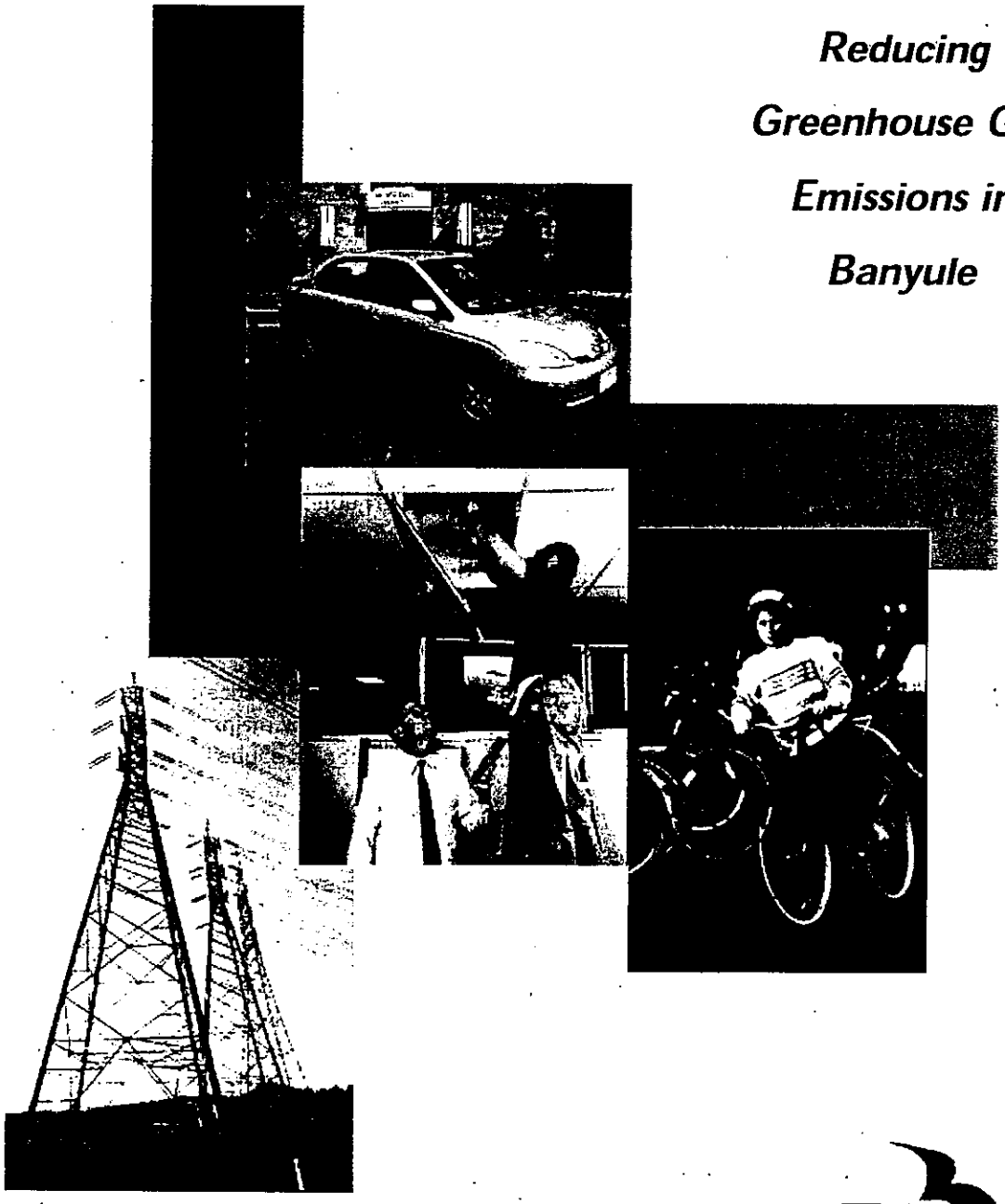
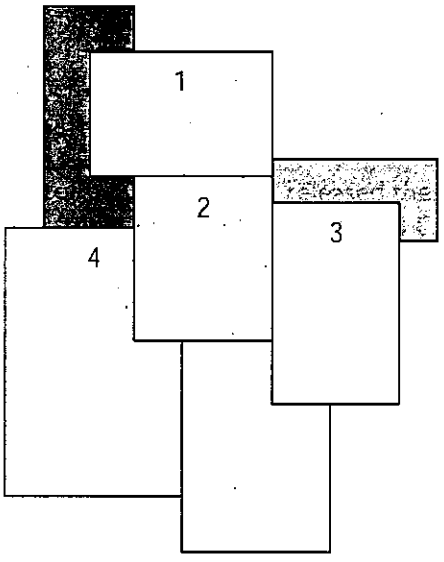
Greenhouse Action Strategy

June 2002



Reducing Greenhouse Gas Emissions in Banyule

Banyule
CITY COUNCIL



Front Cover pictures

1. Banyule City Council – Toyota Prius
2. Warren Gretz (www.nrel.gov/data/pix/searchpix.html) – lighting retrofit
3. Austin Randall Photography (www.nrel.gov/data/pix/searchpix.html) – Bicycle commuter
4. Arthur Mostead (Australian Greenhouse Office) – Powerlines

The Greenhouse Action Strategy has been double sided printed on Green Wrap recycled paper which contains 50% recycled pulp, 10% waste products from the cotton industry and 40% from sustainable managed plantations.

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1 SUMMARY

Banyule City Council has recognised the importance of local action against global warming and climate change.

Through the Cities for Climate Protection™ program Banyule City Council has agreed upon an Emissions Reduction Goal and developed a Greenhouse Action Strategy (GAS).

This report outlines how Banyule City Council, by 2010, will reduce greenhouse gas emissions by 20% below 1996/97 community emissions levels and 30% below 1996/97 corporate (Council) emission levels.

The objectives of the GAS are:

- To achieve the emissions reduction goals set for the corporate and community sectors of Banyule
- To promote and ensure efficient energy use in Council operations, buildings, streetlighting, the wider community, business and industry to achieve greenhouse gas reductions
- To increase the use and generation of renewable energy in Banyule
- To develop and foster an understanding of the enhanced greenhouse effect and increase the participation of Council staff and the community in measures necessary to respond to it
- To reduce reliance on private vehicles as a mode of transport and to encourage and provide opportunities for alternative transport options
- To develop partnerships between Banyule City Council, local business, neighbouring councils and community groups to facilitate program development and establish a collaborative approach towards greenhouse gas abatement
- To reduce the amount of residential, commercial and Council generated waste going to landfill

Sections 1 - 8 provide background information on the enhanced greenhouse effect and international, national and local actions to curb the effects of global warming.
Sections 9 - 14 describe the actions Council has identified as suitable for achieving its emission reduction target.

The actions are divided into community and corporate sections. Each action has a project description, project target and table outlining predicted project costs and annual greenhouse savings. These figures are provided as a guide only to the possible savings and pay-back periods for each project. Each action will be monitored and evaluated after implementation to provide an accurate record of actual monetary and emission savings and project efficiency.

According to the predicted costs and savings, by implementing all of the actions identified in the GAS, Council by 2010 will have achieved the corporate emission reduction target of 30% below 1996/97 emission levels, and stabilised community emissions at 1996/97 levels.

Implementation of actions will be on an individual basis subject to funding and priority of the action in terms of greenhouse gas savings and financial payback periods.

The GAS is a working document and as such will be reviewed annually to take into account new technologies, changes in legislation and funding opportunities and increased awareness and participation of Council and the community alike in reducing greenhouse gas emissions.

Comments on the GAS are welcome, and will be taken into consideration in the annual review of the GAS. Please direct comments to

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Banyule City Council
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2 INTRODUCTION

Global warming, climate change, the greenhouse effect and energy efficiency. These are phrases that are now used everyday due the growing worldwide concern over unsustainable use of energy and reliance on fossil fuels as an energy source.

Concerns over energy shortages in the past have created interest in non fossil-fuel or renewable energy sources. The unrefutable evidence towards human induced global warming and its associated impacts is again causing people across the world to rethink what type of energy they use and how they use it.

Fossil fuels such as coal, gas and petrol contain carbon. When they are burnt, such as coal is in Australia to produce electricity, carbon is released into the atmosphere as carbon dioxide (CO_2). Since industrialisation the level of CO_2 emitted by human practices is greater than the amount naturally absorbed by trees, oceans and soils in the carbon cycle.

CO_2, methane, nitrous oxide and water vapour are the major greenhouse gases. Higher concentrations of these gases in the atmosphere today cause heat to be trapped, raising the average temperature on Earth and creating the enhanced Greenhouse Effect.

The enhanced Greenhouse Effect is leading to changes in global and regional climatic patterns. This could potentially have a devastating impact on natural ecosystems, agricultural productivity, spread of disease and destruction of human infrastructure.

Australia has one of the highest levels of greenhouse gas emissions per capita in the world due to a high reliance on fossil fuels for energy, extensive land clearing, high transport use and energy intensive industries and export products.

Everything that we do in our lives requires energy. Whether it is driving to work, washing clothes or reading a book we now live in such a manufactured world that we cannot sustain our current lifestyle without external sources of energy.

Energy does not just refer to the electricity or gas used at home or petrol used to fuel a car. Energy is required at every stage of a product's life from its manufacture, transportation, use and eventual disposal. Large amounts of energy are actually wasted due to inefficient manufacturing processes, poor product design and inefficient product-use.

Renewable energy is seen as one of the answers to global warming. Renewable energy, such as electricity generated by wind farms, is produced from a renewable source such as wind, water, the sun and plants.

Reducing the amount of energy used, regardless of whether it is renewable or not, is essential in halting climate change. This can be achieved through a mixture of education, regulation and incentives. Referred to as demand-side management techniques, they are especially relevant in Victoria where there is currently not enough electricity to sustain demand during the hot summer periods.

Local Councils, as the level of government closest to the people, are ideally situated through planning laws to create energy efficient communities. Councils, through their own operations also play an important leadership role for residents and businesses by demonstrating the viability of sustainable practices.

The very nature of energy efficiency results in monetary savings. Whilst many energy efficiency measures may require a higher capital investment in the outset, by using less energy, this investment will be paid back. Efficient energy use and selection of sustainable products usually bring about other benefits such as more comfortable living or working conditions, improved air quality; reduction in transport congestion and healthier lifestyles as people find alternative methods of transport.

Banyule City Council must now be active in reducing greenhouse gas emissions. Banyule's Greenhouse Action Strategy, or GAS, is essential for strategically addressing all the issues and stakeholders involved in

a greenhouse action response. There is now international, national, state and local pressure for Council to be committed to climate change.

This strategy will address greenhouse gas levels in the corporate and community sectors. Within the corporate sector reductions in emission levels will be achieved in buildings, council fleet, streetlighting, waste and water use. Similarly in Banyule's community, greenhouse gases will be reduced in the residential, commercial, industrial, transportation and waste sectors.

Commitment from Council and the community is required to achieve the emission reduction goals set by Council of 30% below 1996/97 levels by 2010 in the corporate sector and 20% below 1996/97 levels by 2010 in the community.

The commitment required is financial and behavioural. Forward thinking is required to see the bigger picture of greenhouse gas abatement and how reducing energy consumption will bring benefits on so many levels to many different people.

3 BACKGROUND

A. The Greenhouse Effect

The Greenhouse Effect is the natural climatic system that warms the earth to a habitable temperature. The problem since industrialisation is that human activities such as burning of fossil fuels, vegetation clearance, and poor land management practices have lead to an imbalance of greenhouse gases in the atmosphere.

Surrounding earth are layers of gases and dust particles known as the atmosphere. The atmosphere regulates the temperature on earth by absorbing or reflecting back into space energy from the sun. Solar energy that does reach the earth warms the land and oceans, which in turn release this heat in the form of infrared radiation.

It is this infrared radiation that is absorbed by greenhouse gases in the lower atmosphere, warming the earth and creating a greenhouse effect.

The major greenhouse gases are water vapour, carbon dioxide, nitrous oxide and methane. Water vapour is responsible for about three-quarters of the natural greenhouse effect.

Today there are higher concentrations of greenhouse gases in the atmosphere causing more heat to be trapped. This is called the enhanced greenhouse effect. Table 1 shows the global warming properties of these gases and the increase in concentration since pre-industrial time[1]. The properties of these gases, or their global warming potential, have been calculated by scientists based on factors such as their heat absorbing capabilities and atmospheric lifetime.

Figure 1: The Natural and Enhanced Greenhouse Effect

[1] CSIRO 2001, 'Understanding Climate Change' Department of Natural Resources and Environment

Table 1 : Concentrations of greenhouse gases, pre-industrial and 1999[2]

Gas	Concentration		Increase from pre-industrial to 1999*	Global warming potential compared with CO_2**	Comments
	Pre-industrial	1999			
Carbon Dioxide	~280 ppmv	367 ppmv	31%	1	Responsible for approx ½ enhanced greenhouse effect
Source	Burning fossil fuels to generate energy, clearing land and burning vegetation, industrial processes				
Methane	~700 ppbv	1700 ppbv	142%	21	Less methane in atmosphere than CO_2 but much more powerful greenhouse gas
Source	Product of anaerobic decomposition of organic material. Major sources are cows, rice paddies, landfill				
Nitrous oxide	~275 ppbv	315 ppbv	15%	310	Persists in atmosphere for more than 100 years
Source	Major sources are motor vehicles, fertilisers, burning vegetation and industrial processes				
Chlorofluoro-carbons	0	533 pptv		4600 – 10,600	Use of CFCs has been phased out under the Montreal Protocol
Source	Used in refrigeration, plastics, aerosol products and as a solvent				
Hydrofluoro-carbons	0	20pptv		40 – 1,700	HFCs are CFCs with the chlorine removed. They have replaced CFCs as they do not destroy the ozone layer
Source	Used in refrigerants and plastics industry				
Sulfur hexafluoride	0	5 pptv		23,900	Most powerful greenhouse gas
Source	Used as insulator in electricity industry				
Perfluorocarbons	40 pptv	80 pptv	100%	6,500 – 9,200	Atmospheric lifetime over 1000 years
Source	By products of aluminium smelting				

ppmv = parts per million by volume; ppbv = parts per billion by volume; pptv = parts per trillion by volume.
** A percentage increase cannot be shown for synthetic gases that did not exist in pre-industrial times.*
*** Calculated over a 100 year time horizon*
Global warming potentials are expressed as a multiple of the global warming potential of CO_2.

The Kyoto agreement has targeted the above gases, with the exception of chlorofluorocarbons (CFCs) which are addressed in the Montreal Protocol, to abate global warming. Whilst CFCs are an extremely powerful greenhouse gas, their concentration in the atmosphere is decreasing with implementation of the Montreal Protocol, which was developed to protect the ozone layer.

The following observations from the CSIRO are based on predictions and modelling and are based on the most likely outcomes[3].

Warmer temperatures in the lower atmosphere will have a dramatic effect on weather and regional climate systems. These changes will affect the balance of natural ecosystems, agriculture yields, water resources, occurrence of pests and weeds, urban and coastal communities and human health.

Higher concentrations of CO_2 could lead to increased plant growth, but warmer conditions could be accompanied by regional decreases in rainfall. The net effect of climate change on plant growth is dependent on interactions between CO_2, temperatures and rainfall. Climate change could see crop yields and quality decrease, less feed for foraging cattle and sheep and lower milk yields from cows due to heat stress.

The rate of human induced global warming will mean many natural ecosystems will have trouble adapting to different climatic conditions. Alpine ecosystems will experience a reduction in habitat and with rising sea levels coastal communities will be subject to salt water inundation.

Warmer conditions may be conducive to pests that cannot survive winters such as the Queensland Fruit Fly.

[2] ibid 1. CFC figures from CSIRO, 2001 'Australia State of the Environment 2001'CSIRO Publishing, Vic.

[3] Ash, Dr A. 2001. 'Climate Change – Impacts for Australia' CSIRO.

Australia's already stressed water resources will experience further shortages with higher temperatures and increased evaporation rates. Human built infrastructure will be prone to damage with increases in storm frequencies and intensity leading to rises in insurance premiums. More heat related deaths may occur in summer.

According to the CSIRO during the 20th century the Earth warmed by about 0.6°C and sea level rose by about 15cm. Scientists have calculated that the Earth's average surface temperature is set to rise by 1.4 to 5.8°C by the year 2100 relative to 1990. Associated with this is a rise in sea level of 9 to 88 cm by 2100[4].

CSIRO has calculated future changes in Australian temperature, rainfall and evaporation. Please refer to figures 2 & 3[5] for visual interpretation of these results.

Figure 2: Ranges of annual average rainfall change (%) for around 2030 and 2070 relative to 1990. Coloured bars show changes for areas with corresponding colours in the map

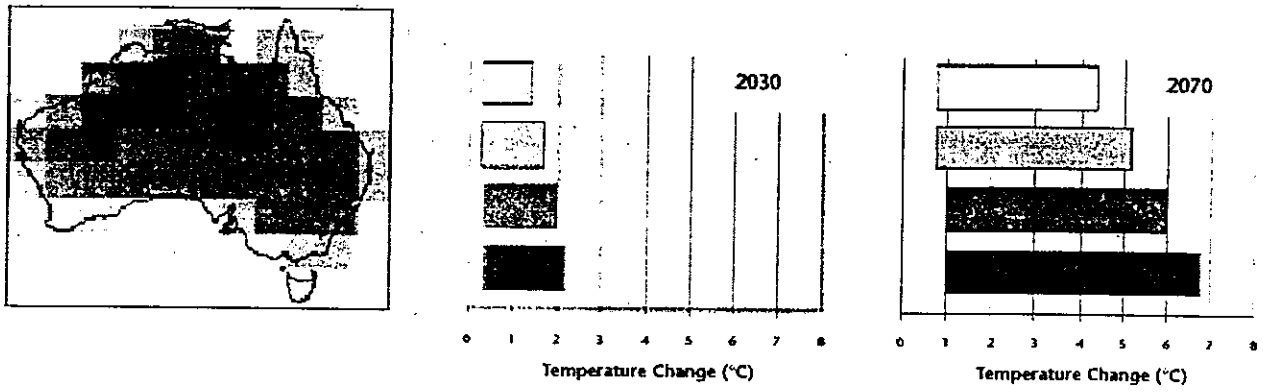
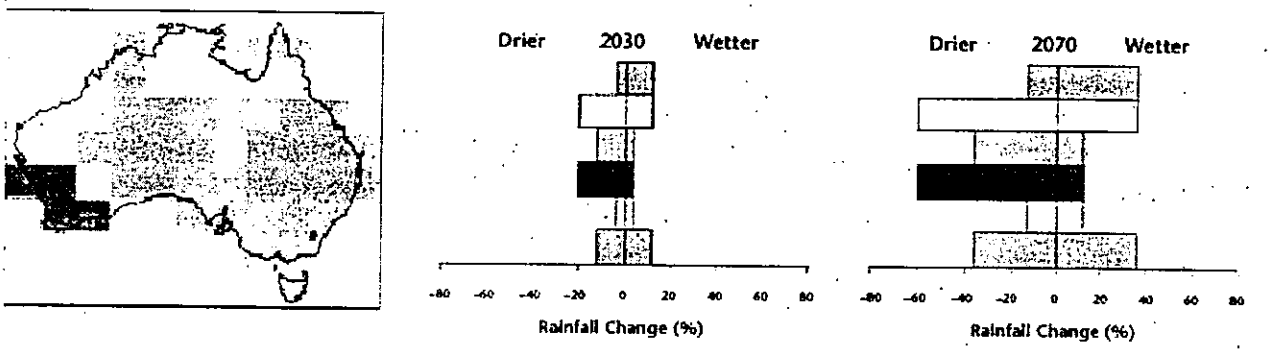


Figure 3: Ranges of average annual warming (C) for around 2030 and 2070 relative to 1990. Coloured bars show changes for areas with corresponding colours in the map



Fortunately greenhouse gases do not remain in the atmosphere indefinitely and there are means of trapping or removing them from the atmosphere.

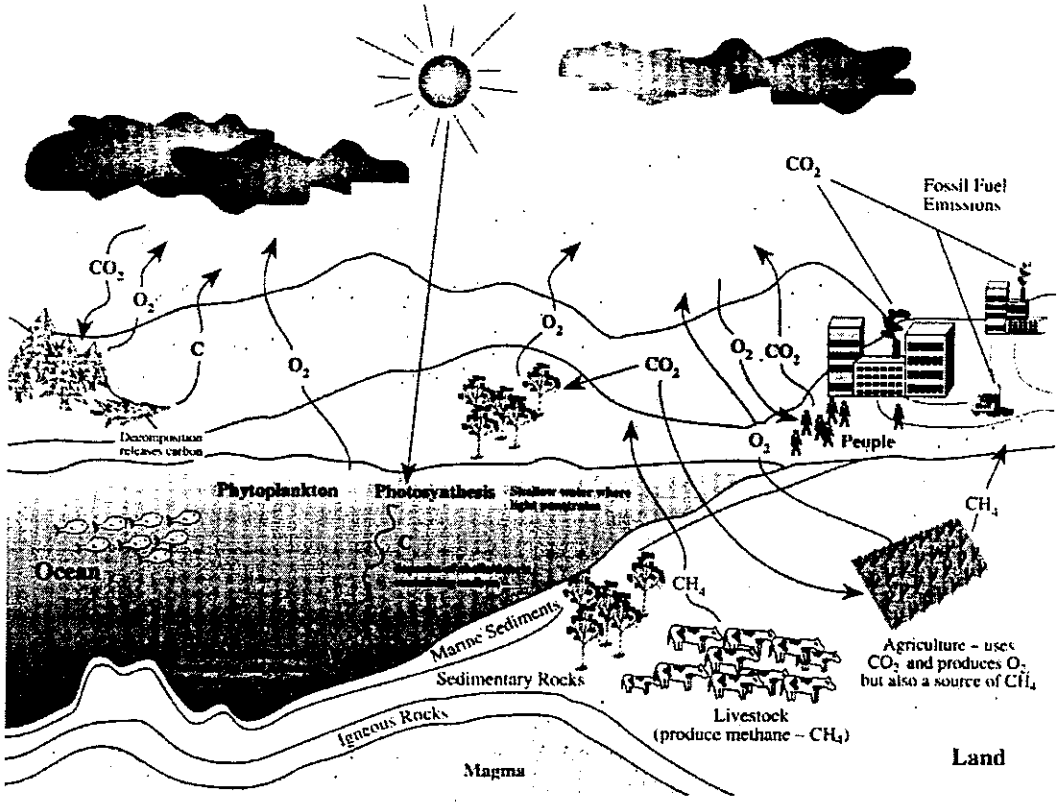
Carbon is found in all organic matter on earth. The carbon cycle refers to the cyclical movement of carbon as it is transferred from plants to animals to the atmosphere and oceans.

Currently more carbon is being released into the atmosphere than being absorbed by soils, vegetation and oceans.

Manipulation of the carbon cycle by planting trees, storing CO_2 below the ground or into the ocean could help correct the carbon cycle and stabilise global warming.

[4] Whetton, Dr P. 2001. 'Climate Change – Projections for Australia' CSIRO
[5] ibid 4

Figure 4: Global Carbon Cycle[6]



B. 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 is to achieve:

> *Stabilisation of the greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic 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 and a series of general commitment for 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.

[6] http://seawifs.gsfc.gov/SEAWIFS/LIVING_OCEAN/carbon_cycle

The countries party to the convention have met regularly since Rio 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 COP7 held in Marrakech November 2001.

COP3 in Kyoto in December 1997 agreed to the Kyoto Protocol, which requires Annex I 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 reduce it's greenhouse gas emissions in the target period to no more than 8% 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 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.

Throughout negotiations Australia has emphasised that it will not ratify the Protocol until the issue of how much credit developed countries could receive towards their Kyoto targets through the use of sinks has been resolved.

COP6 has agreed that;

- Eligible sink activities will include revegetation and the management of forests, croplands 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.[7]

These operational details were finalised at COP7 in Marrakech, 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_2 emissions from this group. So far 37 countries have ratified, including one industrialised country.[8]

Many Parties have indicated a wish to bring the Protocol into force by 2002, in time for the World Summit on Sustainable Development (Johannesburg, September 2002) and the tenth anniversary of the adoption and signing of the Convention.

[7] United Nations, 23/7/01. Press Release 'Governments adopt Bonn agreement on Kyoto Protocol rules'
[8] United Nations, 27/7/01. Press Release 'Bonn decisions promise to speed action on climate change'

C. Australia's Response to Climate Change

Although Australia only contributes just over 1% of global greenhouse gas emissions, its per capita emissions are the highest in the world. This is due to 90% of Australia's electricity being generated from coal fired power, extensive land clearing, a large agricultural base, high transport use and energy intensive industries and export products.

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

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

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 Commonwealth, State and Territory governments, providing a strategic framework for Australia's greenhouse response.

Under this strategy a number of programs have been launched. A major new initiative was the establishment of the Greenhouse Challenge program to encourage business to voluntarily commit to reducing their greenhouse gas emissions.

In November 1997, the Prime Minister announced a $180 million package of 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 Program to assist Australia in meeting commitments under the Kyoto Protocol.[11]

The Victorian Government released their Greenhouse Discussion Paper on 18 August 2001, representing the first step in developing a Victorian Greenhouse Strategy.

The Victorian Planning and Environment Act 1987 established statutory obligations that are relevant to greenhouse abatement.

The Victorian State Planning Policy Framework makes reference to energy efficiency in the section discussing the environment (section 15.12)

'To encourage land use and development that is consistent with the efficient use of energy and the minimisation of greenhouse gas emissions'

Under General Implementation this section of the State Planning Policy Framework states that:
'Planning and responsible officers should:

- *Promote energy efficient building and subdivision design*
- *Promote consolidation of urban development and integration of land use and transport*
- *Encourage retention of existing vegetation or revegetation as part of subdivision and development proposals'*

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[9] Miller, C. 18/9/01 'Australia keeps it bad record on greenhouse' The Age.

[10] Editor 17/11/01 'Kyoto: an early test of leadership' The Age

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

The following objectives are also discussed under Section 16 Housing of the State Planning Policy Framework.

'To encourage residential development that is cost-effective in infrastructure provision and use, energy efficient, incorporates water sensitive design principles and encourages public transport use (section 16.01-1)'

'To encourage the development of well designed medium density housing which improves energy efficiency of housing (section 16.02-1)'

D. The Cities for Climate Protection - Australian Campaign

The Cities for Climate Protection (CCP™) program was conceived in January of 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_2 reduction program 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™ program as it is estimated that Local Government can influence over 50% of greenhouse gas emissions. Through planning schemes, local laws, community programs and management of their own operations, councils can directly influence and in many cases control activities that are the source of greenhouse gases.

CCP™ membership requires a resolution adopted by Council and a commitment to meet the 5 step Milestone program.

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

4 BANYULE CITY COUNCIL'S GREENHOUSE GAS EMISSIONS

A. Milestone 1

Milestone 1 of the Cities for Climate Protection™ program 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 benchmark to mark the progress of an energy reduction program. Banyule City Council commenced Milestone 1 in April 2001, with Council being awarded for completion of Milestone 1 in July 2001.

The inventory examined energy use and costs in the corporate and community sectors of Banyule for both a nominated Base Year and Forecast Year between 2008 - 2010. Banyule chose 1996/97 as its Base Year and 2010 as its Forecast Year as per the CCP™ requirements.

The corporate energy inventory investigated energy consumption and costs in council operated buildings, council fleet (including heavy machinery), council operated streetlights, energy consumed in water and sewage operations and waste produced under council activities. Any electricity, gas or fuel bill that council paid from 1996/97 – 1999/00 has been accounted for in the inventory.

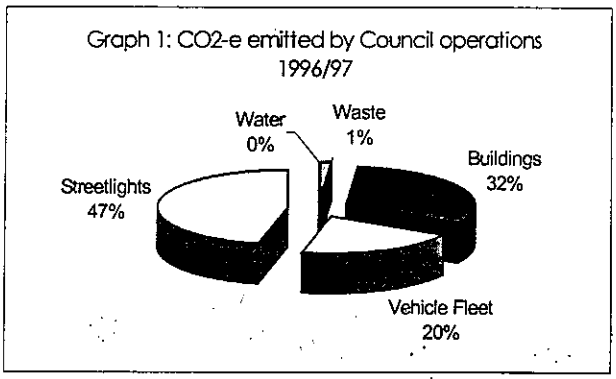
The community inventory investigates energy consumption in the residential, commercial and industrial sectors, as well as looking at greenhouse gases emitted from transportation and waste to landfill.

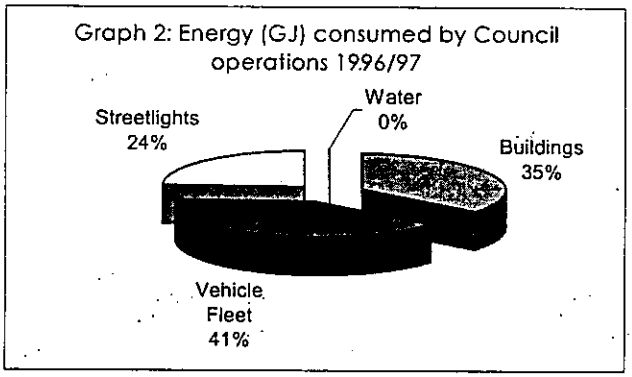
The purpose of the inventory is to obtain a record of past and current energy use within the council and community. This information is then used to forecast council and community energy consumption in 2010. The forecast is based on trends that emerged from the inventory, planned development or new services or changes in employee numbers and the population of Banyule. 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 CCP™ program.

The inventory was recorded using CCP™ software. This software expresses emissions of carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and perfluorocarbons (PFCs) in 'carbon dioxide equivalents' (CO_2-e).

B. Corporate Greenhouse Gas Emissions

Whilst council's vehicle fleet in 1996/97 used the most energy in the corporate sector, streetlighting, as powered by coal-fired electricity, emitted the most CO_2-e. This is due to Victoria's brown coal generated electricity being particularly greenhouse intensive.



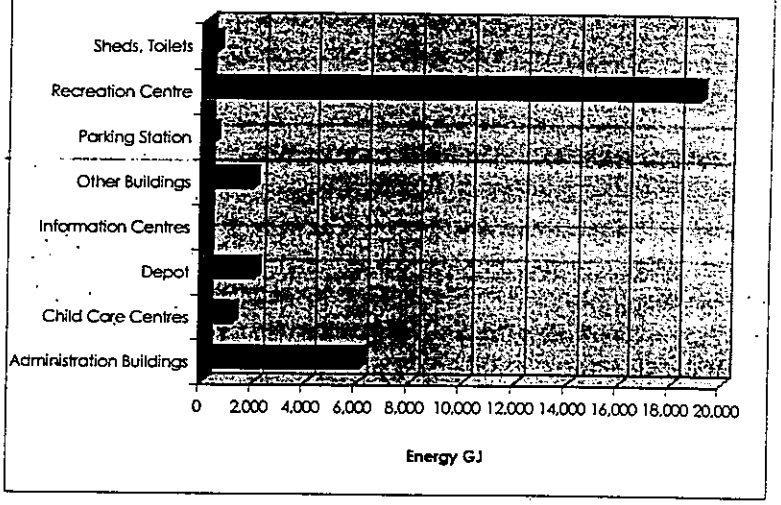


Council's vehicle fleet experienced a reduction in fuel consumption between 1996/97 – 1999/00 due to a reduction in the number of heavy vehicles operated. Energy use in the vehicle fleet has stabilised, with only a 10% increase in passenger vehicles and plant equipment expected across the entire fleet by 2010.

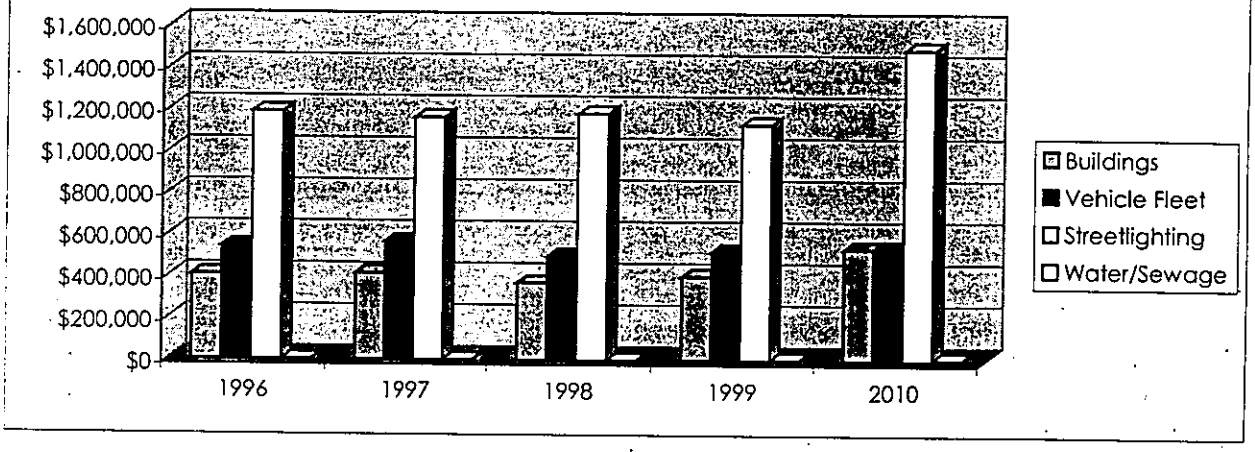
Council's building sector is the second largest user of energy, yet emits far less CO_2-e than streetlighting as many Council buildings use gas rather than electricity. Council buildings are forecasted to increase energy consumption by 33% by 2010 from 1996/97 levels. Recreation centres use the most energy out of all council operated buildings.

Throughout the inventory period 1996/97 – 1999/00 streetlighting has remained the largest emitter of CO_2-e for the corporate sector. It is estimated that streetlighting costs are expected to rise in the future.

Graph 3: Energy consumption by building type 1999



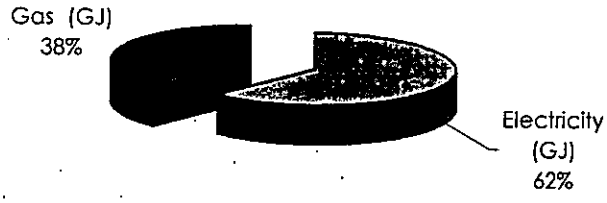
Graph 4: Energy Costs for Different Council Sectors



As Banyule City Council does not operate any sewage pumping or treatment stations and irrigation is under mains pressure there are no direct energy costs associated with water and sewage. The inventory includes electricity consumption for sprinklers, but this would be electricity associated with powering the control panels.

Waste, as with water/sewage accounts for less than 1% of energy use in council operations. The figures in Table 2 for waste are for waste produced only through council operations – not residential waste. There are no costs directly attributed to waste in Table 2 as Council waste is collected as part of Council's residential waste collection service.

Graph 5: Gas and Electricity consumption in the Corporate Sector 1996/97



Electricity accounted for 62% of energy consumed in the building and streetlighting sectors in 1996/97.

Table 2: Corporate Greenhouse Gas Emissions

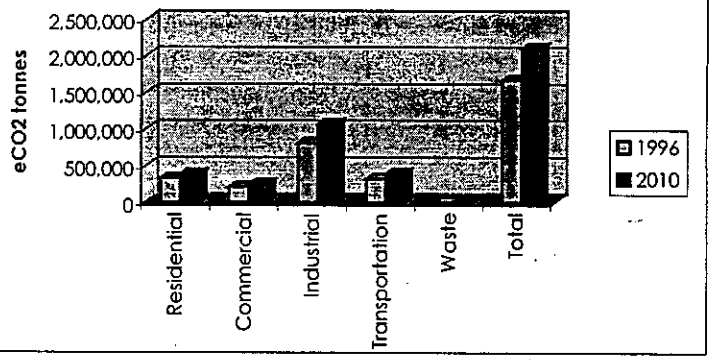
	1996/97	1997/98	1998/99	1999/00	2010
Buildings					
CO2-e Output (tonnes)	4,646	4,605	5,027	5,237	6,322
Energy (GJ)	28,900	24,897	25,320	26,091	38,700
Cost ($)	405,527	384,997	342,862	371,504	534,700
Vehicle Fleet					
CO2-e Output (tonnes)	2,257	2,158	1,930	1,818	2,099
Energy (GJ)	32,621	31,187	27,909	26,296	30,390
Cost ($)	541,609	559,299	504,885	521,902	536,187
Streetlights					
CO2-e Output (tonnes)	7,512	7,555	7,698	8,619	11,963
Energy (GJ)	19,937	20,051	19,562	21,901	31,750
Cost ($)	1,187,520	1,158,655	1,179,739	1,129,031	1,490,560
Water/Sewage					
CO2-e Output (tonnes)	1	1	1	6	36
Energy (GJ)	5	5	4	24	97
Cost ($)	823	825	613	1,531	4,127
Waste					
CO2 -eOutput (tonnes)	139	143	146	153	168
Energy (GJ)	0	0	0	0	0
Cost ($)	0	0	0	0	0
Total					
CO2-e Output (tonnes)	14,556	14,464	14,804	15,837	20,590
Energy (GJ)	81,463	76,141	72,796	74,313	100,950.
Cost ($)	2,135,480	2,109,390	2,019,992	2,022,505	2,565,570

C. Community Greenhouse Gas Emissions

Information for the community inventory 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.

Banyule's total population in 1996 was 117,876 with an estimated population of 118,733 in 2011. Banyule's population is aging, but set to remain stable over the next few years. Household size is also set to decrease from 2.73 people in 1996 to 2.52 in 2011[12].

Graph 6: Community Greenhouse Gas Emissions



According to CCP™ default data the industrial sector is the largest emitter of CO_2-e in Banyule. Manufacturing is classed as an important source of local and regional employment in Banyule, providing 6,345 (21% of jobs) in 1999. In 1999 there were 324 businesses actively involved in manufacturing.[13]

[12] Department of Infrastructure, 2000. Victoria in Future

[13] Banyule City Council. July 1999. 'Banyule Economic Development Strategy 1999-2004'

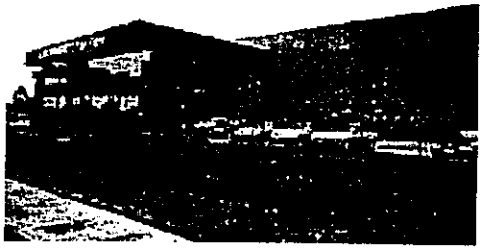
There are 3 distinct industrial areas within Banyule.

- West Heidelberg Industrial Estate,
- Para Rd/Sherbourne Rd Briar Hill
- The Concord/Clements Ave Bundoora.

Table 3: Community Greenhouse Gas Emissions

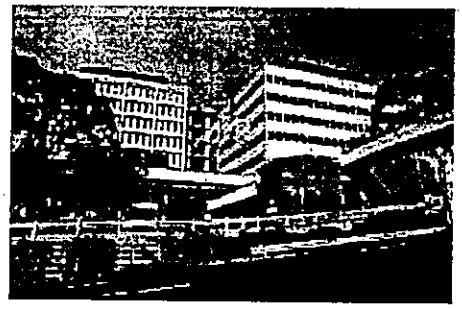
	1996	2010
Residential		
CO2-e Output (tonnes)	429,014	498,215
Energy (GJ)	2,895,034.0	3,362,008.0
Commercial		
CO2-e Output (tonnes)	294,748	355,762
Energy (GJ)	1,064,235.0	1,284,532.0
Industrial		
CO2-e Output (tonnes)	969,689	1,282,742
Energy (GJ)	7,075,028.0	9,366,185.0
Transportation		
CO2-e Output (tonnes)	329,021	402,398
Energy (GJ)	4,834,129.3	5,912,213.2
Waste		
CO2-e Output (tonnes)	9,110	9,176
Total		
CO2-e Output (tonnes)	2,031,585	2,548,294
Energy (GJ)	15,868,426.3	19,924,938.2

Figure 5: Heidelberg West Industrial Estate



Transport is the second largest energy user in Banyule, with 86.2% of households owning 1 or more cars. At the 1996 Census 69% of employed residents travelled to work by car, with 12% using public transport, which is comparable to the Melbourne Statistical Division average. [14]

Figure 6: Austin Repatriation Hospital



Banyule is primarily a residential area with 75% of residents owning their own home. 85% of dwellings are separate houses, but there are increasing number of semi-detached houses, townhouses and units being built. While the total number of households in Banyule is expected to increase, the number of people in each house is expected to decline[15]. The residential sector in Banyule is expected to experience a 16% increase in CO_2-e emissions on 1996 levels by 2010.

The commercial sector in Banyule generates the greatest amount of employment for the municipality. The largest employment sector in the municipality is health and education comprising 30% of all jobs. Retail is the second largest employer providing 6,694 jobs (22%) in 1999.

Property and business is forecasted to have the greatest growth with 105 new businesses commencing within 12 months in 1999[16]. The commercial sector is forecasted to increase CO_2-e emissions by 20% on 1996 by 2010.

[14] Banyule City Council, August 2001. 'Draft Municipal Transport Strategy'
[15] Banyule City Council, 2001.'City Plan 2001-2004'
[16] Banyule City Council, 1999. 'Banyule Economic Development Strategy 1999 –2004'

5 BANYULE CITY COUNCIL'S STRATEGIC FRAMEWORK FOR GREENHOUSE GAS REDUCTION

A. Previous Policies

In March 2000 Banyule City Council made a corporate decision to join the **Cities for Climate Protection Program**. This agreement signalled Banyule's commitment to reducing greenhouse gas emissions as part of its overall environment strategy.

Prior to this formal commitment, Council addressed climate change and its inherent impacts through its planning scheme, environmental policies and other strategic documents.

Banyule's **Municipal Strategic Statement 1997** identifies nine key elements for land use and development in Banyule.

1. Residential
2. Commercial
3. Industrial
4. Cultural, health, educational and institutional facilities
5. Natural environment
6. Heritage
7. Recreation and tourism
8. Transport and accessibility

The MSS provides a strategic planning framework for land use and development within Banyule. It is being reviewed in 2002.

Following on from the ***Banyule City Plan 1997-2000***, the ***Banyule Environment Policy and Strategy*** was developed to provide Council and the community with a framework for protecting and enhancing the natural environment.

Banyule's Environment Policy and Strategy aims to

- Encourage development within Banyule sympathetic with our environment and consistent with the needs of our community
- Plan for the future sustainability of Banyule's environment
- Encourage the efficient and sustainable use of resources within Banyule
- Prevent the unnecessary production of waste within Banyule
- Minimise the impacts of pollution on Banyule's environment
- Increase awareness of the values of Banyule's environment and of requirements for its protection and enhancement

In 2000 Council published the first ***State of the Environment Report*** for the City of Banyule, providing information on the progress of implementation of Council's Environment Policy and Strategy and presenting a detailed Action Plan for its implementation. A State of the Environment report is now produced annually to report on progress.

Banyule's Planning Scheme provides energy efficiency objectives for development within Banyule. For example:

Section 54.03-5:	*To achieve and protect energy efficient dwellings* *To ensure the orientation and layout of development reduce fossil fuel energy use and make appropriate use of daylight and solar energy*
Section 55.03-5:	*As for section 54.03-5 but for two or more dwellings on a lot*
Section 56.02-3:	*To facilitate an environmentally sustainable approach to urban development by minimising fossil fuel use, protecting environmental assets and providing for higher densities*

Banyule's Greenhouse Action Strategy builds on the aims and actions identified in the above policies and strategies.

Whilst Banyule has not had a dedicated energy reduction strategy in place, through the Environment Policy and Strategy, State of the Environment Report, Banyule Planning Scheme, Draft Municipal Transport Strategy, Waste Minimisation Strategy and other strategies, action has been taken to reduce greenhouse gas emissions from council's operations and the municipality. Often these actions are subsequent to energy reduction but still achieve CO_2-e reduction.

Table 4: Energy Reduction Strategies undertaken by Council since 1996/97

Sector	Energy Reduction Strategies	Specifics
Natural Environment	Rehabilitation and protection of vegetation contributing to the development of carbon sinks	• Continuing habitat protection and rehabilitation works undertaken by council and community along Plenty River, Yarra River, Darebin Creek and key conservation areas • Extension of areas covered by vegetation protection controls • Development of management plans for key areas of natural habitat • Wildlife Corridor program, commencement March 1999– 31036 plants provided
Council Fleet	Alternative Fuel Trial	• Drivers are currently given the option of moving to LPG as their vehicles come up for renewal • CNG Draft Study August 2000 • 21 LPG vehicles purchased since July 2001 as part of an alternative fuel trial • Toyota Prius – electric/petrol hybrid vehicle purchased in October 2001 for Council's fleet
Waste Management	Waste Minimisation and Action Strategy. 80% diversion of waste from landfill by 2008	• Rethink Waste Wise Centre and Waste Wise Program – Recycling education program for school groups since 1998 • 2001 Council joined Buy Recycled Alliance • 2001 Recycled Paper Trial • Materials Recovery Facility enabling efficient reuse and recycling of materials • Banyule Waste Assessment Report 2000/2001 • 2002 6 month kerbside greenwaste and recycled collection trial
Water	Monitor Council's water consumption	• 1999 Implementation of computerised sprinkler system for whole Municipality controlled from 1 location, reducing water consumption by up to 30%
Buildings	Encourage the efficient and sustainable use of resources within Council operations	• Audits undertaken on Ivanhoe Office and Ivanhoe Aquatic Centre • Key Council buildings involved in SEAV Benchmarking program • Inventory of energy use in Council and the municipality from 1996/97 to present completed for Milestone 1 of CCP
Transport	Encourage and promote alternatives to reliance on the use of private cars for transport by creating and taking opportunities for the enhancement of public transport, trail networks and infrastructure	• 1996 Promoting and Developing Urban Public Transport Services – study not implemented • 1996 Municipal Bicycle Strategic Statement – up to June 98 employed a Bicycle Co-ordinator to administer the implementation of this strategy • Partial review of Bicycle Statement in 2000 • Review of Principle Bicycle Network 2000 • 2001 Draft Transport Strategy

		• Development of on-road bike lanes and improved bike path signage
Planning	Develop and implement planning policies and controls which provide for and promote the future sustainability of our environment	• Amendment to planning scheme to extend areas with vegetation protection controls • Sustainable design suggestions made to Watsonia Streetscape Masterplan • Implementation of energy efficiency standards as required through Rescode
Council Strategies		• Future Directions – establishment of an internal Environment Task Group • Workshops and training sessions held for implementation of the Environment Policy and Strategy and for investigation into LA21 and triple bottom line
Community Education		• Energy efficiency information available to residents in Service Centres • Energy Efficient Light Bulb Give away August 2001 – Home Energy Survey • Annual Composting Seminar s • Banner articles – Environment Page • Energy Smart Breakfast for local business • Rethink Centre • Wildlife Corridor Program • Various flora brochures relating to flora and fauna and encouraging the planting of indigenous species available from council • Development of an Environment Education Group
Strategies & Reports	Incorporating efficient energy use, reduction of greenhouse gases and decreased reliance on non-renewable energies into council documents, strategies and decision making	• State of the Environment Report 2000/2001 • Municipal Strategic Statement July 1999 • Municipal Bicycle Strategic Statement 1996 • Environment Policy and Strategy 1997 • Draft Municipal Transport Strategy 2001 • Banyule City Council City Plan 2000 – 2003 • Waste Minimisation and Management Strategy 2000-2004 • Banyule Economic Development Strategy 1999-2004

6 MILESTONE 2 - EMISSIONS REDUCTION GOAL

Analysis of the energy inventory allowed current and future trends for energy consumption to be identified for Council's own operations and 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 completion of Milestone 2 of the CCP™ program.

In establishing an emissions reduction goal Council's Environment Working Party considered:

- Previous actions and programs implemented by Council to reduce greenhouse gas emission 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.

Separate emission reduction goals for the Council and community were decided by the Environment Working Party, November 2001.

Council **30% below 1996/97 corporate emission levels by 2010,**

Community **20% below 1996/97 Community emission levels by 2010.**

The emissions reduction goals will be reviewed in conjunction with the comprehensive review of the Greenhouse Action Strategy in 2005. This review will ensure the emissions reduction goal is still achievable and relevant in light of emerging technologies, changing attitudes towards climate change and success of Council's Greenhouse Action Strategy.

Formal adoption of the emission reduction targets by Council is required for Milestone 2 of CCP™.

7 ASSOCIATED BENEFITS OF GREENHOUSE GAS REDUCTION

Banyule City Council recognises the implications of climate change and the benefits that greenhouse gas reduction strategies can have socially, economically and environmentally for Banyule.

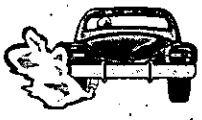
A Greenhouse Action Strategy for Banyule will:

1. Reduce Greenhouse Gas Emissions
This is the primary aim of the strategy but additional economic, social and environmental benefits will result from implementation of actions identified in the strategy

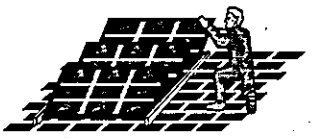
2. Save money and energy
Undertaking a lighting retrofit program will not only improve the energy efficiency of a lighting system, but reduce secondary heating of the office space, improve working conditions with more effective, ambient lighting and reduce need for maintenance with more durable lighting

3. Improve public relations
Taking a pro-active stance against climate change will be an opportunity for Council to demonstrate its leadership and commitment to reducing greenhouse gases to the community, business and other councils.

4. Reduce operating budgets and ongoing maintenance costs
The very nature of reducing energy consumption creates monetary savings. These savings can either be referred to other energy saving measures, provide employee incentives or be used to provide other services to the community.



5. Enhanced air quality and resource conservation
The primary source of greenhouse gas emissions is the burning of fossil fuels. Use of alternative fuels will reduce the volume of pollutants normally released by fossil fuels, improving air quality standards in the area.



6. Create jobs
By encouraging or mandating the use of renewable energy, alternative fuels and energy efficiency technologies new markets and jobs will be created. Awarding local innovation towards greenhouse gas reduction will further enhance this process.

8 GREENHOUSE ACTION STRATEGY OBJECTIVES

Banyule's Greenhouse Action Strategy will aim to address each of the following objectives;

- *To achieve the emissions reduction goals set for the corporate and community sectors of Banyule*
- *To promote and ensure efficient energy use in Council operations, buildings and street lighting, the wider community, business and industry to achieve greenhouse gas reductions*
- *To increase the use and generation of renewable energy in Banyule*
- *To 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 respond to it.*
- *To reduce reliance on private vehicles as a mode of transport and to encourage and provide opportunities for alternative transport options*
- *To develop partnerships between Banyule City Council, local business, neighbouring councils and community groups to facilitate program development and establish a collaborative approach towards greenhouse gas abatement.*
- *To reduce the amount of residential, commercial and Council generated waste going to landfill*

9 INTRODUCTION TO ACTIONS

Sections 10 and 11 outline individual projects suggested to achieve Banyule's emissions reduction goals of

Corporate 30% below 1996/97 corporate CO_2-e levels by 2010
Community 20% below 1996/97 community CO_2-e levels by 2010

A 20% reduction of 1996/97 emission levels in the community sector by 2010 provides a target of 1,625,268 tonnes CO_2-e emitted in 2010. The CCP™ energy forecast suggests that the CO_2-e emissions from the community sector in 2010 will be 2,548,294 tonnes CO_2-e. This is a reduction of 923,026 tonnes of CO_2-e in eight years.

Table 5: Community Reduction Goals

Sector	1996/97 CO2-e emissions (tonnes)	2010 forecasted CO2-e emissions (tonnes)	Target 2010 CO2-e emissions (tonnes)	Actual reduction in tonnes of CO2-e required (tonnes)
Residential	429,014	498,215	343,211	155,004
Commercial Industrial	1,264,437	1,638,504	1,011,549	626,955
Transport	329,021	402,398	263,216	139,182
Waste	9,110	9,176	7,288	1,888
Total	**2,031,585**	**2,548,294**	**1,625,268**	**923,026**

Similarly the target of a 30% reduction in 1996/97 CO_2-e levels in the corporate sector calculates to be 10,189 tonnes CO_2-e emitted in 2010. Currently the CCP™ energy forecast suggests that in 2010 the corporate sector will be responsible for 20,591 tonnes of CO_2-e being emitted. This means Council must reduce greenhouse gas emissions by 10,402 tonnes CO_2-e in their own operations by 2010.

Table 6: Corporate Reduction Goals

Sector	1996/97 CO2-e emissions (tonnes)	2010 forecasted CO2-e emissions (tonnes)	Target 2010 CO2-e emissions (tonnes)	Actual reduction in tonnes of CO2-e required (tonnes)
Buildings	4,646	6,322	3,252	3,070
Vehicle Fleet	2,257	2,099	1,579	520
Streetlighting	7,512	11,963	5,258	6,705
Waste	138	168	96	72
Water	1.7	36	1.1	34.9
Total	**14,556**	**20,591**	**10,189**	**10,402**

The actions identified in the GAS are divided into community and corporate (council) actions. Each action has a project description, project target and a table outlining project costs and annual greenhouse gas savings.

Any reference to greenhouse gases (ghg) or CO_2-e is a collective term for the major gases contributing to the greenhouse effect. These gases are

- Carbon doixide (CO_2)
- Methane (CH_4)
- Nitrous Oxide (N_2O)
- Hydrofluorocarbons
- Sulfur hexafluoride
- Perfluorocarbons

The greenhouse savings suggested for each action 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 Strategy in achieving the emission reduction goals. The emission coefficient assumed for calculations in this report is 1.467kg CO_2-e/kWh[17].

[17] Australian Greenhouse Office 'Greenhouse Challenge Factors and Method Workbook – Version 3' Dec 2001. http://www.greenhouse.gov.au/challenge/html/member-tools/factorsmethod.html

10 COMMUNITY ACTIONS

A. Residential

1) Encourage 5 Star Energy Rating for all New Buildings and Renovations

The Sustainable Energy Authority's FirstRate system, calculates how much energy is required to heat or cool a home. As of 1 March 2002, under the Banyule Planning Scheme, an application for a multi-unit development must meet a 4-star rating under First Rate. This has been introduced due to changes made to energy efficiency standards in Rescode. This does not apply to a single dwelling on a lot. Currently builders of single residences are required only to meet minimum standards for insulation in walls and ceilings.

An average home is currently rated at 2 stars and produces on average 15 tonnes of CO_2-e. A 5 star home not only saves the homeowner money on energy bills as they are 60% more energy efficient, but greenhouse gas emissions are reduced and the home is far more comfortable to live in. As 5 star homes use less energy, demand for electricity is lessened in peak periods, reducing stress on the electricity grid.

Requiring all new residential buildings to achieve a 5 star rating under FirstRate would require changes to Council's planning scheme. The South Australian Government will be introducing similar standards in 2002 when any new houses and extensions larger than 30sq m must meet a 4 star standard. The Age reported on 2 Jan 2002 that the Victorian Government is considering extending the energy efficiency standards that apply to multi-unit developments to all new homes[18].

Action 1 proposes that Sustainable Building Development Guidelines be developed as a temporary measure before legislative changes are made allowing Council to require any new building to achieve a 5 star rating. To support these guidelines Council will provide information to builders and home owners in Banyule on sustainable housing and lobby the Victorian Government to make the required statutory changes.

As soon as legislative changes in Victoria have been made the Greenhouse Action Strategy and Banyule's Planning Scheme will be reviewed to possible include:

- Required 5 star energy rating for any new building or major renovation
- Mandatory installation of solar water heating where possible or results in a net reduction in greenhouse gas emissions
- Installation of AAA rated plumbing fixtures
- Maximum insulation levels in ceiling, walls and floor
- House orientation to achieve maximum solar gain
- Mandatory installation of rainwater tanks.

Project Target: Development of Sustainable Building Development Guidelines to facilitate 5 star energy rating of new buildings/renovations

[18] Szego, J 'Design Rule to Hit Home Buyers' The Age 2nd Jan 2002.

2) Provide a Solar Water Heating Rebate

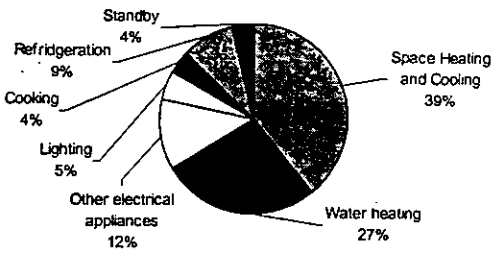


Figure 7: Energy use in the average Australian Home

Water heating accounts for around one quarter of an average household's energy costs. Solar water heating can provide more than 60% of a household's hot water needs.

Currently the Victorian Government is offering rebates of up to $1,500 as a point of sale discount for accredited systems. The rebate has been structured such that only systems that result in a reduction in greenhouse gases will attract the rebate. For example if there is a gas connection to the house, a gas water heater will emit less greenhouse gases than an electric boosted solar water heater (see table 7). The rebate aims to make solar water heating a more viable option for Victorian households.

'Your Home Technical Manual' claims that in most parts of Australia a solar water heater with an electric booster will have fewer greenhouse gas emissions than a heat pump system, but in the cool climates of southern Australia, such as Melbourne, greenhouse gas emissions from solar boosted heat pumps can be similar to or less than those from an electric boosted solar water heater[19].

Heat pumps work like a refrigerator in reverse, absorbing heat from the air and transferring it to the water. Solar boosted heat pumps use solar collectors to further improve the efficiency of a heat pump system. They use a refrigerant as the heat transfer fluid. Heat pumps work even when the sun is not shining as the refrigerant can absorb heat from the ambient air.

Research on appropriate water heating systems for Banyule will need to be undertaken before this measure can be implemented. Importantly Council will want to ensure that the most efficient type of water heater is installed in homes. Consideration must be placed on system efficiency and the type of fuel used. For example instantaneous gas systems do not require large amounts of water to be heated. This means that large standby loses are not created as is the case with storage water heaters. Also an electric boosted solar water heater on Green Power may actually have less greenhouse emissions than an equivalent gas water heater on traditional coal powered electricity. [20].

Table 7: Greenhouse Gas Emissions from Water Heating[21]

Water Heating System	Annual Greenhouse Emissions (tonnes of CO2/year)	Lifecycle Greenhouse Emissions (tonnes over 15 year life)
Natural Gas 5 star	1.2	18
Natural Gas 2 star	1.5	22.5
Solar gas (cool area)	0.5	7.5
Electric	4.8	72
Solar electric (cool area)	1.9	28.5

Whyalla City Council in South Australia is currently offering an additional rebate on top of the South Australian Government solar water heating rebate. Whyalla City Council provides a 10% rebate on the unit price of any complete solar hot water unit. The rebate is calculated after any manufacturer or local agent discounts have been given to the customer.

Any additional rebate offered by Council could only be for systems that attract the SEAV rebate and therefore have already been deemed to produce positive environmental benefits.

Council offering an additional rebate would demonstrate Council's support for this scheme and the promotion of renewable energy systems.

[19] Commonwealth of Australia 2001. 'Your Home Technical Manual' www.yourhome.gov.au

[20] Pears, A. 1997 'Greenhouse Gas Emissions and the Residential Sector' Environment Design Guide BDP May 1997 GEN 13.

[21] Pears, A. 1997 'Greenhouse Gas Emissions and the Residential Sector' Environment Design Guide BDP May 1997 GEN 13.

See: www.whyalla.sa.gov.au/enviro/energy.htm
www.seav.vic.gov.au/renewables/SWH/rebate/index.html

Project target: Council provides an additional $100 rebate for 50 SEAV approved homes per year installing solar water heating systems

Council Solar Water Heating Rebate			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$5,000	Residents recoup savings	N/a	150 tonnes

Calculations based on water heating emitting on average 5 tonnes ghg/year[22], solar water heating being 60% more efficient and 50 target houses. Project cost for 50 homes receiving a $100 rebate from Council.

3) Provide Grants for Community Greenhouse Reduction Projects

Supporting community involvement in protecting and enhancing Banyule's environment is a key policy aim of Council's Environment Policy and Strategy.

Currently Council offers Conservation and Environment Grants as part of Council's broader Community Grants program. The Conservation and Environment Grants provide $15,000 annually to projects assessed by the Banyule Environment Advisory Group.

Supporting community greenhouse reduction projects is equally important and should be similarly funded by Council.

Rather than provide grants to community groups, the Greenhouse Community Grants could be a series of projects that improve the energy efficiency of existing housing in Banyule. This would result in a managed approach to improving energy efficiency standards in Banyule and provide a properly monitored program to report emission reductions.

Example of projects could be:
- Green Power incentive – encouraging residents to connect to Green Power
- Cool Change Program – improving insulation standards in Banyule

RESIDENTIAL GREEN POWER INCENTIVE

Electricity in Victoria is generated from brown coal making it one of the most CO_2-e intensive forms of energy. In Victoria 1kWh of electricity generates 1.467kg of CO_2-e[23].

Green Power substitutes coal powered electricity with electricity produced from a renewable source such as wind farms or solar energy.

Council needs to provide an incentive for residents to purchase Green Power. This could be done in conjunction with the electricity supplier.

Green Power is purchased at a premium price, usually $3-$4 dollars extra a week for a household. Council could offset this price by providing a kit of energy efficient products such as compact fluorescent light globes for every household that connects to Green Power.

[22] SEAV 'So you want to be more Energy Efficient' August 2000
[23] Australian Greenhouse Office 'Greenhouse Challenge Factors and Method Workbook – Version 3' Dec 2001. http://www.greenhouse.gov.au/challenge/html/member-tools/factorsmethod.html

Project Target: 100 Green Power customers per year signing up to Green Power with Council providing an incentive for connection

Green Power Incentive			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$425	None	N/a	1,500 tonnes

GHG savings based on 100% Green Power purchase by 100 households (electricity sole energy) saving maximum 15 tonnes CO_2-e by household. Project cost based on $25/carton of 6 CFLs (prices from Philips Lighting Trade Price List June 2001)

COOL CHANGE PROGRAM

Insulation is essential to keep a house warm in winter and cool in summer. Having adequate insulation levels in the ceiling, walls and floor will reduce energy requirements for heating or cooling as the insulation provides a barrier to heat flow in and out of the home. Increasing insulation levels is an easy way to improve the energy efficiency of homes in Banyule. A well insulated home can save up to $330 per year in reduced energy costs, also reducing greenhouse gas emissions.

Draughts and air leakage is also another source of energy loss. In winter draughts can increase heating costs by up to 25%.

Developing a program that increases insulation and draught proofing levels in existing homes in Banyule will save residents money in energy bills, and make their homes far more comfortable to live in.

The Cool Change Project will focus on:
Ceiling insulation
Wall insulation
Draught Proofing

Recommended insulation levels for Melbourne's climate are[24]:

Ceiling	R3
Walls	minimum of R1.5. Use R2 where space permits
Floor	R1

The program is designed in stages. The first stage is improving ceiling insulation to R3. If a house already has ceiling insulation to this level then their wall insulation can be improved to R1.5. If this measure has already been installed then draught proofing can be improved in the home.

Ceiling insulation	Improved to R3	Up to a value of $500
Wall insulation	Improved to R1.5 or R2 where possible	Up to a value of $500
Draught proofing / hot water tank/pipe insulation	Improved where required	Up to a value of $500

This program is only available to residents on a benefit and homes participating in the program will have to be assessed for levels of insulation to determine what measure is required. Energy bills would have to be supplied for the previous year to ascertain energy savings with the improved insulation levels.

Each home could be provided with a maximum grant of $500 for insulation or $200 for draught proofing. If the work exceeds this amount the resident will be responsible for the remaining amount. An accredited installer must carry out the work. This project could be managed in collaboration with an insulation manufacturer to obtain insulation at discounted prices.

[24] www.yourhome.gov.au

Research indicates that minimum insulation in ceilings provides a 25% reduction in energy use and 15% reduction if walls are insulated, totalling a 40% reduction for both.

Heating and cooling accounts for 14% of a home's energy use. Assuming that most existing homes already have ceiling insulation, additional wall insulation could see a 15% improvement in energy costs. This could save 0.315 tonnes of CO_2-e per dwelling per annum.

Project Target: Insulation levels to be increased for 20 existing homes/year.

Cool Change Project (existing homes)			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
Dependent on financial commitment from other parties	Recouped by residents	N/a	6.3 tonnes

Calculations based on 20 existing homes, with insulation providing 15% improvement

4) Establish Annual Banyule Environmental Awards

Encouraging and celebrating innovation in Banyule towards greenhouse gas reduction is essential to raise the profile of Global Warming and the importance of taking action.

Newcastle City Council has successfully organised Environment Achievement Awards to provide recognition for organisations seeking environmental sustainability. Awards such as these build a culture of environmental excellence in the community and reward groups and businesses for their sustainable actions.

Awards recognising excellence in energy innovation could be tied into an all-encompassing environmental awards night for Banyule.

Project Target: Annually recognise excellence towards energy conservation and sustainability in the municipality

Banyule Environment Awards			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$2,000	None	N/a	Determined from projects

5) Develop Posters and Brochures to raise Community Awareness

Currently Banyule City Council does not produce any educational/display materials relevant to the enhanced greenhouse effect.

Material needs to be produced to raise the awareness of Climate Change and actions Council is taking to reduce the level of greenhouse gas emissions in Banyule.

Currently there is limited display material relating to the greenhouse effect available from any organisation.

Project Target: Development of posters and brochures to facilitate community awareness of the enhanced greenhouse effect

Community Educational Material			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
$10,000	None	N/a	Increased awareness as a result of this action will result in savings

This is a once-off project cost

6) Organise an Annual Energy Efficiency Week

Promoting energy efficiency to residents is an integral component of Council's Greenhouse Action Strategy.

In August 2001 Council ran an Energy Efficiency Week, giving away 400 compact lightbulbs, in conjunction with the Sustainable Energy Authority. Completion of a Home Energy Survey was required to obtain a lightbulb, allowing Council to gather information regarding the energy efficiency of houses in the municipality.

The Energy Efficiency Week was a successful means of raising the profile of energy efficiency, delivering energy saving measure into homes with the lightbulb giveaway and providing further information to residents.

Residential and business workshops could be held during future Energy Efficiency Weeks.

Providing educational forums for residents and business will increase the awareness and interest of the community in greenhouse gas reduction. These workshops would be on specific themes such as solar water heating for the home and provide practical information and tips that the householder or business owner can implement immediately.

Council could encourage local retailers such as Mitre 10 to offer discounts on sustainable /energy efficiency products during Energy Efficiency Week.

Project Target: Organisation of an annual Energy Efficiency Week, with 400 lightbulbs given away and residential/business workshops

Energy Efficiency Week			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$2,500	None	N/a	226 tonnes

$1,650 of project costs for 400 CFLs costing $25/carton of 6. Calculations based on a compact fluorescent globe using 80% less energy than a standard incandescent globe, which produces 705kg of CO_2-e/year[25]

7) Develop a Bulk Purchasing Scheme

Often sustainable living is hindered by the extra costs involved with purchasing suitable products.

A bulk-purchasing scheme can offer residents products at trade prices, increasing the use of such products.

Market research may be required to understand which products would be attractive to residents. As the products would be purchased from Council, any capital costs involved would be returned at point of sale.

Such products could be

- Compact lightbulbs

[25] Sustainable Energy Development Authority 2000. Tenant Energy Management Handbook. SEDA NSW

- Worm Farms
- Composting Bins
- Shower Roses
- Insulation

Local authorities in the United Kingdom successfully administer bulk purchasing schemes. Often discounts are offered on ceiling and cavity wall insulation, solar panels, condensing boilers and compost bins. In the case of compost bins the local authority negotiates with the supplier/manufacturer to bulk purchase the bins at a discounted price, then further subsidises those costs.

Council currently sells compost bins and mulch from the Transfer Station, and indigenous plants from the Parks Depot nursery. A shop or retail outlet could be established, incorporating these current services and additional energy efficient products.

Full investigation of this project needs to be undertaken, with the subsequent development of a business case for a retail outlet.

Project Target: Development of a business plan for the establishment of a retail Sustainable Shop

Bulk Purchasing Scheme			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
To be determined	To be determined	To be determined	Can be estimated from products sold

8) Establish an Eco Street

To facilitate the acceptance of sustainable living amongst Banyule's residents Council needs to demonstrate the viability, affordability and ease of sustainable living.

This could be achieved through an 'Eco Street' project.

Council could develop a project where one street in the municipality agrees to reduce energy consumption and improve the sustainability of every house in the street. Council could provide financial assistance, advice, media coverage and monitoring. The street accepted for the project could be chosen through a competition, raising the profile and interest of the project within the community.

Such a project would provide an opportunity for Council to trial energy efficient/water conserving products. Managed monitoring of energy bills from each house will provide realistic energy savings for Council's emissions reduction target and the community.

Port Philip Council has established a similar program. The Sustainable Living Program, which begins in 2002, aims to help residents to make sustainable lifestyle choices. Participating households, grouped into 10 teams, will have monthly meetings to share ideas and compare notes. The homes will be fitted with water saving devices by Melbourne Water and receive a free water audits, compost bin and energy efficient light bulbs[26].

Project Target: Development of an 'Eco street' project

[26] Miller, Claire. 2001 'Joining the war against waste' The Age 17/12/01

Eco Street			
Project Cost.	Savings $/year	Payback period	GHG emissions savings tonnes/year
$5,000	Savings recouped by residents	N/a	Houses to be monitored

Project cost is an estimation of promotional, product and administrative costs. Once off project cost.

9) Develop a school education program

Currently Council produces school education programs for its Waste Wise, Water Watch and Wildlife Corridor programs. This should be extended to include greenhouse and energy efficiency issues.

The Sustainable Energy Authority administers an Energy Smart Schools Program, which provides schools with information on how to reduce energy in the operation of the school.

Our Planet Enterprises, in conjunction with the Australian Greenhouse Office, have produced a 55 minute performance for years 5 – 8 that teaches children about the greenhouse effect. The shows are designed for 150-160 students.

Council could sponsor a series of shows by Our Planet Enterprise for schools within the district. The schools also receive an eco pack, which provides teaching resources for additional education sessions.

Alternatively a day long workshop could be organised for groups from a number of local schools. This would include the performance, eco-pack for teachers, and workshops after the performance to reinforce the message delivered during the performance. A suggested cost for such an approach would be around $1,500.

There are 48 primary and secondary schools within Banyule. 38 schools have participated in Council's Wildlife Corridor Program.

Project Target: 10 performances reaching 1,500 students, or 2 workshop days reaching 300 students

Greenhouse Education Program			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
$4,000	None	N/a	No direct savings

Cost calculated at $400 a performance for 10 performances by Our Planet Enterprises

10) Establish a stakeholder program

Recognising stakeholders in the community for involvement in and endorsement of Council's GAS is an essential step in obtaining community recognition and participation of the program.

Banyule has 3 obvious stakeholders that should be involved in the GAS program. These are:

- Australian Defence Force Simpson Barracks
- Hospitals
- Ministry of Housing

AUSTRALIAN DEFENCE FORCE SIMPSON BARRACKS

The Simpson Barracks covers a large area of land in Banyule, consisting of buildings, open space and natural bushland. There is opportunity for energy consumption to be reduced in building and fleet management, building maintenance or refurbishment programs. A major renewable energy demonstration project could be undertaken at the Barracks involving photovoltaics or solar water heating. Barracks management should be encouraged to participate in programs such as the AGO's Greenhouse Challenge.

The Simpson Barracks have previously been involved in the Wildlife Corridor planting program.

HOSPITALS

Health is the largest employment sector in Banyule, with 4 separate hospitals. As such it is important that this sector acts as an example for sustainable management practices. Delivering an energy efficient message as part of a training package in these establishments would be an effective means of promoting energy efficiency to the community. The current redevelopment of the Austin Repatriation Hospital in Heidelberg offers an opportunity for Council involvement in sustainable building design.

DEPARTMENT OF HUMAN SERVICES PUBLIC HOUSING

Encouraging tenants to invest in energy saving measures is a difficult prospect. Whilst they will benefit in the short term from reduced energy bills there is no incentive to make any capital investment to improve the energy efficiency of the home.

By encouraging the Department of Human Services to improve the energy efficiency of public homes within Banyule and to establish a 4 or 5 star rating policy for any new accommodation developed in Banyule will alleviate this problem with tenants.

Such a project demonstrates the social and environmental benefits of sustainable living as living conditions are improved and energy bills reduced for individual families that may be experiencing financial difficulty.

Funding may be available from the Sustainable Energy Authority's solar hot water rebate scheme.

The Department of Human Services also offers loans for home renovations. This scheme could be extended for energy efficient renovations – eg offering low interest loans for a fixed term for installation of measures such as solar water heating, insulation or more efficient appliances that will result in reduced energy use for a family.

As of October 2001, there were approximately 1,950 dwellings owned by the Office of Housing in the City of Banyule. This comprised 1 bedroom flats to 5+ bedroom houses. It is estimated that 70-80% of these properties are located in Heidelberg West and Heidelberg Heights.

Project target: Development of individual projects to ensure the participation of major community stakeholders in achieving Council's greenhouse reduction goal.

11) Organise a dedicated sustainability display in Service Centre(s)

Council currently offers brochures and information regarding energy efficiency, native vegetation, weeds and other environmental information in the customer service centres. This information is poorly displayed and organised, making it difficult for residents to locate information relevant to their needs, or entice them to take home additional information.

A dedicated sustainable information display could be organised in one or all of the service centres. This could include interactive information such as First Rate, allowing residents to get a rating on their home. Whilst the Sustainable Energy Authority offers an excellent display in their Spring St office, this location is not conducive to many residents in Banyule.

Figure 8: Information display available from SEAV

The Sustainable Energy Authority previously offered a heating and cooling advisory service. This service is no longer being promoted as the demand exceeds staff availability. Council could develop a similar service or offer a 'Quick Rate' rating service.

Project Target: Develop a dedicated sustainability display in Council's service centres or other appropriate location.

Dedicated Sustainability Display			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
$1,500	None	N/a	Not measurable

Project costs estimated and once off cost

12) Energy Efficient Fridge/Freezer Replacement

Refrigeration is responsible for 17% of greenhouse gases from home energy use[27]. Energy rating labels are now available on white goods to assist consumers in choosing the most energy efficient model for their needs. Many households would own fridges that were purchased 10-20 years previously. These fridges may no longer be working efficiently, or be oversized for the changed requirements of the household. Older fridges may also be using ozone damaging CFCs.

Old fridges could use twice a much energy as a new one and cost an extra $100 a year in electricity.

In conjunction with the Sustainable Energy Authority, refrigerator manufacturer or electricity supplier, Council could offer residents replacement fridges.

To participate in this program the resident must be receiving a benefit and own an inefficient fridge. A limited number of fridges will be available, with the replacement being subject to eligibility and availability. Recipients of the fridge must pay a nominal fee of 10% of the retail cost of the fridge. Council will arrange for the correct disposal of the old fridge. The replacement fridge will have the highest possible rating for it's size.

Project target: Replacement of 100 fridges a year

Replacement Fridge Program			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
To be determined	None.	N/a	54 tonnes

Calculations based on replacement fridge being Fisher & Paykel C737 model using 406kWh/year and old fridge using twice as much energy.

B. *Commercial/Industrial*

13) Bright Spark Business Program – assisting local business to become energy smart

In most organisations a cut in total energy bills of 20-30% is often achievable over the first 2-3 years of an energy management plan. Office energy use can lead to annual costs of up to $35 per square meter and up to 500kg of greenhouse gas per square meter per year[28].

Retail is the second largest employer in Banyule providing 6,694 jobs (22%) in 1999. Growth in this sector was static during 1999.

[27] Home Technical Manual. www.yourhome.com.au

[28] Sustainable Energy Development Authority 2000. Tenant Energy Management Handbook. SEDA Sydney.

Property and business is the fourth largest employer in the municipality and is forecasted to have the greatest growth. In 1999 the sector provided 3426 jobs with 105 new businesses commencing within 12 months.

Recent studies into Banyule's economy reveal a future strong growth phase with increasing numbers of jobs, investment and development applications.

It is essential that Council provides measures to control and reduce emissions from these growth sectors.

Banyule City Council operates 10 Shopping Centre Special Rate and Charge Schemes. Council matches funds raised in the scheme on a dollar for dollar basis. These funds are used to implement the shopping centre's business plans.

An objective for each of these business plans should be the development of an energy management program for the centre and an emissions reduction goal. Any refurbishment costs to improve the energy efficiency of a centre or to provide training to business owners/employees could be covered by the special rate and charge.

Two energy smart seminars a year will be provided for local business not involved in special rate schemes. These businesses must be encouraged to participate in either the Sustainable Energy Authority's Energy Smart Business program or the Australian Greenhouse Office's Greenhouse Challenge Program.

Sponsorship should also be sought for the program to be able to provide services such as free energy or water audits.

Project target: 100 business/year participating in the program

Bright Spark Business Program			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$2,000	Recouped by business	N/a	460 tonnes

ghg savings calculated on $3,000 electricity bill and 20% saving with energy mgt plan for 100 businesses. Project costs to cover promotional costs, 2 seminars and product/information support/incentives for participating businesses.

14) Develop Bright Spark Business Case Studies

In conjunction with the Sustainable Energy Authority and Council's Bright Spark Business Program, Council should develop case studies of 5 local businesses undertaking an energy retrofit program.

Council will provide administrative support and media coverage for the businesses involved. A variety of businesses should be studied such as newsagents, hairdressers and bakeries to provide a wide range of case studies.

Project Target: 5 businesses undertaking energy management plans to achieve a 20% reduction in energy bills

Bright Spark Business Case Study			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
$1,000	Recouped by business	N/a	23 tonnes

Project costs to cover development and printing costs of case studies. Project cost once off.

15) Establish Eco Industrial Parks

According to Banyule's Milestone 1 Inventory the industrial sector is the largest emitter of CO_2-e in Banyule. Manufacturing is an important source of local and regional employment in Banyule, providing 6,345 jobs in 1999. In 1999 there were 324 businesses actively involved in manufacturing.

There are 3 distinct industrial areas within Banyule.

- Heidelberg West Industrial Estate
- Para Rd/Sherbourne Rd Briar Hill
- The Concord/Clements Ave Bundoora

Council could assist the development of an energy management plan for the 3 industrial areas. This could be in conjunction with the Sustainable Energy Authority or the Australian Greenhouse Office.

Similarly the Green link program and ISO 14001 Assistance program offered by NIETL could be investigated for Council's industrial areas.

Project target: 5% reduction in energy consumption for each of the industrial areas by 2005, to be increased to 20% by 2010.

Eco Industrial Parks			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$3,000	To be determined by projects. Recouped by business	N/a	3,360 tonnes

Calculations based on 1996 emissions data for the entire industrial sector. Project costs an estimation of administration, promotional and educational costs.

16) Produce a Green Business Directory

Council currently produces an annual Business Directory, listing over 4,000 local businesses. As of next year the directory will be produced live on Council's website. A green business section could be incorporated onto this website.

By promoting the services of local businesses involved in sustainability, Council will be raising the profile of local green businesses and means for residents to become sustainable.

To promote the Green Directory a voucher booklet could be produced offering discounts for energy efficient products and services from local businesses. This will not only promote and create business for local tradespeople, but also encourage energy efficiency improvements to homes or businesses in Banyule. A similar project was undertaken by Brisbane City Council.

'Efficient Brisbane' aimed to increase the use of energy and resource-efficient products and services by Brisbane residents.

Every household in Brisbane was sent an 'Efficient Brisbane' voucher booklet offering discounts, rebates and free offers on efficient products and services for 1 month.

The 'Efficient Brisbane' project was in partnership with the Australian Greenhouse Office, the State Government, ENERGEX and the Energy Development Association of Australia, and supported by Channel 7 and The Courier Mail.

See: www.brisbane.qld.gov.au

Project Target: Develop a Green Business section in future Banyule Business Directories

Green Business Directory			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
$6,000	Recouped by residents	N/a	Dependent on products purchased

Project costs estimated – possibly included in current Banyule Business Directory budget

17) Facility management training program

Leisure Facilities are the biggest energy consumers in Council. Day to day management makes a difference on the operational energy costs of the facilities. RMIT are currently investigating developing a Facilities Energy Management Program. The management program being developed for the MacLeod Netball complex could be adopted by other facilities in the Council.

Council also provides facilities for sporting clubs in the municipality, with each sporting club paying for their electricity and gas bills.

Clubs should therefore be motivated to make improvements to the energy efficiency of the pavilions, as they will see the immediate benefits in reduced energy bills.

Training could be provided to the clubs in conjunction with Council's own facility management training.

The Sustainable Energy Development Authority in NSW has organised a similar program called Club of the Future. Council's project could be administered in collaboration with the Sustainable Energy Authority or the Department of Sport and Recreation.

See also Department of Canadian Heritage and Sport Canada
http://www.greengold.on.ca/resources/pdf/Sport_Canada_Toolkit.pdf
www.energysmart.com.au/images/WESpdf/cluboffuture.pdf

Project Target: 20% reduction in ghg emissions for each sporting club

Facility Management Training Program			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
To be determined	Recouped by clubs	N/a	10 tonnes

Calculations based on 1999/00 consumption figures for 9 Pavilions and 20% reduction

C. *Transportation*

18) Assist the development and implementation of the Draft Municipal Transport Strategy 2002

Council is currently developing a draft Municipal Transport Strategy to guide the provision, use and development of transport facilities for the general community.

Transport demands in Banyule are forecast to grow in the future due to projected population growth to the north and east of the municipality; redevelopment of land within the municipality; new transport corridors creating additional travel and employment choices to the south of the municipality; and socio-demographic changes within the municipality.

The target of the Municipal Transport Strategy is to develop a more sustainable urban form by better integrating transport and landuse planning, reducing the need for private automobile transport and increasing the use of environmentally sustainable transport. The Strategy also provides the framework for Council to work towards a set of objectives and to facilitate better coordination between Council, State Government and transport providers.

Project Target: Assist the development and implementation of the Draft Municipal Transport Strategy 2002

19) Undertake a car free promotion

Residents in Banyule have a high reliance on private vehicles for transport. Most trips are not made for work, but are made for purposes such as shopping, social, personal or employer trips. On average journey to work trips constitute only 7.5% of all trips[29].

Motor vehicles are the major source of air pollutants and greenhouse gas emissions from the transport sector are the fastest growing of any sector in Australia. Council needs to be active in the promotion of alternative forms of transport.

In conjunction with the Victorian Transport Authority, Connex Trains and local bus companies, Bicycle Victoria and the Australian Greenhouse Office, a day or week of reduced car travel could be promoted with incentives and information offered by Council.

This could be organised to coincide with Bike to Work Day or Smogbusters Day.

Project Target: Organise annual car free promotional event

Car Free Promotion			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$5,000	None	N/a	N/a

GHG savings not calculated as inaccuracy of estimate for transport sector. Project costs to cover promotion, literature and incentives.

20) Assist development of Travel Smart Business Plans

All businesses are trip generators – ie every person who comes to the business has travelled by some means of transport. All forms of transport, with the exception of walking, riding, and skateboarding etc generate greenhouse gases.

Local businesses need to be assisted in the development of Travel Smart Plans and provided with resources such as maps showing local public transport, bike racks in shopping centres and promotion of the program.

Darebin City Council is currently piloting the Sustainable Energy Authority's Travel Smart Better Ways to Work program. The program assists organisations prepare an access plan, which maps alternative means to travel to work.

Project Target: 20 businesses per year to prepare travel smart plans

[29] Banyule Draft Transport Strategy Background and Issues Paper 2001

Travel Smart Business Plans			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes year
$1,000/year	None	N/a	Determined by level of participation from business

Project costs to cover administration, promotion and training costs

21) Improve cycling facilities

Council's Draft Municipal Transport Strategy 2002 aims to provide a safe network of bicycle routes which encourage cycling as an alternative to other forms of road transport and as a recreational pursuit.

In 1996 Council adopted a Municipal Bicycle Strategy to set the framework for cycling facilities and programs in Banyule.

Council has recently reviewed the Principle Bicycle Network within the municipality and a revised bicycle network has been submitted to VicRoads for approval.

Council's Draft Municipal Transport Strategy 2002 aims to:

- Provide a safe, continuous, direct and convenient network of bicycle routes and related infrastructure, which encourage cycling as an alternative to other forms of road transport
- Improve bicycle access to all key destinations and activity centres
- Raise the awareness and expertise of all transport and service providers to cycling issues

Such aims are consistent with the Melbourne Transport Forum's Creating Choices: the transport web document that places an emphasis on sustainable transport options that move away from car dependence.

Project Target: Improvement of cycling facilities in Council through implementation of the Draft Municipal Transport Strategy 2002

D. Waste

22) Waste Minimisation

Council has developed a Waste and Litter Minimisation and Management Strategy 2000-2004 to assist Council in achieving the statewide goal of a 60% reduction of waste to landfill by 2010. Currently Banyule is the leader in waste minimisation and recycling in Victoria, with approximately 47% of all residential waste being diverted from landfill[30].

Council is currently carrying out a best value review of its waste collection service. The waste to landfill reduction target is being revised according to the Northern Region Waste Management Target of 80% of kerbside waste diverted from landfill by 2008.

Achieving this 80% reduction will result in a reduction of 7,333 tonnes of CO_2-e by 2010.

Please refer to the Waste and Litter Minimisation and Management Strategy 2000 - 2004 for actions to reduce waste generated from Banyule's community

Project Target: 80% reduction in waste going to landfill by 2008

[30] Banyule City Council 2000 'Waste and Litter Minimisation and Management Strategy'

E. Future Initiatives

23) Mandatory installation of rainwater tanks in new buildings and major renovations

Growing water use and shortening water supplies will become a major issue for Australia in the future. Councils, through planning regulations, can mandate the installation of rainwater tanks into new buildings/extensions. Rainwater tanks provide on-site detention of water, reduce stormwater flows and lower household dependence on supplied water, reducing costs to the Council, consumer and utility.

As shown in figure 9, nearly half of all water consumption in a household uses clean drinking water for a purpose where it doesn't need to be potable[31]. An average Melbourne household uses about 260,000 litres of water per year, or 700 litres per day. This could be reduced by using harvested rainwater for uses such as toilet flushing or garden irrigation, where the water does not need to be potable.

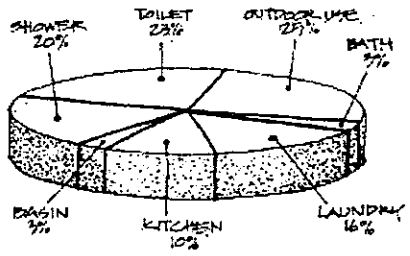


Figure 9: Residential Water Consumption (Sydney)

Oaklands Park is a pioneering community in Melbourne responding to the issue of increasing water shortages. Comprising 80 allotments, drinking water is derived from rainwater tanks with a minimum 70,000 litre capacity. Non-potable water is supplied under mains pressure through a reticulated system from 5 lakes on the site. Additional non-potable garden water is collected from resident's individual wastewater treatment plants, which have been installed in preference to traditional septic systems. Residents don't pay water and sewage rates, which eventually offsets the $12,000 spent on water tanks and treatment systems[32].

See www.oaklands-park.com.au

24) Mandatory installation of Solar Water Heaters in new buildings/major renovations.

Water heating accounts for around one quarter of an average household's energy costs. Solar water heating can provide more than 60% of a household's hot water needs.

Leichhardt City Council in 1994 mandated the installation of solar or heat pump water heaters in all new residential developments and some major renovations. This measure has seen over 900 solar and heat pump water heaters installed with an estimated 3,040 tonnes of CO_2-e saved.

The extra cost of solar water heaters can be off set with the current $1,500 rebate offered by the Victorian Government.

This measure would be achieved through an amendment to the Banyule Planning Scheme and should include multi-level residential developments as well as single dwellings.

See: www.mycommunity.com.au/leichhardt/

[31] BDP Nov 1996. Environment Design Guide 'An Introduction to Water Sensitive Design' DES 13.
[32] McGuinness, Jan 'Oakland Park takes water conservation several steps further' The Age 6 Jan 2002

25) Mandatory installation of AAA rated shower roses in all new buildings/renovations

An inefficient shower rose can use 20-30 litres of water per minute, whilst an efficient shower rose will only use 9 litres every minute[33]. Also AAA rated showerheads use less hot water, reducing water heating requirements saving money and energy.

Council should trial and suggest appropriate brands for installation. This information may be available from other Council's that have run similar schemes, Sustainable Energy Authority or consumer groups.

Currently the AAA rating system for plumbing fixtures is being reviewed. These findings should be taken into account in this project.

Marrickville Council in Sydney has introduced an 'Energy Smart Water Wise' program through its Development Control Plan No 32 (DCP32). The DCP introduces controls and design guidelines for most new building works, ranging from home renovations to larger residential, commercial, retail and industrial developments. The water wise component of the DCP requires that for most new building works, bathroom/kitchen taps, shower heads and toilet cisterns must be AAA rated[34]. Also water efficient landscaping must now be included in landscaping plans.

[33] Your Home Technical Manual www.yourhome.gov.au

[34] BDP Nov 2001. Environment Design Guide ' Sustainable Urban Water Use' GEN 41

11 CORPORATE ACTIONS

A. Buildings

1) Prepare and implement a Green Purchasing Policy

Council's purchasing decisions influence energy consumption, waste production, water use, heat loads, indoor air quality and noise levels in the office.

Council's purchasing power extends the effect of purchasing decisions beyond Council to suppliers and manufacturers.

Benefits of a Green Purchasing Policy

- Through careful product selection Council can achieve reduced energy consumption and waste creation
- Greater demand for green products opens up the market
- Shows leadership by Council
- Improved indoor air quality and working conditions for staff

Council will need to work with other organisations like the Buy Recycled Alliance and other Council's that have adopted a green purchasing policy to ease the difficulties in sourcing appropriate products.

Council should be able to receive assistance from RMIT in developing a system for product selection.

Formal adoption of this policy by Council will add further weight for enforcement.

Project Target: Formal adoption of Councils Green Purchasing Policy early 2002

Green Purchasing Policy			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
None	Dependent on products purchased	N/a	Dependent on products purchased

2) Undertake Energy Auditing of Municipal Buildings

Energy audits should be undertaken on municipal buildings to identify opportunities for energy savings. The audits should cover internal and external lighting, HVAC, insulation, office layout and use, window protection and office equipment.

Previously the Sustainable Energy Authority has been able to offer financial assistance for audits to be undertaken.

There are 3 levels of audits.

- Level 1 – desktop audit of energy consumption
- Level 2 – This level of audit requires a brief inspection of the site by the auditor, and includes an analysis of historical billing data- $3,000
- Level 3 - This level of audit requires a detailed inspection and analysis of the site by the auditor, including energy demand monitoring and logging, and an analysis of historical billing data. $6,000 - $8,000

Council has already had level 2 audits completed on the Ivanhoe Aquatic Centre and The Centre Ivanhoe. Level 2 audits are currently in progress for the Rosanna Office, Olympic Leisure Centre, Bundoora Hall, Meals Kitchen and Operations Depot.

Project target: Level 2 audits on 2 Council buildings per year

Energy Audits			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$6,000	Determined from audit findings	Determined from audit findings	Determined from audit findings

Project costs estimated at $3,000/audit

3) Implement Audit findings

It is essential to implement the findings obtained from the energy audits to realise the suggested energy and monetary savings. The audit findings should be implemented in the following financial year from which the audits were completed

In 2001/02 level 2 audits were undertaken on:

- Olympic Leisure Centre
- Rosanna Municipal Offices
- Banyule Meals Kitchen
- Operations Depot
- Bundoora Hall

Project Target: Implement audit findings from the previous year (see Project 2 above)

Energy Audits			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$65,440	$28,741	2.2 years	255 tonnes

Project costs and savings taken from audit reports

4) Council's Commercial Buildings rated under the Australian Building Greenhouse Rating Scheme

Developed by the NSW Sustainable Energy Development Authority and endorsed by the Property Council of Australia, the Australian Building Greenhouse Rating benchmarks a building's greenhouse impact on a scale of 1 to 5.

By participating in such a program and obtaining an official rating Council can publicly commit to improving the star rating on each of the buildings until a 5 star rating is achieved. This provides a measurable and achievable objective for staff and tenants to work towards and a recognisable scale the public can relate to for Council's greenhouse performance.

Council currently owns 5 commercial office buildings, 3 of which are operated as Council's Service Centres.

See www.abgr.com.au

Project target: Obtain an official rating on the Australian Building Greenhouse Rating for each of Council's 5 Commercial Office Buildings and aim to improve this rating to 5 stars.

5) Purchase Green Power

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 the most environmentally friendly renewable energy available from energy suppliers.
- It provides a high profile commitment to improving the environment
- It will help position Council as a leading corporate citizen
- 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 if desired.

For franchise customers, who cannot yet choose their energy supplier, the premium is usually around 2c per kWh. Contestable customers, that can choose their energy supplier, may be able to negotiate a better rate with their supplier.

Project target: 1 major building electricity account to be converted to 100% Green Power per year

Green Power			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$5,700	None	N/a	310 tonnes

Calculation based on Rosanna Office 2000/01 consumption figures. Electricity price estimated at 14c/kwh, and Green Power at 2c/kwh extra

6) Increase Staff Energy Awareness

Behavioural impacts on energy consumption can be significant – lights and equipment left on after hours and unnecessary printing creating waste.

Staff training raises awareness of energy issues and enables staff to become involved in reducing the amount of energy they consume at work. Greater awareness creates a sense of ownership and responsibility for Council's Greenhouse Action Strategy encouraging participation and interest in the program.

Staff training also has the added bonus that staff can take home the principles from work and implement them at home, saving themselves money and energy.

It is anticipated that energy training will be incorporated into proposed broader sustainability training for all staff to participate in.

The staff training program could also include energy awards recognising innovation and action towards reducing energy consumption at work.

Staff will be kept up to date with the progress of the Greenhouse Action Strategy through the Birdseye View.

Project Target: Increased awareness of staff and changed attitude towards sustainable work practices

Staff Energy Training			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
Incorporated into other corporate training budgets	None	N/a	N/a

Due to the difficulty of calculating $ and ghg savings from education programs these have not been included for this action

7) Install Energy Star Office Equipment

Using energy efficient office equipment can reduce energy consumption of individual equipment by more than half.

An Energy Star enabled computer will automatically switch itself into a power-saving 'sleep' mode after a specified amount of idle time. A desktop computer used 8 hours a day generates over 600kg of greenhouse gases each year[35].

Council currently operates 361 PCs. This number is expected to reach 400 by 2006. Under the current *'End User Computing Policy and Guidelines August 2001'* there is not a policy for activation of 'sleep' mode on PCs and there is currently no information regarding the number of staff who activate the 'sleep' mode on their PC.

If Council is to pursue voluntary activation of 'sleep' mode on PCs an amendment must be made to the *'End User Computing Policy and Guidelines'*

Please note that the suggested savings below require total participation, from all staff in enabling the shut down mode on their PCs.

Activation of timers or sleep mode on all printers and photocopiers should also be investigated.

There will be no project costs involved if all PCs are Energy Star compliant and have the sleep mode function.

See: www.energystar.gov.au

Project Target: enable shut down mode on Council's 361 computers

Energy Star Office Equipment			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
0	$15,683	N/a	112 tonnes

Figures calculated on Energy Star website calculator www.energystar.gov.au.

8) Energy Management Option Software

An energy consumption software program has been developed by Fujitsu Australia Software Technology reducing energy consumption of personal computers, providing a reduction in electricity use and greenhouse gas emissions.

This software differs from Energy Star software in that it is a networked system approach and computers are programmed to shut down after a specified time of inactivity. The EMO saves any files currently open and calculates the energy dollars saved and greenhouse gas reduction.

This action would be chosen over and above enabling Energy Star software as in the previous action.

[35] National Appliance and Equipment Energy Efficiency Committee 'Energy Star Office Equipment' www.energystar.gov.au

See http://www.fastware.com.au/emo.html

Project Target: Implementation of Energy Management Option Software

Energy Management Option Software			
Project Cost/ 5 years	Savings $/year	Payback period	GHG emissions savings tonnes/year
$10,000	$6,000	1.6yrs	76 tonnes

Costs supplied by Energy Management Solutions for a 5 year licence on software.

9) Installation of Photovoltaics on the Centre Ivanhoe

The Centre Ivanhoe/Municipal Offices is a high profile building in the municipality. The building is lit at night to highlight the distinctive art deco architecture.

As the building is high profile installing PV is a great opportunity to raise the profile of this renewable energy technology and demonstrate Council's commitment to greenhouse gas reduction.

Pt Philip Council have installed 12 120watt solar panels on the St Kilda Town Hall as part of their CCP™ program. Burnside City Council in Adelaide as part of their library redevelopment installed 7 kW of PV to supply one third of the building's electricity needs, saving 21 tonnes of ghg/year.

Darebin City Council are also trialing photovoltaics on their Reservoir Civic Centre Green Project.

'As an investment in the future and a statement supporting the environmental features of the building, the RCC will have a solar panel clad wall and roof structure on the North and North West sides. This is expected to produce approximately 40kWh of electricity a day. On current estimates it will provide over 20% of the building's energy needs.[36]'

The Australian Greenhouse Office currently offers a rebate for the installation of PV to community groups/local governments.

Project target: Installation of PV on Centre Ivanhoe to raise awareness of renewable energy

PV on the Centre Ivanhoe			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
Costs to be determined. PV on Burnside Library cost $100,000	To be determined by size of PV array and amount of electricity generated	Affected by price of electricity bought back by utilities and amount of energy saved	To be determined

10) Install solar water heating at Council Service Centres

Solar water heating can save more than 60% on hot water energy requirements. Installing solar water heaters at the 3 service centres would be an ideal demonstration project for the community.

Project Target: Installation of solar water heating at the 3 Council service centres

[36] City of Darebin 2001 'Reservoir Civic Centre RCC Green Project'

Solar Water Heating installed at Council Service Centres			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
$16,200	$6,750	2.4 years	63 tonnes

Calculations based on estimated project costs and savings for installation of solar water heating at the Rosanna Service Centre as suggested in the energy audit report prepared by Lincolne Scott March 2002. This figure has then been multiplied by 3 to cover the 3 service centres.

11) Power Factor Correction

Power Factor is the ratio of true power (or watts) compared to apparent power (or volt amps). With low power factor loads the current flowing through electrical system components is higher than necessary to do the required work, leading to an inefficient use of electricity. Currently in Victoria there is no charge for inefficient power factor. As poor power factor is penalised in NSW, Newcastle City Council installed Power Factor Correction equipment on their City Hall, leading to annual savings of $7,000 and a payback period of 2.7 years.

Council should investigate installing Power Factor Correction equipment on key Council Buildings.

12) Prepare and implement a Capital Works Green Guide

Adopting a Capital Works Green Guide will ensure future buildings and redevelopments will be designed on sustainable design principles, minimising energy operating costs, impacts during construction and waste creation during construction, operation and deconstruction.

Council is currently in an arrangement with RMIT's Centre for Design to receive ecologically sustainable design advice for 5 new building works. This will result in buildings that have lower energy consumption, waste creation and water use not only during the operating life of the building but also during its construction and deconstruction.

Currently the Centre for Design is developing a new building works guide suitable for local government. This should be available early next year.

Through the arrangement with RMIT, Council should be available to receive assistance in developing a capital works guide suitable for Banyule.

Project Target: Adoption by Council of a Capital Works Green Guide in 2002

Capital Works Green Guide			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
None	Dependent on future new building works	N/a	New works will actually result in an increase in CO_2-e emissions

13) Energy efficiency maintenance program

Regular maintenance and cleaning of electrical appliances/lighting increases the efficiencies of products.

Council needs to adopt a list of products suitable for replacement to ensure energy efficient products are used in routine maintenance checks and replacements. RMIT can offer assistance in producing a list of suitable products.

Project Target: Development of a scheduled maintenance product list

B. *Streetlighting*

14) Purchase Green Power for Public Lighting

Contestability and contract negotiations for public lighting offers an opportunity for Council to negotiate a percentage of electricity used for public lighting to be generated from renewable sources.

Greater Dandenong Council has purchased 100% Green Power for street lighting in their municipality. This amounted to 5,000MWh or the equivalent of reducing their corporate greenhouse emissions by 7,300 tonnes. Banyule's streetlighting in 2000/01 used approximately 4,000MWh of electricity.

Developing a Green Power target of purchasing an additional 500MWh of Green Power each year for public lighting would lead to annual reductions of 460 tonnes of CO_2-e.

Project Target: 500Mwh of Green Power purchased annually for streetlighting

Green Powered Public Lighting			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$10,000	None	N/a	705 tonnes

Calculations based on green power costing additional 2c/kw and electricity 14c/kw and 1.41kg CO_2-e per 1kwh

15) Undertake a Streetlighting retrofit

Streetlighting is the largest consumer of electricity in the Council and for that reason emits the most CO_2-e.

Council's streetlighting is either solely owned by Council as in building security lighting, or the property of the distribution company. Streetlighting is either solely paid for by Council or divided between Council and Vic Roads.

Improving the efficiency of streetlighting should come under the responsibility of the distribution company. It is up to Council however to lobby for this improvement or require it in contract negotiations.

Currently Council's streetlighting includes 4,000 mercury vapour lamps, which are the most inefficient lamp type. A progressive retrofit program should be initiated to improve the energy efficiency and light output of Banyule's streetlighting. This retrofit program must consider light pollution.

Wastage of streetlighting and commercial outdoor lighting in the US has been estimated at around 30%. The percentages are probably much the same for Australia[37]. Eliminating this wastage in Council's

[37] BDP Feb 1999. Environment Design Guide 'Light pollution' Gen 24

streetlighting would amount to savings of approximately $330,000 for Council (30% of Council's 1999/00 streetlighting costs for Council).

Project Target: Progressive retrofit of Council's 4,000 Mercury Vapour Lamps

Street Lighting Retrofit			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
Cost determined with AGL & TXU		To be determined	To be determined

16) Undertake a Dio Light Trial

Dio lights are a new lighting technology being piloted by Port Phillip Council. Dio lights reduce electricity consumption by 80%, reduce visual pollution by providing direct light and are virtually maintenance free. See www.myshowers.com

Banyule City Council needs to establish a trial dio-light project to ascertain the suitability of these lights for street and public lighting in Banyule.

The city of Port Phillip achieved an annual saving of $36,000 by retrofitting 290 existing lights with the Dio light.

See www.portphillip.vic.gov.au/diolighting.html

Project Target: Trial Dio Lights in a carpark development

Dio Light Trial			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
To be determined by design of trial project			

17) Develop a light pollution reduction goal and management plan

Council needs to strategically address the problem of light pollution. Not only does it indicate inefficient lighting design and there fore inefficient use of energy, light pollution creates environmental impacts for nocturnal animals and disturbs night viewing of the stars.

Melbourne City Council has developed a light pollution strategy.

Project Target: Develop a light pollution management plan for Banyule

C. Council Fleet

18) Purchase Green Fleet Membership

Council's fleet currently comprises approximately 133 light vehicles.

Green Fleet membership costs $30 per vehicle. In return Greenfleet plants and cares for at least seventeen trees on the member's behalf.

According to information supplied by Ford regarding the carbon sink potential of trees, 17 trees planted will absorb 4.33 tonnes of CO_2-e during their lifetime[38]. This information was supplied to Ford by Greenfleet.

Green Fleet Membership could contribute to Council's carbon sink program.

The City of Melbourne (132 cars), City of Pt Philip (145 cars) and Frankston City Council (160 cars) have all subscribed to GreenFleet as part of their fleet emissions reduction program.

The benefits of subscribing to GreenFleet rather than Council undertaking it's own planting program is that administrative and maintenance costs and time are borne by Greenfleet.

See www.greenfleet.com.au

Project Target: 50 cars per year subscribed to GreenFleet

Green Fleet Membership			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$1,500	None	N/a	73 tonnes

Calculations Based on 17 trees absorbing 4.33 tonnes of CO_2-e during their lifetime

A. Principles of Greenfleet

Greenfleet undertakes environmental plantings, where the original species are planted, and will remain in the ground over their natural life.

Greenfleet plants indigenous local species and endeavors to use seed collected from the particular area where planting.

Greenfleet uses local knowledge and expertise to advise on species identification, soil preparation and optimum times for planting to create the best possible chance of survival for the trees.

Greenfleet supports the local community where its planting by contracting local nurseries for the supply of plants and uses the local labor force to assist with planting the trees.

Greenfleet applies its motorists subscriptions to the supply of trees and planting portion of its projects, and partners with other organisations and individual landholders to support with preparation and ongoing maintenance of those trees.

[38] Ford Australia LPG Factsheet

19) Initiate a Council Travel Smart Program

Council's passenger vehicle fleet (6 cylinder utes, cars, 4WDs and 4 cylinder cars) in 1996/97 accounted for approximately 330,000 litres of petrol and diesel.

There is a high reliance of cars for transport in the Council especially as there are 5 separate administration centres.

The total number of kilometres travelled by the passenger vehicles could be reduced by implementing actions such as

- Car pooling to meetings – organised via Outlook
- Use of the train to meetings – the 3 service centres are located on the Hurstbridge Train Line. A supply of MetCards could be made available to staff for public transport.
- Staff training – to increase efficiency of driving
- Car free days – to promote the use of public transport and car pooling
- Tele-conferencing

Improving the cycling facilities offered at the service centres will be an essential element of this action. Cycling is an immediate and simple means of reducing the impact greenhouse impact of cars. By providing secure and protected bike parking facilities at the 5 administration centres, Council will be encouraging and facilitating the use of bicycles by staff.

Darebin City Council, through it's Travel Smart program, is offering interest free loans to staff for the purchase of bicycles and providing an additional 2 days leave for staff who cycle or walk to work regularly[39].

Project target: 5% reduction in number of kilometres travelled by Council Fleet by 2004.

Council Travel Smart Program			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings/year tonnes/year
$5,000	$3,075	1.6 years	7.8 tonnes

Calculations based on 5% of eCO_2 emitted and 5% of fuel used in the light 6-cylinder vehicle class of the Council Fleet in 1999/00. Prices based on 2001 average of 89c/litre. Project costs to cover training, promotion, incentive and building costs

20) Optimising the Council Fleet

The majority of Council's passenger fleet vehicles are 6 cylinder vehicles.

The environmental impact of these vehicles could be minimised by:

- Simply downsizing these vehicles to 4 cylinder cars which will save on fuel consumption and greenhouse gases emitted.

- Alternatively a fuel consumption benchmark could be established for purchasing new cars eg consumption must be no more than 8.5 litres/100km on city driving.

An appropriate match needs to be made between smaller fuel efficient vehicles and the type of travel/jobs they are used for, mindful that smaller cars are not Australian made and are not of as high a safety standard.

[39] Sustainable Energy Authority 'Travel Smart News' Issue 1 Dec 2001.

Project target: purchase the highest efficient vehicle in the smallest class of vehicle, which will fulfill the necessary tasks (eg downsizing 10 vehicles to 4 cylinder vehicles per year where appropriate)

Optimising the Council Fleet			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
Smaller cars should be less expensive	$4,500 (fuel only)	N/a	18 tonnes

Calculations based on 10 Ford Falcon (fuel economy 11.5l/100km) downsized to Ford Laser (9.5l/100km)[40]. $ Savings based on $0.90/l petrol.

21) Investigate higher standards for new fleet vehicles

The Australian Government's Tax Package Agreement with the Australian Democrats included a broad range of environmental initiatives under the heading Measures for a Better Environment. One of the measures in the MBE included the introduction of a package of stringent new-vehicle emissions standards for petrol and diesel vehicles to take effect from 2002[41].

These new standards are based on European standards commonly referred to as Euro 2, 3 and 4.

These standards reduce levels of CO, HC, NOx and evaporatives from vehicle exhaust emissions. Whilst these are not greenhouse gases themselves, they do influence chemical cycles in the atmosphere that create or destroy other greenhouse gases. Euro 4 produces the lowest emission levels. It is recommended that Council purchase vehicles that already meet Euro 4 standards as this requirement will have to be met by 2005 for petrol vehicles and 2006 for diesel vehicles. Council would be showing leadership and reducing vehicle emission with this forward thinking approach to fleet management.

This is especially pertinent in the purchase of Council's new diesel powered garbage truck fleet To ensure the lowest engine and tailpipe emissions, Euro 4 compliant trucks should be purchased.

Iveco are already producing trucks that are compliant with Euro4 (ADR80). See www.iveco.com.au

See http://www.dotrs.gov.au/land/Environment/vehicle-emissions-adrs.htm

Project Target: Adoption of the highest new vehicle standards for basis of purchasing new vehicles

22) Fuel Conversion to LPG for Council Utes

Council undertook an alternative fuel trial involving 6 dedicated LPG vehicles.

Based on the success of the trial, 26 dedicated LPG vehicles are now in the fleet.

LPG is a mix of hydrocarbons, predominantly propane and butane, which enter a liquid state when compressed. The use of LPG instead of petrol offers the potential to reduce greenhouse gas emissions from passenger vehicles by 13 –15%[42].

LPG is also cheaper than petrol, offering financial incentive to convert the fleet to LPG.

[40] Australian Greenhouse Office 2001. Fuel Consumption Guide

[41] Department of Transport and Regional Services 2001'Land Transport – Vehicle Emission Australian Design Rules (ADRs)' www.dotrs.gov.au

[42] CCP Factsheet. 'Reducing the emissions from the Council Fleet'.

In 1999/00 Council's fleet included 24 light 6-cylinder commercial vehicles, which consumed 71,168 litres of petrol in 1999/00.

A gradual conversion program could be introduced with this whole sector LPG compliant by 2005.

Project Target: 10 6-cylinder commercial vehicles converted to LPG per year

LPG Fleet Conversion			
Project Cost/year	Savings $/year	Payback period	GHG emissions savings tonnes/year
$7,980	$23,555 (fuel only)	0.3 years	53 tonnes

Calculations based on 10 commercial 6-cylinder vehicles using 29,653l/petrol in1999/00 (Council figures) and 10 vehicles using on average 9,195l/LPG per year(GreenFleet). LPG ghg conversion rates from GreenFleet. RRP of $798 for LPG and average fuel costs for Melbourne LPG (48.9c) unleaded petrol (94.6c) taken from Ford LPG factsheet.

23) Trial New Fuels for the Council Fleet

The type and quality of fuel chosen for the Council fleet makes a huge impact on the level of vehicle emissions.

The quality of the fuel primarily effects engine performance. With CO_2-e emissions being directly proportional to the rate of fuel consumption it is essential that a high-grade fuel that improves engine performance be chosen for the fleet.

Secondly the level of tailpipe emissions are effected by fuel quality. A fuel with a high sulphur content increases the particle emissions of both petrol and diesel and leads to engine wear. Sulphur also restricts the efficiency of exhaust emission control technologies, increasing the level of tailpipe emissions.

Council currently sources its fuel supply from Shell. Shell has premium diesel and petrol fuels available with lower than Australian standard sulphur contents. By choosing these fuels Council will be demonstrating its commitment to sustainability, improving the performance of its vehicles and reducing levels of exhaust emissions.

Shell is also currently trialing a bio-diesel product. A-55 contains 15% water and 2% emulsifier, which results in a cleaner, more complete burn. As A-55 uses less diesel than normal, tailpipe emissions are reduced.

BP Ultimate is a new fuel choice offered by BP. Everytime BP Ultimate is purchased, BP will invest a percentage of the purchase price in independently verified greenhouse gas reduction projects. BP Ultimate is a premium quality fuel and currently around 6 cents above the price of other unleaded petrol. Similar to Green Power, Council could investigate purchasing BP Ultimate to offset the greenhouse effects of Council's fleet.

See www.bp.com.au/globalchoice
See www.shell.com.au

Project Target: Trial of premium and alternative fuels for vehicle Fleet

Trial New Fuels			
Project Cost /year	Savings $/year	Payback period	GHG emissions savings tonnes/year
To be determined	Reliant on improved vehicle performance, less maintenance, reduced fuel consumption	N/a	Reliant on improved vehicle performance, less maintenance, reduced fuel consumption

Calculations based on fuel prices 21/1/02 Shell Premium 78.5c/litre, Shell Optimax 86.5c/litre. Using 1999/00 Light 6 cylinder vehicle figures (207,319litres in 1999/00

D. Waste

24) Food Waste Collection

Council currently recycles waste paper in the 5 administration centres. However there is no form of food waste collection from staff.

A bin audit in Council's offices needs to be undertaken to determine the volume of food waste being produced each week from staff. The viability of introducing food waste collection into the office could then be assessed. This food waste could be disposed of in worm farms.

According to Banyule's energy inventory for the CCP™ program in 1999/00 office waste weighed approximately 311 tonnes, of which 129.5 tonnes is food debris (figures based on Beverage Industry Environment Council's National Recycling and Garbage Bin Audit Analysis 1997). Undertaking a food waste program could reduce the amount of food debris by 50% by 2010.

Staff education will play a vital role in the success of this program.

A food waste trial will be occurring in the Operations Depot late 2002.

Project Target: 50% reduction in office food waste by 2010

Food Waste Collection			
Project Cost	Savings $/year	Payback period	GHG emissions savings tonnes/year
Project costs referred to waste mgt program	None	N/a	7.5 tonnes

E. Water

25) Undertake a Water Audit in Service Centres

Water conservation is an integral part of an energy conservation program, and essential to Council's commitment to sustainability.

An audit of plumbing fixtures and equipment needs to be undertaken in the 3 service centres to determine opportunities for water savings.

Inefficient water use can lead to energy wastage when that water is being heated.

Project Target: Water audit of 3 Service Centres

Water Audit in Service Centres			
Project Cost	Savings $/year	Payback period	GHG emissions savings Tonnes/year
$6,000	Determined by audit results	Determined by audit results	Determined by audit results

Project costs estimated and based on $2,000/audit

26) Implement Water Audit Findings

To realise the savings suggested in the water audit findings it is essential to budget for the works required.

Increasing the efficiency of water fixtures will lead to savings in water consumption, and energy savings from a reduced volume of hot water required to be heated and more efficient techniques used to heat the water.

These works will have to be integrated into Council's building maintenance program.

Project target: Implement water audit findings

Implement water audit findings			
Project Cost	Savings $/year	Payback period	GHG emissions savings Tonnes/year
$10,000	Determined by audit results	Determined by audit results	Determined by audit results

Project costs estimated– for 3 service centres

F. Other

27) Develop a Carbon Sink Project

Maintenance and enhancement of Banyule's natural habitat and bushland is essential to protect the Yarra River wildlife corridor. As a result Council is already proactive in enhancing greenhouse sinks through planting programs, protection of natural bushland and education of landholders in sustainable land management.

According to the Australian Greenhouse Office plantings that meet the following criteria may be eligible as reforestation sinks:

- A forest of trees with a potential height of at least 2 metres and crown cover of at least 20%
- In patches greater than 1 hectare in area
- Established since 1 January 1990
- On land that was clear of forest as of 1 January 1990
- Established by direct human induced methods[43]

The rate at which trees take up carbon depends on the site and to a lesser extent the species that is planted.

Investigation needs to be undertaken on the eligibility of different projects for carbon credits. For example a combination of street trees, trees in parks and on private property could meet the definition of a forest.

If it is decided Banyule is unsuitable for a large scale carbon sink program then investigation could be undertaken on collaborating with a sister shire to provide the land for the project.

For further information on greenhouse sinks please refer to the AGOs *'Growing Trees as Greenhouse Sinks – an overview for local government'*

Project target: Investigate establishing an urban forest or a sister shire carbon sink program to offset greenhouse gas emissions in Banyule

[43] Australian Greenhouse Office 2001 'Growing Trees as Greenhouse Sinks – an overview for local government'

28) New Policies

These measures will not infer a direct cost to Council, but take time for development, consultation and implementation.

Each of these policies in their own right will result in energy savings, reduction in waste or greater sustainable practices for Council.

ENERGY AND WASTE WISE CONFERENCE AND CATERING GUIDELINES

Council undertakes many community events. If these events were organised on energy and waste wise guidelines it would save money for council in energy costs and waste collection but also send a message to the community about council's commitment to sustainability. Banyule's annual community festival has been a waste wise event since 2000.

GREEN TENDER POLICY

Stipulating environmental protection measures in tender documents will raise the level of environmental protection offered during construction and raise the standard required by contractors. See guidelines developed by Environs Australia www.environs.org.au/planning/guidelines.html. Council's partnership with RMIT could also assist the development of a green tender document.

GREEN LEASE AGREEMENT

Council leases a significant number of properties to independent parties. It therefore can stipulate energy improvements to be made to properties in lease agreements.
This document could also be used for Council's rental properties. When entering a property lease agreement Council should request certification of the energy performance of the building, and where practicable requires that any building it rents has a 5 star rating or equivalent.

REVOLVING ENERGY FUND

It is recommended that Council establish a revolving energy fund to reinvest savings generated from the Greenhouse Action Strategy into funding future greenhouse projects. The very nature of reduced energy use resulting in monetary savings would allow Council's GAS to become financially self sustainable.

29) Other policies and documents

Council already has in place many policies and strategies that will result in reduced greenhouse gas emissions for the Council and Community.

Part of the Cities for Climate Protection program will be to ensure the implementation of those documents that will have an effect on Council's emissions reduction goal.

Often these strategies list actions that could be included in Council's Greenhouse Action Strategy. Rather than repeat information in a separate document, reference has been made to these policies.

a. Municipal Transport Strategy – Draft 2001
b. Banyule's Waste Management Strategy 2000-2004
c. Banyule Environment Policy and Strategy 1997 – in particular sections 7, 8, 9, 10, 11, 12 and 13
d. State of the Environment Report 2001 – in particular sections 9, 10 and 11.

12 IMPLEMENTATION, MONITORING AND REVIEW

Banyule's Greenhouse Action Strategy is a dynamic document, taking into consideration changes in attitudes, technology, awareness and means for achieving greenhouse gas reduction. The strategy will be a reflection of Banyule City Council's growing knowledge and experience in greenhouse gas reduction.

Implementation of the Greenhouse Action Strategy will be undertaken by the Environment Working Party. The Environment Working Party meets monthly where the CCP officer will provide an update on progress of the strategy.

Review of the Greenhouse Action Plan will occur on an annual basis. A report will be provided on the progress of actions, their effectiveness and acceptance by staff and the community. This process will identify areas requiring additional action or successful means for achieving greenhouse gas reduction as well as accommodate for changes in priorities for achieving greenhouse gas reduction. This will be done in conjunction with the annual State of the Environment reporting process.

A comprehensive review of the Greenhouse Action Strategy will occur in 2005 to assess the relevance of the actions in view of new technologies, legislation, funding and National/State Government policy changes. Council's Emissions Reduction Goal will also be reviewed to assess whether the goals are still appropriate and achievable.

Ranking or weighting of actions in the Greenhouse Action Strategy will be based on:

1. Annual greenhouse savings for individual projects
2. Project cost
3. Payback period
4. Timescale of the project
5. Stakeholders
6. Other benefits (social/environmental)

Timing of implementation of the individual projects in the Greenhouse Action Strategy is strongly dependent on the availability of funds. The timing indicated is based on the development of a revolving energy fund with initial capital of $300,000 in the first and second years. This capital will be sourced from the savings in electricity costs that have arisen from contestability in the public lighting market.

Community Projects	Responsibility	Priority	Timing
A. Residential			
1. Development Guidelines for New Buildings	DCD, MDS, SPC	High	2002/03
2. Solar Water Heating Rebate	CCP, DCoS	High	2002/03
3. Community Grants	CCP, EO	High	2002/03
4. Banyule Environment Awards	CCP, EO	High	2002/03
5. Posters/Brochures to raise community awareness	CCP	High	2002/03
6. Energy Efficiency Week	CCP	High	2002/03
7. Bulk Purchasing Scheme	DCoS, PC, CCP	High	2002/03
8. Banyule Eco Street	CCP,WEC,EO,WCPO	Medium	2003/04
9. School education program	CCP	High	2002/03
10. Stakeholder program	CCP	Medium	2003/04
11. Dedicated Sustainability Displays	CCP	High	2002/03
12. Fridge/Freezer replacement	CCP	Medium	2003/04
B. Commercial/Industrial			
13. Bright Spark Business Program	CCP, SEAV, AGO, CED	High	2002/03
14. Bright Spark Business Case Studies	CCP, CED, CC	High	2002/03
15. Eco Industrial Parks	CCP, SEAV,AGO	Medium	2003/04
16. Green Business Directory	CCP,CED	High	2002/03
17. Facility Management Training Program	MLRC, MPB, CCP, SEAV	Medium	2003/04

C. Transportation

18.	Development of Draft Municipal Transport Strategy	TPO	High	2002/03
19.	Car Free Event	CCP, TPO, external orgs	High	2002/03
20.	Travel Smart Business Plans	CCP, CED,	High	2002/03
21.	Improve Cycling Facilities	As per Municipal Transport Strategy	High	2002/03

D. Waste

	Implementation of Waste Minimisation Strategy	MO	High	2002/03

Corporate Projects		Responsibility	Priority	Timing
A. Buildings				
1.	Green Purchasing Policy	DCoS, PC, EX	High	2002/03
2.	Energy Auditing of Municipal Buildings	MPB, CCP	High	2002/03
3.	Implement Audit Findings	MPB	High	2002/03
4.	Buildings rated under ABGR	CCP	High	2002/03
5.	Green Power	DCoS, PC, CCP, EX	High	2002/03
6.	Staff Training	CCP, EWG	High	2002/03
7.	Energy star equipment	DCoS, PC, CCP,EX	High	2002/03
8.	EMO Software	CCP, MIT	High	2002/03
9.	Photovoltaics on the Centre Ivanhoe	DCS, MPB	Low	2003/04
10.	Solar Water Heating at Service Centres	DCS, MPB	Medium	2003/04
11.	Power Factor Correction	MPB, DCS	Low	2004/05
12.	Capital Works Green Guide	MC,MO, MPB, CCP	High	2002/03
13.	Energy Efficiency Maintenance program	MPB, PC, CCP, BMSC	High	2002/03
B. Streetlighting				
14.	Green Powered Public Lighting	DCoS, ,DCD	High	2002/03
15.	Streetlighting Retrofit	DCS, AGL, TXU	High	2002/03
16.	Dio Light Trial	DCS, MPB	High	2002/03
17.	Light Pollution Mgt Plan	EO, CCP	Low	2004/05
C. Council Fleet				
18.	Green Fleet Membership	EX,CCP	High	2002/03
19.	Council Travel Smart Program	EX,MO	High	2002/03
20.	Optimising Council Fleet	EX,MO, FC	High	2002/03
21.	New Vehicle Standards	MO, FC	High	2002/03
22.	LPG conversion	EX, MO	High	2002/03
23.	Trial alternative fuels	MO, FC	Low	2003/04
D. Waste				
24.	Food Waste Collection	DCS,MO,MPB,EWG	Medium	2003/04
E. Water				
25.	Water audit in service centres	MPB	Medium	2003/04
26.	Implement water audit findings	MPB	Low	2004/05
F. Other				
27.	Carbon Sink Program	CCP, EO	Low	2004/05

Responsible Officers (as per SOER)

- AGO Australian Greenhouse Office
- BMSC Building Maintenance Services Co-ordinator
- CC Communications Officer
- CCP Cities for Climate Protection Officer
- CED Coordinator Economic Development (used to be EDP)
- DCD Director City Development
- DCoS Director Corporate Services
- DCS Director City Services
- EO Environment Officer
- EWG Environmental Working Group
- EX Executive
- FC Fleet Controller
- MC Manager Constructions
- MDS Manager Development Services
- MIT Manager Information Technology
- MLRC Manager Leisure Recreation and Culture
- MO Manager Operations
- MPB Manager Parks and Buildings
- PC Purchasing Controller
- SEAV Sustainable Energy Authority Victoria
- SPC Strategic Planning Coordinator
- TPO Transportation Project Officer
- WEC Waste Education Co-ordinator
- WCPO Wildlife Corridor Program Officer

13 FUNDING

External funding is available for projects related to greenhouse gas reduction.

A. Australian Greenhouse Office

Emissions Reduction Incentive Program (ERIP)

ERIP seeks to encourage councils to achieve a sustained reduction of greenhouse gas emissions through actions which are beyond core business. ERIP will only support projects that will result in abatement not expected to occur in the absence of ERIP funding. Priority is given to projects that deliver abatement exceeding 250 tonnes eCO_2-e per annum. To be eligible for ERIP councils must have attained Milestone 3 of CCP. ERIP provides 50% of the project funding. Details are yet to be published by the AGO on the second round of ERIP funding

Photovoltaic Rebate Program for Community Buildings

Cash rebates are available to owners of community use buildings who install grid-connected or stand-alone photovoltaic systems providing that the installation can be demonstrated to have educational and interpretative merit. The PV system must have a minimum size of 450-ppW. The rebates are paid at a rate of $5.00 per peak Watt, but generally are capped at $10,000 (2kW).

Alternative Fuels Conversion Program

The Alternative Fuels Conversion Program is a four year $75 million program designed to provide assistance to the operators of heavy commercial vehicles and buses, weighing 3.5 tonnes gross vehicle mass or more, to convert their vehicles to operate on either CNG or LPG, or to purchase new vehicles running on these fuels.

The AFCP provides funds of up to 50 per cent of either:

- the difference between the purchase price of new CNG or LPG fuelled vehicles over their conventionally fuelled equivalents;
- the cost of converting conventionally fuelled vehicles to operate on CNG or LPG; or
- the cost of upgrading the fuel systems of vehicles already operating on CNG or LPG where improvements in greenhouse and other emissions can be demonstrated

Household Greenhouse Action Grants

Through this grants program, the Australian Greenhouse Office has provided financial support to industry, governments and the community to form innovative partnerships to reduce greenhouse gas emissions from households.

The program funds initiatives to reduce greenhouse gas emissions in the areas of refrigeration, lighting, heating and cooling and hot water

B. Sustainable Energy Authority

SEAV Grants for Local Government Energy Management Projects

Grants are offered annually of up to $15,000 each to assist local governments implement projects to achieve energy savings and greenhouse gas reductions.

Solar Hot Water Rebate Program

Rebates of up to $1,500 are available for solar water heaters installed into community use facilities. The amount of rebate available is based on the performance of the system and the type of water heater that is being replaced.

14 PROJECT SUMMARY TABLES

Community Actions

Community Actions	*1996/97 eCO_2 emissions*	*Target 2010 eCO_2 emissions level*	*Project Description*	*Project Cost per year*	*GHG savings (tonnes) first year*	*GHG savings (tonnes) second year*	*GHG savings (tonnes) 2010*
RESIDENTIAL	**429,014**	**343,212**					
Development Guidelines			Encourage new buildings & renovations to meet 5 star rating	None	9,000	9,000	72,000
Solar Water Heating Rebate			50 installations/year	$5,000	150	150	1,200
Community Grants			New projects developed each year	$20,000	1,500	1,500	12,000
Banyule Environment Awards			Recognition of excellence in sustainability	$2,000	N/a	N/a	N/a
Community Awareness			Development of community education material	$10,000	Unable to quantify	Unable to quantify	Unable to quantify
Energy Efficiency Week			400 lightbulbs given away during the week and residential workshops	$2,500	225	225	1,800
Bulk Purchasing Scheme			300 tonnes eCO_2 saved/year	$5,000	300	300	2,400
Eco Street			Establish Eco Street	$5,000	N/a	N/a	N/a
School Education Program			Sponsor a series of seminars	$4,000	Unable to quantify	Unable to quantify	Unable to quantify
Stakeholder program			Encourage involvement of community stakeholders in GAS	N/a	N/a	N/a	N/a
Dedicated Sustainability display			Establish a sustainability display in customer service centres	$1,500	Unable to quantify	Unable to quantify	Unable to quantify
Fridge/Freezer replacement			Replacement old fridges with energy efficient models	To be decided	54	54	432
Residential Total				**$55,000**	**11,229**	**11,229**	**89,832**

COMMERCIAL INDUSTRIAL	**1,264,437**	**1,011,549**					
Bright Spark Business Program			100 business/year participating in project	$2,000	460	460	3,680
Bright Spark Business Case Study			5 businesses achieving 20% energy reduction	$1,000	23	0	23
Eco Industrial Parks			5% reduction in energy consumption for each of the parks by 2005. Increased to 20% by 2010	$3,000	3,360	3,360	161,314
Green Business Directory			Development of Green Business Directory and energy voucher booklet	$6,000	Unable to quantify	Unable to quantify	Unable to quantify
Facility Mgt Training			Energy management training for facility management	To be decided	To be determined	To be determined	To be determined
COMMERCIAL INDUSTRIAL TOTALS				**$12,000**	**3,843**	**3,820**	**165,017**
TRANSPORT	**329,021**	**263,216**					
Car Free Week			Organisation of annual car free week in Banyule	$5,000	Unable to quantify	Unable to quantify	Unable to quantify
Travel Smart Business Plans			Development of travel plans for local business	$1,000	To be determined	To be determined	To be determined
Improve Cycling Facilities			Implement Council's Municipal Transport Strategy	See Transport Strategy	To be determined	To be determined	To be determined
Transport Total				**$6,000**	**To be determined**	**To be determined**	**To be determine**
WASTE	**9,110**	**7,288**					
Implementation of Waste Management Strategy			80% reduction in waste to landfill by 2008.	See Waste Mgt Strategy	277	277	2,223
WASTE TOTAL				**N/a**	**916**	**916**	**7,333**
TOTAL	**2,031,585**	**1,625,268**		**$73,000**	**15,711**	**15,688**	**259,959**

The total greenhouse gas savings for the community sector do not take into account emission reductions from the transport sector, as they are difficult to quantify at this planning stage. The CCP forecast suggests CO_2-e emissions will total 2,548,294 tonnes by 2010 for the community sector. The Emissions Reduction Goal of 20% below 1996 levels sets the 2010 emissions target at 1,625,268 tonnes CO_2-e, which represents a 36% reduction from the 2010 forecast. Implementation of the Greenhouse Action Strategy will see a reduction of 259,959 tonnes of CO_2-e by 2010. This puts 2010 emission levels at 2,288,335 tonnes, 12% above 1996/97 levels. Monitoring of the projects once implemented will provide an accurate emissions reduction figure.

Corporate Actions

Corporate Actions	1996/97 eCO_2 emissions	Target 2010 eCO_2 emission levels	Project Description	Project Cost per year	$ Savings per year	Payback period	GHG savings (tonnes) first year	GHG savings (tonnes) 2010
BUILDINGS	**4,646**	**3,252**						
Green Purchasing Policy			Adoption of the Green Purchasing Policy by 2002	None	Dependent on products purchased	None	Dependent on products purchased	Dependent on products purchased
Energy Auditing of Municipal Buildings			Level 2 audits on 2 Council buildings/year	$6,000	None	None	None	None
Implement audit findings			Implement audit findings	$65,440	$28,741	2.2 years	255	2,040
Commercial buildings ABGR rating			Commercial buildings rated under ABGR scheme	To be determine	None	None	None	None
Green Power			1 major building electricity account converted to 100% Green Power/year	$5,700	None	None	310	2,480
Staff Training			Increase staff awareness	$1,000	Difficult to quantify	N/a	Not measurable	N/a
Energy star equipment			Enable Energy Star software on all computers	None	$15,205	N/a	108	108
Energy Management Option Software			Purchase EMO software	$10,000	$6,100	1.6 years	74	500
Photovoltaics on the			Installation of PV to supply electricity for illumination of	$100,000	$11,500	8.6 years	21	168

Centre Ivanhoe			buildings					
Solar Water Heating at service centres			Installation of solar water heating at the 3 service centres	$16,200	$6,750	2.4 yrs	63	504
Power Factor Correction			Installation of Power Factor Correction	To be determined	To be determined	N/a	To be determined	To be determined
Capital Works Green Guide			Adoption of Capital Works Green Guide	None	Dependent on future new building works	N/a	New works will actually result in an increase in eCO_2 emissions	N/a
Energy Efficiency Maintenance program			Establish an energy efficient maintenance program	To be determined	To be determined	N/a	To be determined	N/a
TOTAL BUILDINGS				**$204,340**	**$68,296**	**2.9 YRS**	**831**	**5,800**
STREETLIGHTING	**7,512**	**5,258**						
Green Powered Streetlights			500MW of Green Power purchased for Streetlighting/ year	$10,000	None	None	460	3,680
Streetlighting Retrofit			Progressive retrofit of 4000 mercury vapour lamps	Cost dependent on agreement with electricity distributors				
Dio Light Trial			Trial of Dio lights	To be determined		N/a	To be determined	N/a
Light Pollution Mgt Plan			Develop a light pollution management plan	To be determined		N/a	To be determined	N/a
TOTAL STREETLIGHTING				**$10,000**	**N/A**	**N/A**	**460**	**3,680**
COUNCIL FLEET	**2,257**	**1,579**						
Green Fleet Membership			50 Cars per year subscribed to Green Fleet	$1,500	None	N/a	73	584
Council Travel Smart Program			5% reduction in VKT by Council Fleet by 2010	$5,000	$3,075	1.6 yrs	7.8	62.4
Downsizing Council Fleet			10 6 cylinder vehicles year downsized to 4 cylinders	Smaller cars should be less expensive	$4,500	N/a	18	144

New standards for vehicles			Adopt highest standards when purchasing new vehicles			To be determined		
LPG conversion			10 6 cylinder commercial vehicles converted to LPG/year	$7,980	$23,555	1 years	53	424
Alternative Fuels			Trial alternative fuels			To be determined		
TOTAL COUNCIL FLEET				**$14,480**	**$31,130**	**8 months**	**151**	**1,214**
WASTE	**138.7**	**97.1**						
Food Waste Collection			50% reduction in staff food waste by 2010	$1,000	None	N/a	7.5	60
TOTAL WASTE				**$1,000**	**NONE**	**N/A**	**7.5**	**60**
WATER	**1.7**	**1.2**						
Water audit			Water audit of 3 service centres	$6,000	None	None	None	None
AAA Water Retrofit			Implement audit findings	$10,000		To be determined		
WATER TOTAL				**$16,000**		**TO BE DETERMINED**		
TOTAL	**14,556**	**10,189**		**$245,820**	**$99,426**	**2.4 YRS**	**1,449**	**10,754**

The CCP Forecast suggests a total of 20,591 tonnes of CO_2-e to be produced by 2010 from Council operations. Implementing all of the above actions will reduce CO_2-e emissions by 10,754 tonnes by 2010, putting 2010 emission levels at 9,837 tonnes CO_2-e. This represents a 32% reduction in CO_2-e levels from 1996 levels, which achieves Council's reduction target of 30% below 1996/97 levels.

HELP COUNCIL REDUCE GREENHOUSE GAS EMISSIONS

Victoria, per capita, is one of the highest greenhouse gas producers in the world. Saving energy though can be as simple as using cold water when washing your clothes, or choosing appliances with high energy efficiency ratings.

Heating

- Set your thermostat between 18-20°C for living areas. For every degree.you increase the thermostat setting, your bill can increase by up to 15%
- Run the heater fan on its highest setting for best efficiency and heat distribution. Fans cost only around 1 cent an hour to run

Cooling

- Cool bedroom and living areas to no less then 15°C. Each degree you lower the thermostat can increase running costs by up to 15%
- During hot weather run exhaust fans in kitchens and bathrooms to flush out hot air overnight

Driving

- Keep you car well tuned and tyres correctly inflated to improve the efficiency of your car
- Remove unnecessary weight such as tools or luggage from the car

Lighting

- Replace lights that are on for more than 4 hours a day with compact fluorescent light bulbs
- Regularly clean light fittings and lampshades to increase the light output

Renewable Energy

- Consider purchasing Green Power for your home's electricity use.

Appliances

- Regularly clean the coils behind your refrigerator and defrost at least every 6 months to ensure your fridge runs efficiently
- Don't leave appliances on standby – switch them off at the power point

Hot Water

- Consider installing a solar water heater to save up to 60% on your hot water bills. A point of sale rebate of up to $1,500 is available from the Sustainable Energy Authority for accredited systems.
- Fit AAA rated low flow shower heads to save water and energy

Information taken from 'So you want to become more Energy Smart' Sustainable Energy Authority 2000.

Banyule
CITY COUNCIL