997, the Prime Minister announced a \$180 million package for greenhouse measures, including the establishment of the Australian Greenhouse Office. This was followed in May 1999 by an announcement that the Australian Government would commit an additional \$400 million through the Greenhouse Abatement Programme to assist Australia in meeting commitments under the Kyoto Protocol<sup>11</sup>.

### **3.4 The Cities for Climate Protection - Australian Campaign**

The Cities for Climate Protection (CCP™) campaign was formulated in January 1993 at the First Municipal Leaders Summit on Climate Change, held at the United Nations in New York. The International Council for Local Environmental Initiatives (ICLEI) initiated the Cities for Climate Protection™ campaign in response to the widespread scientific agreement of the enhanced greenhouse effect.

The campaign began as the Urban CO<sub>2</sub> Reduction Programme and was then redesignated as the Worldwide Cities for Climate Protection™ with regional offices in North America, Africa, Europe, Asia and South America. In Australia, the campaign has grown under the collaboration of ICLEI, the Australian Greenhouse Office and Local Government.

Municipalities are the focus of the CCP™ campaign, as it is estimated that Local Government can directly influence over 50% of greenhouse gas emissions through planning schemes, local laws, community programmes and management of their own operations. There are currently 171 Councils representing 67% of Australia's population participating in the CCP™ campaign<sup>12</sup>.

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<sup>9</sup> Miller, C. 18/9/01 'Australia keeps it bad record on greenhouse' The Age.

<sup>10</sup> Editor 17/11/01 'Kyoto: an early test of leadership' The Age

<sup>11</sup> Australian Academy of Science 'Box 4 Greenhouse Policies' <http://www.science.org.au/nova/016/016box04.htm>

<sup>12</sup> CCP™ Bulletin, Issue 34 May 2003. <http://www3.iclei.org/ccp-au/publication/174.pdf>

CCP™ membership requires a resolution adopted by Council and a commitment to meet the five step milestone programme.

The 5 milestones for council's to complete under the Cities for Climate Protection™ campaign are:

1. Establish a base year emissions inventory and forecast for the community and corporate sector
2. Set an emissions reduction goal
3. Develop and adopt a greenhouse reduction strategy – the Local Action Plan
4. Implement the greenhouse action plan
5. Monitor and report on emissions and implementation of actions and policies

### **3.5 State Response to Climate Change**

The Victorian Government is committed to ensuring Victoria plays its part in national and international efforts to address the threat of climate change, and will pursue this commitment in a manner consistent with the directions set out in the *Growing Victoria Together* statement. In particular, the Government will continue to promote a better quality of life for current and future generations by ensuring Victoria's economy, society and environment develop in a balanced way.

The *Victorian Greenhouse Strategy* (VGS) will play a key part in realising this vision. The Victorian Government also supports ratification of the Kyoto Protocol as a responsible framework for international action. The *Victorian Greenhouse Strategy* provides the vehicle by which this commitment will be pursued. The goals of the VGS are to:

1. Build awareness and understanding of greenhouse issues
2. Limit Victoria's greenhouse gas emissions and enhance greenhouse sinks
3. Position Victoria to prosper in a future carbon constrained economy – including by creating an environment in which Victorian industry can take advantage of business opportunities in greenhouse gas mitigation
4. Develop a greater understanding of climate change impacts and, where appropriate, initiate adaptation actions relevant to Victoria

## 4 CITY OF MONASH'S GREENHOUSE GAS EMISSIONS

### 4.1 Milestone 1

Council endorsed the decision that the City of Monash became a member of the Cities for Climate Protection™ (CCP) programme on 27 February 2001. Work on Milestone 1 commenced in early March 2002. Milestone 1 of the CCP programme requires councils to take an inventory of energy use in their operations (corporate) and in the community. This process identifies what activities are contributing to greenhouse gas emissions and serves as a standard to mark the progress of an energy reduction programme. City of Monash was awarded for the completion of Milestone 1 on 4 July 2002.

The inventory examined energy use in the corporate and community sectors of the City of Monash for both a nominated base year and forecast year (between 2008 and 2010). The City of Monash chose a base year of 1996 for the community inventory, and a base year of 2000 for the corporate inventory. A forecast year of 2010 was chosen for both the community and corporate sectors as per the CCPT™ requirements.

The corporate energy inventory investigated energy consumption and costs in council operated buildings, council fleet (including heavy machinery and gardening equipment), council operated streetlights, energy consumed by pumping water to irrigate gardens and grounds, and waste produced under council activities. Any electricity, gas or fuel bill that council paid during 2000 has been accounted for in the inventory.

The community inventory investigates energy consumption in the residential, commercial and industrial sectors, as well as looking at greenhouse gases emitted from transportation and from waste going to landfill. The community inventory is mainly based on Australian Bureau of Statistics data from the 1996 census.

The purpose of the inventory is to obtain a record of past and current energy use within the council and community. This information is then used to forecast council and community energy consumption in 2010. The forecast is based on trends that emerged from the inventory, planned development, new services, changes in employee numbers and the population growth of the City of Monash. As the forecast is based on a business as usual approach, it does not take into consideration any energy saving measures which may result from the CCPT™ programme.

The inventory was recorded using CCPT™ software. This software expresses emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O) and perfluorocarbons (PFCs) in 'carbon dioxide equivalents' (CO<sub>2</sub>-e).

### 4.2 Corporate Greenhouse Gas Emissions

The City of Monash's total corporate greenhouse gas emissions in 2000 was 19,580 tonnes of CO<sub>2</sub>-e. Streetlighting emitted more than half of the total greenhouse gas emissions, followed by corporate buildings and vehicle fleet (see Figure 2). The City of Monash does not operate any sewage pumping or treatment stations, therefore only energy use associated with the pumping of water for irrigation purposes is included in the inventory.

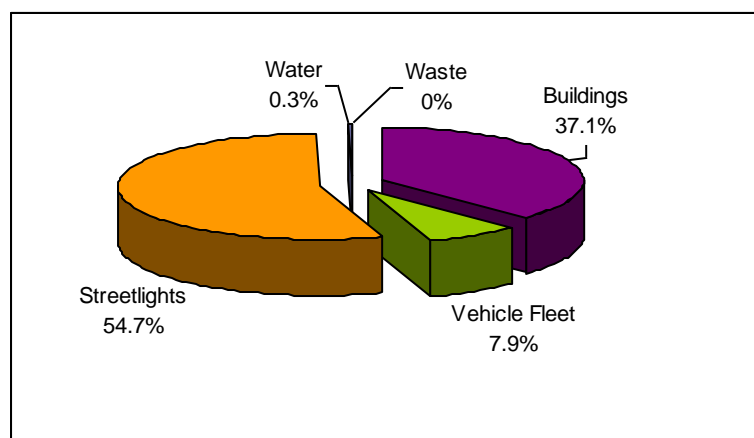
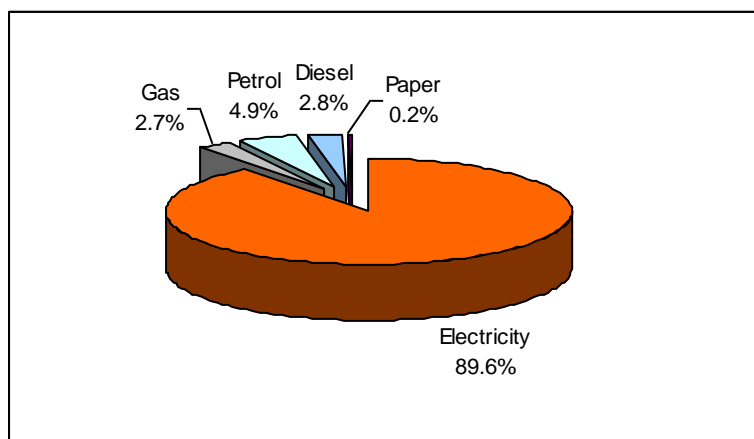


Figure 2: CO<sub>2</sub>-e emitted by Council operations in 2000

Electricity, for streetlighting, building operations and water irrigation systems, accounted for almost 17,900 tonnes of CO<sub>2</sub>-e or 89% of corporate greenhouse gas emissions (see Figure 3). A large proportion of electricity generation in Victoria is produced using brown coal, which explains the high emissions from these sources.



**Figure 3: Source of CO<sub>2</sub>-e emitted by Council operations in 2000**

The City of Monash’s population is expected to grow by 7.3% by the forecast year of 2010, however council operations are not expected to change markedly. The Waverley Park, Montpellier Gardens and Rusden Residential Campus redevelopments, will require the installation of streetlighting – provision of for these redevelopments have been included in the forecast data. A comparison of total CO<sub>2</sub>-e, energy use and cost of the City of Monash’s operations for the base year and for the forecast year in a business as usual situation are shown in Table 2.

**Table 2: Corporate Greenhouse Gas Emissions for 2000 and Forecast of Emissions for 2010**

	2000	2010
<b>Buildings</b>		
CO <sub>2</sub> -e Output (tonnes)	7,273	7,273
Energy (GJ)	27,690	27,690
Cost	\$580,059	\$580,059
<b>Vehicle Fleet</b>		
CO <sub>2</sub> -e Output (tonnes)	1,537	1,537
Energy (GJ)	22,341	22,341
Cost	\$530,527	\$530,527
<b>Streetlights</b>		
CO <sub>2</sub> -e Output (tonnes)	10,707	11,112
Energy (GJ)	27,206	28,235
Cost	\$1,513,546	\$1,570,717
<b>Water</b>		
CO <sub>2</sub> -e Output (tonnes)	59	59
Energy (GJ)	151	151
Cost	\$5,997	\$5,997
<b>Waste</b>		
CO <sub>2</sub> -e Output (tonnes)	4	4
Energy (GJ)	0	0
Cost	\$65,054	\$65,054
<b>Total</b>		
CO <sub>2</sub> -e Output (tonnes)	19,580	19,985
Energy (GJ)	77,388	78,417
Cost	\$2,695,184	\$2,752,355

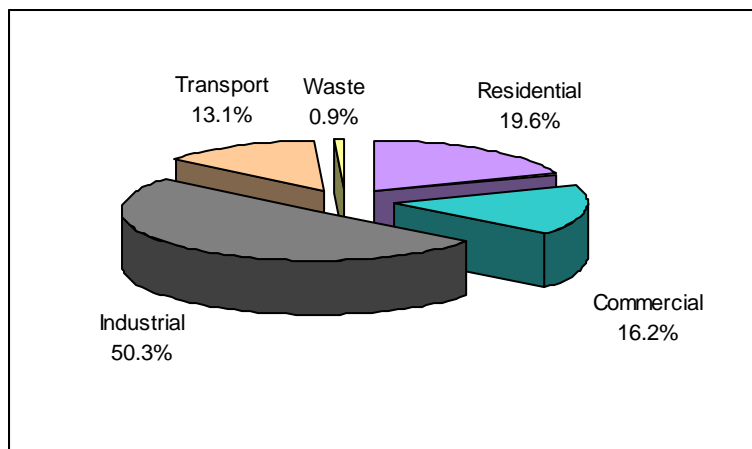
### 4.3 Community Greenhouse Gas Analysis

Information for the community analysis was largely obtained from 1996 census data and default data supplied by CCP™. The energy consumption forecast for the community sector is based on population trends. This forecast may need to be reviewed when the findings from the 2001 Australian Census and residential electricity/gas consumption data from utility companies become available.

Approximately 76% of the municipality has been developed for residential purposes with a further 10% devoted to open space, 7% to technology, 6% to industry and 1% to business/commercial purposes<sup>13</sup>.

The City of Monash's total community greenhouse gas emissions in 1996 were 3,084,998 tonnes of CO<sub>2</sub>-e. More than 50% of the greenhouse gas emissions came from the industrial sector (Figure 4). Manufacturing is an important source of local and regional employment in Monash, providing over 20,200 jobs (23% of all employment) at 800 business establishments.<sup>14</sup> The industrial areas are Monash Science & Technology Park, Waverley Business Park, Axxec Corporate Park, Wellington Business Park, Brandon Office Park, University Business Park, and Monash Technology Precinct.

The second largest emitter of greenhouse gases emissions in Monash came from the residential sector with 20% of the gases emitted (Figure 4). The City of Monash is primarily a residential area, with a total population in 1996 of 160,677 and will have an estimated population of 172,338 by 2010<sup>15</sup>. Monash has an aging population, with 18.6% of the population over the age of 60 in 1996, and is expected to rise to 22.4% by 2010<sup>16</sup>. The population in the over 80 age group is expected to increase by 40.9% by 2010 which has issues of appropriate housing, access to public transport, residential services and the level of in-home community services that will be required. While the number of households in the municipality is expected to increase (57,121 in 1996 will increase to 64,669 by 2010), the number of people in each household is expected to decline from 2.76 in 1996 to 2.66 by 2010<sup>13</sup>.



**Figure 4: CO<sub>2</sub>-e emitted from the Monash Community in 1996**

The commercial sector of retail and wholesale trade is the largest employer in Monash, providing 21,800 jobs (25% of all employment) in approximately 2,210 premises. The primary locations of the retail outlets are in the enclosed shopping centres at The Glen, Century City Walk, Brandon Park, Waverley Gardens, Oakleigh Central and Wheelers Hill, and the more traditional strip shopping centres at Glen Waverley, Oakleigh, Clayton, Mount Waverley, Pinewood and Syndal<sup>17</sup>. The commercial sector was the third largest energy user in Monash in 1996 (Figure 4), and greenhouse gas emissions from this sector are expected to increase in 2010 (Table 3).

<sup>13</sup> Monash City Council, 1997, Monash Conservation and Environment Strategy.

<sup>14</sup> City of Monash, First for Business – Economic Development Strategy 2003-2007

<sup>15</sup> Department of Infrastructure, based on 1996 census figures, <http://www.doi.vic.gov.au/DOI/knowyour.nsf>

<sup>16</sup> Department of Infrastructure, based on 2001 census figures, <http://www.doi.vic.gov.au/DOI/knowyour.nsf>

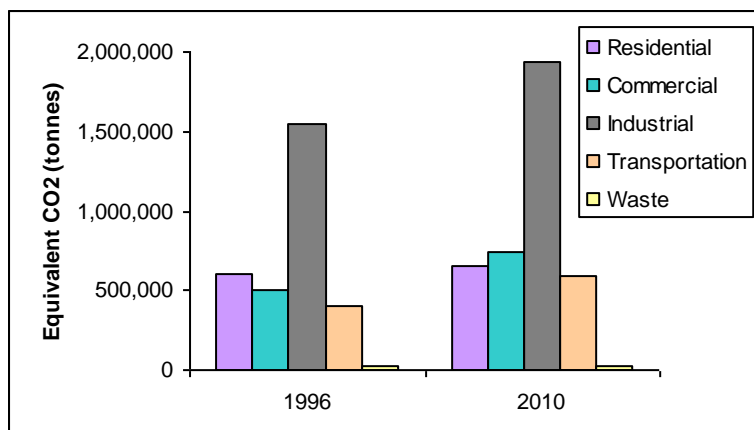
<sup>17</sup> Monash City Council, December 2002, Monash Economic Development Strategy.

**Table 3: Community Greenhouse Gas Emissions for 1996 and forecast of emissions for 2010**

	1996	2010
<b>Residential</b>		
CO <sub>2</sub> -e Output (tonnes)	603,976	659,061
Energy (GJ)	4,131,302	4,526,678
<b>Commercial</b>		
CO <sub>2</sub> -e Output (tonnes)	498,630	746,803
Energy (GJ)	2,142,372	3,278,336
<b>Industrial</b>		
CO <sub>2</sub> -e Output (tonnes)	1,551,724	1,932,494
Energy (GJ)	10,227,571	13,970,475
<b>Transportation</b>		
CO <sub>2</sub> -e Output (tonnes)	402,941	596,936
Energy (GJ)	5,917,559	8,766,567
<b>Waste</b>		
CO <sub>2</sub> -e Output (tonnes)	27,727	26,776
<b>Total</b>		
CO <sub>2</sub> -e Output (tonnes)	3,084,998	3,962,070
Energy (GJ)	22,418,804	30,542,056

Although transport equates for only 13% of the greenhouse gas emissions in 1996 (Figure 4), it was the second largest energy user in the City of Monash (Table 3). At the 1996 census 87.4% of households owned 1 or more cars, and 69% of residents travelled to work by car, compared to only 11.2% using public transport<sup>18</sup>.

Emissions from all community sectors are expected to increase in 2010, with the exception of the Waste sector (Figure 5).



**Figure 5: Comparison of total emissions in 1996 and 2010 for all community sectors**

<sup>18</sup> Community Profile ID, <http://www.id.com.au/monash/commprofile>

## 5 CITY OF MONASH EMISSIONS REDUCTION GOAL

### 5.1 Milestone 2

Analysis of the energy inventory allowed current and future trends of energy consumption to be identified for Council's own operations and in the community. This information provides the benchmark from which an emissions reduction goal is established for Council and the community.

The emissions reduction goal is a public statement of Council's commitment to greenhouse gas reduction and is required for the completion of Milestone 2 of the CCP program.

In establishing an emissions reduction goal Council considered:

- Previous actions and programmes implemented by Council to reduce greenhouse gas emissions and the level of success of these actions
- Resources available to implement a Greenhouse Action Strategy
- Attitude and commitment of Council towards climate change
- Current and forecasted energy use in the Council and community
- Community stakeholders
- Emission reduction goals set by other Council's and actions they have taken to achieve the targets
- Future changes in legislation that could effect any action taken by Council to curb energy use

The majority of Monash's neighbouring Council's have set a corporate reduction goal of 20% on their base year. As Monash has already made significant energy savings through the *Energy Conservation Strategy* a lower, but more realistic, goal was chosen. Council decided on following separate emission reduction goals for council operations and the community, in February 2003.

**Council 15% below 2000 Corporate emission levels by 2010,**

**Community 10% below 1996 Community emission levels by 2010.**

#### Corporate Target

To achieve the reduction target of 15% below 2000, Monash City Council will need to reduce its corporate emissions in 2010 by 2,937 tonnes CO<sub>2</sub>-e (Table 4). The total greenhouse gas emissions target reductions are shown in Table 4 with a suggested breakdown into the different sectors, however these reductions from the different sectors are not fixed.

**Table 4: Corporate Emissions Targets Projection and Target**

Sector	2000 CO <sub>2</sub> -e emissions (tonnes)	2010 Forecasted CO <sub>2</sub> -e emissions (tonnes)	Target 2010 CO <sub>2</sub> -e emissions (tonnes)
Buildings	7,273	7,273	6,182
Vehicle Fleet	1,537	1,537	1,306
Streetlights	10,707	11,112	9,101
Water	59	59	50
Waste	4	4	3
<b>Total</b>	<b>19,580</b>	<b>19,985</b>	<b>16,642</b>

### Community Target

To achieve the reduction target of 10% below 1996, Monash City Council will need to reduce its Community emissions in 2010 by 308,500 tonnes CO<sub>2</sub>-e (Table 5). The total greenhouse gas emissions target reductions are shown in Table 5 with a suggested breakdown into the different sectors, however these reductions from the different sectors are not fixed.

**Table 5: Community Emissions Targets Projection and Target**

<b>Sector</b>	<b>1996 CO<sub>2</sub>-e emissions (tonnes)</b>	<b>2010 Forecasted CO<sub>2</sub>-e emissions (tonnes)</b>	<b>Target 2010 CO<sub>2</sub>-e emissions (tonnes)</b>
<b>Residential</b>	603,976	659,061	543,578
<b>Commercial</b>	498,630	746,803	448,767
<b>Industrial</b>	1,551,724	1,932,494	1,396,552
<b>Transportation</b>	402,941	596,936	362,647
<b>Waste</b>	27,727	26,776	24,954
<b>Total</b>	<b>3,084,998</b>	<b>3,962,070</b>	<b>2,776,498</b>

The actions identified in this Greenhouse Action Plan are divided into corporate and community actions. In order to meet the reduction targets by 2010, the City of Monash can take into consideration any existing reduction activities that occurred after the base year that resulted in reduced greenhouse gas emissions as well as implementing new actions.

In order to reach the reduction targets, the major areas of greenhouse gas emissions need to be targeted, that is streetlighting in the corporate sector and industry in the community sector. Energy efficiency measures in both Council operations and in the community are important not only because they will result in greenhouse gas emission reductions, but they will also provide financial savings. These savings can be utilised to implement further improvements in energy efficiency. Measures that result in small savings in greenhouse gas emissions are also important. Not only because many small improvements have a significant overall effect in emission reductions, but these measures can have positive benefits in raising awareness, providing opportunity for staff and community participation and provide overarching direction to other Council policies and priorities.

## **6 MONASH CITY COUNCILS STRATEGIC FRAMEWORK FOR GREENHOUSE GAS REDUCTION**

### **6.1 Objectives of the Greenhouse Action Plan**

The City of Monash's Greenhouse Action Plan will aim to address the following objectives:

- Continually seek reasonable opportunities to reduce energy consumption, energy costs and greenhouse gas emissions generated by Councils operations
- Achieve the emissions reduction goals set for the corporate and community sectors of Monash
- Promote and ensure efficient energy use to achieve greenhouse gas reductions in Council operations, buildings and streetlighting, the wider community, and business and industry
- Record financial savings generated by energy efficiency projects (after capital cost recovery)
- Review current Council policies and strategies to ensure consistency with the aims of the Greenhouse Action Plan
- Develop and foster an understanding of the enhanced greenhouse effect and increase the participation of Council staff and the community in the measures necessary to reduce greenhouse gas emissions
- Develop partnerships between the City of Monash, local business, neighbouring councils, education facilities and community groups to facilitate in programme development and establish a collaborative approach towards greenhouse gas abatement
- Support and advocate for improved energy efficiency of residential buildings and use of energy efficient domestic appliances.
- Encourage the reduction in private vehicle use and promote the use of alternative forms of transport that produce less greenhouse gas, such as bicycles and public transport
- Conserve and enhance the carbon sink capacity of the municipality
- Reduce the amount of residential, commercial and Council generated waste going to landfill

When finalised and endorsed by Council, this Greenhouse Action Plan will meet the CCP™ requirements of Milestone 3. The action plan also documents Monash's achievement of Milestones 1 and 2, and lays the groundwork for achieving Milestones 4 and 5.

### **6.2 What Has Been Done So Far?**

The CCP™ programme provides Council with a strategic framework to reduce greenhouse emissions. The City of Monash was already in the process of reducing greenhouse gas emissions under the *Energy Conservation Strategy*, which was endorsed by Council in February 1999. The CCP™ campaign complements this strategy and provides Council with the opportunity to place all energy reduction initiatives under the same umbrella, which has a number of benefits including increased awareness of the greenhouse effect for Council staff and the Community, access to an Australian network of participating Councils and possible funding opportunities. Below in Table 6 are a number of existing actions that Council has implemented.

**Table 6: Completed Initiatives to Reduce Greenhouse Gas Emissions to Date**

**Buildings**

Energy Reduction Strategies	Details
<ul style="list-style-type: none"> <li>Power save function enabled on office equipment</li> </ul>	<ul style="list-style-type: none"> <li>Power save function is enabled on all new computers, printers, photocopiers when they are installed</li> <li>All staff are encouraged to turn computers off overnight</li> </ul>
<ul style="list-style-type: none"> <li>Energy audits conducted at high energy sites</li> </ul>	<ul style="list-style-type: none"> <li>Works Administration Centre (WAC) 1997</li> <li>Glen Waverley &amp; Oakleigh Libraries May 1999</li> <li>Civic Centre November 1999</li> <li>Clarinda Centre &amp; Monash Gardens Elderly Persons Accommodation April 2000</li> <li>Monash Gallery of Art May 2000</li> <li>Oakleigh Training Centre June 2003</li> </ul>
<ul style="list-style-type: none"> <li>Building retrofits</li> </ul>	<ul style="list-style-type: none"> <li>Installation of time switches/change to operating hours for air conditioning systems at the Civic Centre, WAC, Oakleigh Library,</li> <li>Tune &amp; reconditioning of air conditioning systems at Glen Waverley Library,</li> <li>Conversion of oil burner to gas at Oakleigh Library</li> <li>Trial of air-conditioning additive in chiller unit at Civic Centre</li> </ul>
<ul style="list-style-type: none"> <li>Lighting retrofits</li> </ul>	<ul style="list-style-type: none"> <li>Work has included installation of occupancy sensors, dimming controls, and replacement of incandescent lamps with energy efficient compact fluorescent lamps</li> <li>Sites include: Glen Waverley Library August 1999; WAC October 1999; Civic Centre; Monash Gallery of Art, Oakleigh Training Centre</li> </ul>
<ul style="list-style-type: none"> <li>Energy use review</li> </ul>	<ul style="list-style-type: none"> <li>TXU consultant reviewed energy use in WAC, Glen Waverley and Oakleigh libraries, Civic Centre, and Monash Gallery of Art in 2002</li> </ul>
<ul style="list-style-type: none"> <li>Installation of solar hot water service</li> </ul>	<ul style="list-style-type: none"> <li>Trial of solar hot water service at WAC – April 2001</li> </ul>
<ul style="list-style-type: none"> <li>Energy efficient equipment in tender document</li> </ul>	<ul style="list-style-type: none"> <li>Used for replacement of air conditioning system at the WAC November 2000</li> </ul>
<ul style="list-style-type: none"> <li>Involved in Energy Efficiency Victoria (now known as Sustainable Energy Authority) Local Government Benchmarking Study</li> </ul>	<ul style="list-style-type: none"> <li>All libraries were included in this benchmarking study</li> </ul>
<ul style="list-style-type: none"> <li>Passive Solar Design incorporated into all new Council buildings and</li> </ul>	<ul style="list-style-type: none"> <li>Investigations, further to manufacturer's information, to support sustainable design for Council buildings (eg. rainwater systems, solar hot water) eg. Use of photovoltaic cells</li> </ul>

renovations	at Valley Reserve
	<ul style="list-style-type: none"> <li>• Refurbishment's include changing orientation of windows and installation of louvre windows for cross ventilation</li> <li>• Monash Aquatic and Recreation Centre</li> </ul>
• Installation of gas hot water service	• Replacement of electric hot water service with reticulated gas hot water service at smaller sites
• Installation of instantaneous gas hot water service	• Instantaneous gas hot water service only comes on when the hot tap is turned on (no pilot lights) – installed at 3 MCH centres
• Flow restrictors on bathroom taps to reduce water & energy use	• Installed on all bathroom taps in Civic Centre, WAC, and Brine Street Child Care
• Staff education & participation programmes	<ul style="list-style-type: none"> <li>• Energy Conservation News – sent out to all staff by e-mail</li> <li>• Sustainable Futures Forum – bimonthly meetings for interested staff</li> </ul>
• Purchasing Policy incorporates triple bottom line principles	<ul style="list-style-type: none"> <li>• Joined Buy Recycled Alliance</li> <li>• Preference given to the purchasing of Australian made products</li> </ul>
• 2001 Energy Smart Awards hosted by Sustainable Energy Authority	• Awarded "Outstanding Achievement" in the Best Government Operation category in 2001
• Corporate Procurement Policy	• Looks at benefits and value for the environment and community along with cost

## Vehicle Fleet

Energy Reduction Strategies	Details
• Investigated alternative fuel options	• Investigated the feasibility of installing CNG facility for use by Monash vehicles and fleet
• Use of alternative fuel	• Purchased 15 LPG fuelled vehicles to replace 6 cylinder petrol vehicles
• Monitoring of greenhouse gas emissions from Council fleet	• Monthly monitoring of emissions
• Investigating changing the fleet purchasing policy	<ul style="list-style-type: none"> <li>• Investigating purchase of more fuel efficient vehicles</li> <li>• Australian made vehicles are purchased as specified in the Purchasing Policy – Holden is developing a duel fuel vehicle</li> </ul>
• Approved contract for residential waste collection	• Cleanaway contract chosen because vehicles have ability to collect recyclables and paper at the same time, this reduces number of vehicles needed, and these are fuelled with CNG (with the use of CNG advertised on side of vehicle)

## Streetlights

Energy Reduction Strategies	Details
<ul style="list-style-type: none"> <li>Investigation of alternative lighting technology</li> </ul>	<ul style="list-style-type: none"> <li>Trial of high-pressure sodium lights in some car parks</li> <li>Solar light trialled at Mayfield Park, Mount Waverley</li> <li>Trial of solar powered reflectors on round-a-bout in Glen Waverley</li> </ul>
<ul style="list-style-type: none"> <li>Lighting retrofit at Bogong car park</li> </ul>	<ul style="list-style-type: none"> <li>Installation of sensors, energy efficient lights, and power control device – April 2002</li> </ul>

## Water

Energy Reduction Strategies	Details
<ul style="list-style-type: none"> <li>Water Strategy</li> </ul>	<ul style="list-style-type: none"> <li>Draft developed – includes using irrigation controllers which sense rainfall and turn off sprinklers</li> </ul>
<ul style="list-style-type: none"> <li>Development of no-water landscaping</li> </ul>	<ul style="list-style-type: none"> <li>Landscaping is now developed to not need an irrigation system</li> </ul>

## Waste

Energy Reduction Strategies	Details
<ul style="list-style-type: none"> <li>Recycling facilities</li> </ul>	<ul style="list-style-type: none"> <li>Installed for collection of paper, glass, plastic, milk cartons &amp; aluminium</li> <li>Worm farm at WAC for lunch scraps</li> <li>'Close the loop' recycling of all printer, fax &amp; photocopier cartridges</li> <li>Standard practice for crushed concrete (in place of crushed rock) to be used in all engineering, landscaping and building projects – currently to be used at the Waverley Park Estate</li> <li>Aluminium foil collected back and recycled from residents receiving meals on wheels</li> </ul>
<ul style="list-style-type: none"> <li>Waste reduction strategies</li> </ul>	<ul style="list-style-type: none"> <li>Duplexing trays installed on all laser printers to enable double-sided printing in December 2000</li> <li>Replacement of plastic cups with crockery cups for all staff at WAC</li> </ul>
<ul style="list-style-type: none"> <li>WAC resource recovery</li> </ul>	<ul style="list-style-type: none"> <li>Resources are reused where possible or recycled. Includes paints, turps, tyres, oil, plumbing &amp; building fittings, car batteries, old machinery, office furniture, scrap metal</li> </ul>

## Community

Energy Reduction Strategies	Details
<ul style="list-style-type: none"> <li>Community Information</li> </ul>	<ul style="list-style-type: none"> <li>SEAV Hot Water Rebate was displayed at the Civic Centre in April 2001</li> <li>Council hosted 3 Green Plumber Workshops to train plumbers in energy and water efficient products (August &amp; October 2001 – extra workshop required due to popularity)</li> <li>Council hosted a “Caring for Our Water” community information session in February 2003</li> <li>Energy efficient light bulbs were given to people receiving help from the ‘home handy-person’ service and those taking part in the ‘Many People One Land’ language classes</li> </ul>
<ul style="list-style-type: none"> <li>Australian Productivity Council</li> </ul>	<ul style="list-style-type: none"> <li>Monash supported 20 companies to participate on this council</li> </ul>
<ul style="list-style-type: none"> <li>Bicycle Strategy</li> </ul>	<ul style="list-style-type: none"> <li>Produced a map of on-road and off-road bicycle routes</li> </ul>
<ul style="list-style-type: none"> <li>Recycling &amp; Waste Reduction</li> </ul>	<ul style="list-style-type: none"> <li>Domestic garbage bin size reduced to 120L from 240L</li> <li>Fortnightly green waste collection</li> <li>Larger recycling tub collected weekly</li> <li>Crate for recycling paper collected fortnightly</li> <li>Litter bins are sorted to remove recyclables</li> </ul>
<ul style="list-style-type: none"> <li>Planning provisions</li> </ul>	<ul style="list-style-type: none"> <li>New houses need to pass planning regulations to prevent shadowing of neighbouring houses</li> <li>New houses need to be approved in accordance with Rescode</li> <li>New buildings to be appropriately insulated</li> </ul>

### **6.3 Proposed Future Actions to Reduce Greenhouse Gas Emissions**

The actions that have been taken to date to reduce greenhouse gas emissions (Table 6) show the success and commitment of Council to conserve energy use from its operations. The proposed future actions listed here aim to build on this success. The future actions included in this Greenhouse Action Plan were proposed at a workshop with staff from a diverse cross-section of Council departments represented. In assessing possible actions the following criteria were considered: degree of emission reduction, ease and cost of implementation, capacity for education and awareness raising, and the capacity to bring other positive benefits to the community.

The actions identified in this section (Table 7) are divided into corporate and community actions. Each action has a project description, priority status and is assigned to the relevant Departments or Managers for responsibility. The budget for the upcoming financial year, 2003/2004, has already been allocated. Allocation of specific funding for greenhouse gas reduction actions will begin in the following financial year (2004/2005). Initiatives requiring minimal budget allocation will be started in the interim, including current energy conservation improvements to Council facilities and operations.

Estimations of annual project costs, savings and greenhouse gas savings are shown in Appendix 1 for selected actions, which have been assigned Short Term Action priority.

**Table 7: Proposed Actions to Reduce Greenhouse Gas Emissions**

**Buildings**

<b>Energy Reduction Strategies</b>	<b>Priority</b>	<b>Responsible Department / Manager</b>	<b>Budget Implication</b>
Continue development of Data Management System.	S	Qual & Cust Serv	No
Staff awareness/education. <i>For example: Training session on the procedures and benefits of printing documents double-sided.</i>	S	Envir Mgmt Coord	No
Develop visual displays of energy reduction initiatives. <i>For example: Posters by instant boiling water units.</i>	S	Coord Recyc & Disposal Envir Mgmt Coord	No
Increased use of technology to reduce greenhouse gas emissions. <i>For example: Remove screensavers from PCs and set power-save function. Install timer switches on office equipment to turn off over-night and during weekends.</i>	S	Building Services, IT, Mger Qual & Cust Serv, Urban Design	No
Complete Energy Audits in selected council buildings and implement findings into other buildings.	S/M	Qual & Cust Serv	No
Continue to install instantaneous gas hot water services to replace electric hot water services where applicable.	S/M	Building Services, Envir Mgmt Coord	No
Continue lighting retrofits in existing buildings.	S/M	Building Services, Corp Admin, Qual & Cust Serv	No
Investigate the installation of Energy Management Systems in buildings.	S/M	Building Services, Corp Admin, Envir Mgmt Coord	No
Work with clubs, daycare centres and preschools, which use Council buildings, to decrease energy and water use, and to reduce waste generation.	S/M	Envir Mgmt Coord, Rec Serv, Recyc & Disposal	Yes
Design buildings and office layouts to utilise natural light when building refurbishment's are planned.	S/L	Corp Admin, Urban Design	No
Develop energy & waste reduction initiatives to be included in staff position descriptions and induction process. <i>For example: Include a section staff induction process that demonstrates ways to reduce energy use and amount of waste produced (turning off computers, printing double-sided, recycling).</i>	S/L	Coord Recyc & Disposal, HR	No
Investigate alternative technology for energy reduction. <i>For example: Co-generation, Solar power.</i>	S/L	Qual & Cust Serv	No
Review Tendering Policy to include more emphasis on environmental sustainability.	M	Competition Contracts & Quality	No

*For example: Preference given to tenders that reuse and recycle products.*

<b>Energy Reduction Strategies</b>	<b>Priority</b>	<b>Responsible Department / Manager</b>	<b>Budget Implication</b>
Review & initiate Purchasing Policy to include the cost of product life cycle.	M	All Mgers, Corp Admin, Recyc & Disposal	No
Develop Heating Ventilation Air-Conditioning (HVAC) guidelines for operational hours and amount of heating/cooling necessary for all council buildings.	M	Corp Admin, Envir Mgmt Coord	No
Consider purchasing a proportion of electricity from Green Power for buildings. <i>For example: Appendix 1 has an example of purchasing 10% or 100% green power.</i>	L	Corp Admin, Cust Serv, Mger Qual & Cust Serv	Yes
Consider installing air locks in selected buildings to lower heating/cooling costs.	L	Corp Admin	Yes
Purchase further solar panels. <i>For example: Install solar hot water panels on community centres to assist with greenhouse education of the community.</i>	L	Envir Mgmt Coord, Urban Design	Yes

## **Vehicle Fleet**

<b>Energy Reduction Strategies</b>	<b>Priority</b>	<b>Responsible Department / Manager</b>	<b>Budget Implication</b>
Use public transport to get to meetings where practical. <i>For example: Provide transport tickets for business trips; has the additional benefits of no car-parking costs, and pool vehicle is available for other staff to use.</i>	S	All Mgers, Corp Admin	No
Review the need to purchase more fuel efficient and lower greenhouse gas emitting vehicles for council staff.	S	Fleet Services, HR	No
Consider developing a car-pooling system for transport to off-site meetings.	S	All Mgers, Corp Admin, HR	Yes
Investigate a Council TravelSmart programme. <i>For example: RACV Intranet car-pooling software.</i>	S	Coord Recyc & Disposal	No
Purchase Council fleet vehicles taking into account their operating costs.	S	Fleet Services	No
Continue to monitor alternative fuel options.	S/L	Fleet Services	No
Investigate the opportunities for staff to Telecommute.	M	IT, HR, Some Mgers	Yes

## Streetlights

Energy Reduction Strategies	Priority	Responsible Department / Manager	Budget Implication
Develop a Public Lighting Policy.	S	Trans & Infra	No
Review lighting trials using alternative technology. <i>For example: Solar, diode and halide lights.</i>	S	Mger Qual & Cust Serv, Trans & Infra,	No
Form partnerships with neighbouring Councils and work with VicRoads to initiate energy efficient streetlighting retrofits.	S	Mger Qual & Cust Serv, Trans & Infra	No
Install Light Emitting Diodes (LED's) on Council operated traffic signals when due for replacement (to reduce energy consumption and maintenance costs).	M	Trans & Infra	Yes
Review options of purchasing a proportion of streetlighting through Green Power.	M/L	Trans & Infra	Yes
Investigate improvements in solar powered lighting technology to allow for installation in roads, and identified parks and reserves.	L	Rec Serv, Trans & Infra, Urban Design	No
Investigate installing movement sensors on lighting in low activity areas.	L	Trans & Infra	No

## Other

Energy Reduction Strategies	Priority	Responsible Department / Manager	Budget Implication
Consider options to reduce greenhouse gas emissions to be linked into other Council strategies and policies. <i>For example: Corporate Plan, Biodiversity Strategy.</i>	S	All Depts	No
Link the 'Energy Management Interest Group' into the existing 'Sustainable Futures Forum'.	S/M	Staff	No
Review the need to introduce a budget line for implementing energy efficiency initiatives within the next 2 years.	S	Finance, Mger Qual & Cust Serv, Mger Recyc & Disposal	Yes

## Community Actions

Energy Reduction Strategies	Priority	Responsible Department / Manger	Budget Implication
Encourage use of public transport.	S	All Councillors, Family & Comm Care, Town Planning, Trans & Infra, Urban Design,	No
Consider integrated Travel Demand Management in public design when reviewing applications and new Council projects.	S	Building, Mger Comm Ser & Planning, Rec Serv, Town Planning, Urban Design	No
Community awareness/education campaigns. <i>For example: Public displays in libraries, shopping centres and bus shelters promoting energy efficiency.</i>	S	Coord Recyc & Disposal, Economic Devel, Env Mgmt Coord	Yes
Facilitating community education and community based programmes to reduce greenhouse gas emissions. <i>For example: Through existing Monash World Environment Day Awards and Golden Plate Awards.</i>	S	Health, Recyc & Disposal	No
Working closely with interested groups and EcoRecycle, further develop partnerships in greenhouse gas reduction strategies, with local businesses, education facilities and community groups.	S	Coord Recyc & Disposal, Economic Devel	No
Link greenhouse gas reduction to Communication Strategy.	S	Public Affairs	No
Investigate opportunities for park & ride facilities and advocate for government to establish these facilities.	S	Coord Recyc & Disposal, Mger Comm Serv & Planning, Trans & Infra	No
Promote available resources for the community; provide links to alternative energy on Council web page and publications <i>For example: SEAV, EcoRecycle, ATA.</i>	S	Coord Recyc & Disposal, Env Mgmt Coord	No
Promote Council achievements, in greenhouse gas reduction, as positive leadership of the community.	S/M	Coord Recyc & Disposal, Env Mgmt Coord	No
Act as advocates for community on greenhouse issues. <i>For example: Work with ICLEI and Australian Greenhouse Office to lobby State and Federal Government for resources for community initiatives.</i>	S/M	Coord Recyc & Disposal	No
Further develop current Walking Strategy.	M	Coord Recyc & Disposal, Health Promotions Officer, Rec Serv, Trans & Infra	No

Develop an Energy Efficient Housing Policy. Consider developing guidelines for minimal use of heating/cooling and lighting in new buildings. <i>For example: Use of ResCode to promote 5 star energy rating in housing.</i>	M	Building, Coord Recyc & Disposal, Env Mgmt Coord, Town Planning	No
Investigate future 'rate rebate' or 'permit fee reduction' for energy efficiency measures in the community.	L	Building, Coord Recyc & Disposal, Env Mgmt Coord, Finance, Town Planning	Yes

Key to Abbreviations:

S	Short term action 2003/2004-2004/2005 financial years
M	Medium term action 3-4 years
L	Long term action 4-7 years
All Depts	All Departments
All Mgers	All Managers
Coord Recyc & Disposal	Coordinator Recycling & Disposal Services
Corp Admin	Corporate Administration
Economic Devel	Economic Development
Env Mgmt Coord	Environment Management Coordinator
Family & Comm Care	Family & Community Care
Health	Environmental Health Services
HR	Human Resources & Administration
IT	Information Technology
Mger Comm Ser & Planning	Manager Community Services & Planning
Mger Qual & Cust Serv	Manager Quality & Customer Service
Mger Recyc & Disposal	Manager Recycling & Disposal
Qual & Cust Serv	Quality & Customer Service
Rec Serv	Recreation Services
Recyc & Disposal	Recycling & Disposal
Trans & Infra	Transport & Infrastructure Planning

## **7 IMPLEMENTATION, MONITORING AND REVIEW**

The overall Greenhouse Action Plan will be subject to periodic review to determine whether strategy recommendations are being implemented, to assess their effectiveness and to reassess the list of priority areas defined by the plan. The reviews will assess whether the City of Monash is on target to achieve both the corporate reduction goal of 15% and the community reduction goal of 10% and will explore new measures to ensure that these goals are met.

Some of the actions implemented since the corporate base year of 2000 and the Community base year of 1996 are listed in Table 6. The effect that these actions have had on meeting the reduction goals has not yet been calculated. Measures that commenced prior to the corporate base year of 2000 and the community base year of 1996 form part of the business as usual scenario and cannot be included as reduction measures.

Not all of the actions will be quantifiable, however, these measures can have many positive benefits of raising awareness of greenhouse issues, and providing opportunities for staff and community participation.

The majority of short-term actions have little or no cost associated with them. It is envisaged that individual areas will put forward budget proposals to meet any funding that is required to complete them.

The inventory of greenhouse gas emissions from Council and the community will be re-evaluated regularly, with information on any additional buildings and subdivisions to be included, along with any greenhouse reduction initiatives.

Performance will be monitored and emissions re-assessed to determine whether or not reduction goals are being achieved as required by Milestone 4 and 5 of the CCP™ programme.

## 8 APPENDIX 1 – ESTIMATIONS OF POSSIBLE ACTIONS: PROJECT COSTS AND ANNUAL GREENHOUSE GAS SAVINGS FOR SELECTED ACTIONS

The greenhouse savings suggested for each action listed here are calculated on a tonne/year basis. These figures have been calculated as accurately as possible using current information to provide as realistic a picture as possible of the success of the Greenhouse Action Plan in achieving the emission reduction goals. The emission coefficient assumed for calculations in this report is 1.467 kg CO<sub>2</sub>-E/kWh<sup>19</sup>.

### 8.1 Purchase Green Power for Council Buildings

By choosing an accredited Green Power product, Council will be reducing the amount of fossil fuels burnt to produce electricity, thereby reducing the amount of greenhouse gases released into the atmosphere. Council will also be playing a lead role in the community by demonstrating to residents and businesses that environmental action is simple and inexpensive in relation to overall operation costs. Additional benefits of buying accredited Green Power include:

- Council is guaranteed to get an environmentally friendly renewable energy
- It provides Council with a measurable greenhouse action to meet emission reduction goals
- Council will receive a Green Power certificate to demonstrate green credentials and be listed on the Green Power website at [www.greenpower.com.au/councils.html](http://www.greenpower.com.au/councils.html) if desired.
- Contestable customers may be able to negotiate a rate with their supplier

Two options of purchasing 10% or 100% Green Power are shown in the following tables.

#### Purchase 10% Green Power in Major Buildings

Building	Project Cost/year	Savings \$/year	GHG emissions Savings tonnes/year
Glen Waverley Civic Centre	\$13,301	None	143 tonnes
WAC	\$5,628	None	57 tonnes
Aged Care Centres	\$18,193	None	217 tonnes
Libraries	\$9,631	None	107 tonnes
Monash Gallery of Art	\$4,015	None	41 tonnes
<b>Total</b>	<b>\$50,768</b>		<b>565 tonnes</b>

Calculation based on 2000 consumption figures. Electricity price estimated at 12c/kWh and Green Power at 4c/kWh extra. Note: The additional cost of purchasing 90% regular electricity has not been included in the project costs per year.

#### Purchase 100% Green Power in Major Buildings

Building	Project Cost/year	Savings \$/year	GHG emissions Savings tonnes/year
Glen Waverley Civic Centre	\$133,011	None	1,434 tonnes
WAC	\$56,275	None	573 tonnes
Aged Care Centres	\$181,933	None	2,173 tonnes
Libraries	\$96,310	None	1,067 tonnes
Monash Gallery of Art	\$40,157	None	406 tonnes
<b>Total</b>	<b>\$507,686</b>		<b>5,653 tonnes</b>

Calculation based on 2000 consumption figures. Electricity price estimated at 12c/kWh and Green Power at 4c/kWh extra

<sup>19</sup> Australian Greenhouse Office 'Greenhouse Challenge Factors and Method Workbook – Version 3' December 2001. <http://www.greenhouse.gov.au/challenge/html/member-tools/factorsmethod.html>

## 8.2 Purchase Vehicles That Are More Fuel Efficient

The majority of Council’s passenger fleet vehicles are 6 cylinder vehicles. The environmental impact of these vehicles could be minimised by:

- Downsizing these vehicles to 4 cylinders will save on the amount of fuel used and greenhouse gases emitted
- A fuel consumption benchmark could be established for purchasing new passenger vehicles eg. Consumption to be no more than 8.5 litres/100 km on city driving

<b>Purchase Fuel Efficient Vehicles</b>		
<b>Vehicle</b>	<b>Savings \$/year</b>	<b>GHG emissions Savings tonnes/year</b>
Holden Barina City – 4 cylinder	\$26,325 (fuel only)	131 tonnes

Calculation based on 50 Holden Commodores (fuel economy 11.5L/100 km city cycle) downsized to 50 Holden Barina’s (fuel economy 7.6L/100 km city cycle)<sup>20</sup> travelling 15,000 km annually. \$ savings based on \$0.90/L petrol.

<sup>20</sup> 2001/2002 Fuel Consumption Guide, Australian Greenhouse Office, <http://www.greenhouse.gov.au/fuelguide/index.html>