Environment and Natural Resources Committee

# Inquiry into Sustainable Communities

June 2005

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# Inquiry into Sustainable Communities

## Report of the Environment and Natural Resources Committee on the Inquiry into Sustainable Communities

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# Committee Members

This Inquiry was conducted during the term of the 55th Parliament.

The Members of the 55th Parliament are:

Ms Jenny Lindell, MP (Chair)

Hon Andrea Coote, MLC (Deputy Chair)

Hon Damian Drum, MLC

Ms Joanne Duncan, MP

Hon Geoff Hilton, MLC

Hon Wendy Lovell, MLC

Mr George Seitz, MP

## Staff

For this Inquiry, the Committee was supported by a secretariat comprising:

| | |
|---|---|
| Executive Officer: | Dr Caroline Williams |
| Research Officer: | Mr David Fairbridge |
| Office Manager: | Ms Dene Elsegood<br>April 2004 – November 2004 |
| | Ms Vanessa Thomas<br>from December 2004 |

# The Environment and Natural Resources Committee

The Victorian Environment and Natural Resources Committee is constituted under the *Parliamentary Committees Act* 2003, as amended.

The Committee comprises of seven members of Parliament drawn from both houses and all parties.

Its functions under the Act are to inquire into, consider and report to the Parliament on any proposal, matter or thing concerned with -

a) the environment;

b) natural resources;

c) planning the use, development or protection of land.

## Committee Address


| | |
|---|---|
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# Terms of Reference

The Governor in Council, under section 33(1)(b) of the *Parliamentary Committees Act* 2003, approves the referral of an Inquiry into Sustainable Communities to the Environment and Natural Resources Committee of Parliament with the terms of reference:

To inquire into and report to Parliament on opportunities to promote changes in the way we use energy, water and other natural resources at the local community (not including industries) and household level to reduce environmental impact.

In particular, the Committee is requested to:

1. Examine what practical low cost initiatives State or Local Governments can encourage that will:

    - promote efficiency of water use and supply and use of energy;
    - reduce greenhouse gas emissions;
    - increase the rate of recycling;
    - foster renewable energy use; and
    - improve energy efficiency.

2. Identify the barriers to increasing the rate of participation by individuals and households in recycling and conserving water, energy and other resources, and improving energy efficiency.

3. Identify other low cost opportunities for communities to participate in promoting and encouraging environmental sustainability.

The Committee is to report to Parliament by 31 March 2005.

Dated 27 April 2004

Responsible Minister:

STEVE BRACKS
Premier

On 3 November 2004, the Governor in Council under section 33 of the *Parliamentary Committees Act* 2003, amended the reporting date to 31 May 2005, by Order in Council.

# Chair's Foreword

The choices people make, their behaviour and lifestyles all have a direct and indirect impact on the natural environment. This report focuses on the management of energy, waste and water by Victorian households. Significant progress has been made in managing household water and energy use and waste production. However such gains have been outweighed by increases in the sheer level of consumption.

This report contains 72 recommendations which the Committee believes can be readily implemented and will substantially strengthen sustainable consumption management and policy in Victoria. With regard to waste, the Committee has recommended that a Victorian integrated product policy be developed and that the *Towards Zero Waste* strategy contain specific targets for various waste fractions.

With reference to household water, the Committee has recommended that the ban on watering private lawns and the requirement for hoses used to clean vehicles be fitted with a high pressure cleaning unit, be reviewed. The Committee has recommended that the Victorian Government introduce a minimum efficiency standard for washing machines and that the pricing of household water be further investigated within the rising block tariff to promote water conservation. The Committee has also recommended that a system of mandatory disclosure of water efficiency on the sale or lease of residential property be created.

The Committee has recommended that the 5 star energy rating scheme for new houses should be extended to include, for example, major renovations. The Committee has also recommended that mandatory minimum environmental design standards be developed for State Government infrastructure projects, including schools. It has recommended that regulatory standards to ensure buildings are orientated to maximise energy efficiency be investigated. More informative electricity and water bills are advocated by the Committee. The Committee has also recommended that the State Government increase its purchase of Green Power to 25 per cent by 2010.

Finally witnesses emphasized the importance of State Government and Parliament demonstrating leadership on sustainable consumption issues. Accordingly the Committee has recommended that the Victorian Parliament develop an environmental management system, as a matter of priority.

I would like to thank those people who generously shared their ideas and expertise with the Committee. The Committee received 82 written submissions and evidence from 135 people. Several meetings were also held interstate and overseas on the reference.

I would like to thank my fellow Committee Members for their contribution to the Inquiry – Hon Andrea Coote (Deputy Chair); Hon Damian Drum; Ms Joanne Duncan; Hon Geoff Hilton; Hon Wendy Lovell and Mr George Seitz. Finally, on behalf of my colleagues I would also like to thank the secretariat staff for their hard work and support throughout the Inquiry – Caroline Williams, David Fairbridge, Vanessa Thomas and Dene Elsegood.

**Jenny Lindell, MP**

**Chair**

# Executive Summary

## Chapter 1: Inquiry in context

The Committee received the Sustainable Communities reference in April 2004. The terms of reference required the Committee to focus on household energy and water use and waste production. The reference is a timely one given the considerable attention that sustainable household consumption has received from the international environmental community, including the United Nations, Organisation for Economic Cooperation and Development (OECD) and the European Union. The environmental problems often unwittingly created by households through everyday activities, are relatively minor compared with industry, but combined the effect is significant.

The environmental impacts of households are not unique to Victoria. However, there are several defining features of household consumption in Victoria and Australia that highlight the extent of the challenge for policy makers and managers. The residential sector accounts for a quarter of stationary energy related greenhouse gas emissions. Electricity is produced in Victoria from brown coal which has a high greenhouse gas intensity. Australia is the second highest per capita OECD producer of municipal waste, after the United States. By 2030, Melbourne is projected to have an additional one million residents, and at current per capita usage rates of water, demand will exceed the capacity of the city's water supply.

Several key issues were raised by witnesses during the Inquiry. There is often a lack of integration within and between government and community programs designed to promote sustainable household consumption, as well as a lack of monitoring of outcomes. Consumers face multiple barriers to making sustainable choices, for example economic disincentives and regulatory barriers such as conflicting rules regarding the use of greywater.

The Committee was advised that European policymakers and consumers are more attuned to energy saving and renewable energy than in Australia, and that products and expertise which are readily available in Europe, are unavailable or expensive to access in Victoria. The 5 star energy rating for new homes in Victoria is a significant improvement on former standards, however the regulations could be further strengthened.

Cultural attitudes towards household water use need to be re-evaluated as well as infrastructure which is currently designed to dispose of water rather than conserve and recycle it. Water pricing was identified as an effective management measure when significant price increases were used in combination with the provision of information to consumers.

With regards to household waste, programs directed at waste prevention are limited in Australia and the National Packaging Covenant has not delivered sufficient gains in product stewardship and resource efficiency. The low

cost of landfill is a major barrier to the adoption of more sustainable methods of managing municipal waste.

## Chapter 2: An introduction to sustainable communities

Environmental sustainability is a difficult concept for people to understand and relate to their everyday lives. The Committee was advised that one of the key barriers to the adoption of more sustainable practices is the current poor understanding of sustainability principles and natural environmental cycles, not only by the general community, but also by building designers, housing developers and policy makers. Despite this, people understand that the environment may be deteriorating over a long time frame.

Sustainable consumption is the consumption of goods and services that meet basic needs and quality of life without jeopardising the needs of future generations. For individual consumers this means purchasing and using fewer resources and products; more eco-efficient products and services; and producing less waste.

Some witnesses emphasised the importance of utilising existing social networks to promote environmental sustainability rather than focussing on the individual consumer. Other witnesses argued that building relationships within communities was as important as achieving environmental outcomes. However, the Committee also received evidence that many people do not identify with any particular community, which has implications for policy and management.

People's attitudes towards and perceptions of energy, water and waste are often not reflected in their behaviour. For example, householders' support for energy conservation is not strongly linked to energy conservation actions. Effective management of sustainable household consumption requires an understanding of this gap between attitudes and behaviour. The Committee was also advised that most people do not necessarily regard energy, water or waste management as environmental issues but consider them part of everyday living.

Several methods have been developed to assist people to understand the impact of their behaviour on the environment and how to reduce that impact. One of the most popular methods is the ecological footprint - a measure of the land area required to sustain a particular population indefinitely. This measure is being used by the Environment Protection Authority as well as some local governments.

## Chapter 3: The environmental impact of households

The context of the environmental impact of households is discussed in the first section of this chapter. Industry is responsible for the largest proportion of energy and water consumption and waste production in Victoria. For example, municipal sources only account for 30 per cent of the waste stream in Victoria.

Household construction has an immediate environmental impact and also influences the occupation phase. However this chapter concentrates on the environmental impact of households in the occupation phase. Most of the energy consumed by the average Victorian household is for home heating, followed by hot water heating and refrigeration. The dataset on energy consumption in Victorian homes is dated, being over six years old. This was identified by the Committee as an important shortcoming. Seventy six per cent of personal trips in Melbourne are by car, accounting for a significant proportion of greenhouse gas emissions.

Domestic water consumption in Australia is about 30 per cent higher than the OECD average. Water used on gardens accounted for approximately 40 per cent of household water consumption in one Melbourne study. The Committee experienced difficulties in accessing consistent and current data on household water consumption by use.

Australia ranks second to the United States in terms of OECD waste production per capita. In Victoria, households recycle on average 28 per cent of their waste, in particular paper, plastics and glass. However, what is not recycled, including green waste, usually goes to landfill.

The trends in household energy and water use and waste production in Victoria reflect those of the OECD. Household energy consumption in Australia is steadily increasing as is the generation of household waste, while household water consumption has stabilised or declined.

Social, economic and demographic changes are driving household energy and water consumption and waste production in Victoria and other western countries. These include changes in social and demographic patterns, population increases, technological advances, increases in household income and increases in the prevalence of disposable products and packaging.

While households have a major indirect impact on the environment through the demand for goods and services they also have direct impacts on the environment through the consumption of energy and water and waste production. These include pollution from waste water; diversion of water from environmental flows; leaching and methane production from landfills; air pollution caused by motor vehicles; and the generation of greenhouse gases from energy production.

## Chapter 4: The role of government in promoting sustainable household consumption

Governments can influence the decisions made by households and communities through policy and regulatory frameworks; influencing markets to support more environmentally sustainable technologies and services; and the provision and distribution of information. Parliamentary and government leadership on sustainable consumption issues is also important. The Committee recommends that the Victorian Parliament develop an environmental management system, as a matter of priority, as current environmental management is conducted on an ad hoc basis.

The overlapping roles of federal, state and gocal Government in promoting sustainable consumption is discussed. Despite a trend towards increasing harmonisation of policy, particularly on the issues of household energy and water management, the planning and management of the environment remains highly uncoordinated between the three levels of Government. The establishment of a mechanism to ensure close cooperation on early environmental program design and implementation is recommended to minimise duplication and ensure consistency.

There are four main types of policy instruments: regulation; economic instruments; social instruments such as education; and infrastructure and technology that can influence sustainable consumption. Social instruments underpin all policy instruments as consumers need to understand policy, for example permanent water restrictions, in order to accept and comply with policy. The most effective policy combination will depend on the nature of the consumption issue being addressed, however consistency across government policy is important.

Regulations have the potential to change consumption and behaviour patterns quickly but can also alienate consumers. Economic instruments can be used to promote sustainable behaviour through price setting (for example the volumetric pricing of water) and influence the market to promote environmentally sustainable technologies such as solar hot water heaters. Social instruments such as information and awareness raising campaigns to promote environmentally sustainable behaviour are frequently used by governments within the OECD, but used as stand alone measures, are unlikely to achieve change. Ensuring that sustainable practices are straightforward for people through the provision of accessible and easy to use technology and infrastructure, such as co-mingled bins, is important in encouraging behavioural change.

An overview of the multiple energy and greenhouse, water and waste policies that influence sustainable consumption in Victoria is also discussed in this chapter.

The Committee found that there is a lack of evaluation of the outcomes of behavioural change and household consumption policies and programs. This is a significant deficiency because without a means of quantifying the

outcomes of different government and non-government programs, it is difficult to identify the most effective approaches. The limited capacity and resources of the non-government sector to conduct program evaluation was also raised as an issue. The Committee has recommended that performance targets are integrated into all state and local government funded household energy, waste and water programs and the outcomes regularly reported to the community.

## Chapter 5: Consumer behaviour and behavioural change

Behavioural change is complex and there are multiple theories that attempt to explain household consumption and the processes involved in creating and sustaining behavioural change. While no single theory provides the full explanation of why consumers behave in a certain way, understanding the theory of behavioural change serves to highlight different approaches that can be used to target consumers. The needs-opportunities-abilities model of consumer behaviour and persuasion theory, including community-based social marketing, are discussed.

Evidence from overseas and Victoria also shows that the extent to which consumers can exercise choice in their consumption of goods is limited. A consumer's decision to purchase goods or services is influenced by a range of intermediary players in the production chain including designers, manufacturers, retailers and tradespeople. The Committee found that there is an opportunity to change consumer behaviour by targeting intermediaries who have an influence on consumer decisions.

One of the most effective methods of promoting household sustainability is by adopting a preventative approach through designing products which avoid or reduce environmental impact from the outset. This minimises the need to manage the impact of the product and removes the need for consumers to make a choice. The Committee was advised that ecodesign, or design for the environment, is a principle that recognises the importance of product design in reducing environmental impacts.

The Committee was advised that consumers are a diverse group, therefore varied approaches to behavioural change are needed for different segments of the community. Behavioural change programs should also be underpinned by sound social research in order to effectively target different sectors of the community.

A number of barriers to behavioural change were identified during the Inquiry. These include the cost of environmental products and technologies and perception of payback periods; the low price of resources such as water; and in-built technology and infrastructure that makes behavioural change difficult. The Committee found values, aspirations and the need to conform also influence consumption behaviour, and that policy, regulations and guidelines can also be a barrier.

## Chapter 6: Environmental education and a strategic approach to environmental sustainability

The first section of this chapter examines the role of education and behavioural change in promoting environmentally sustainable behaviour within the Victorian community, including the terminology used in the literature.

The second section of the chapter provides an overview of environmental education in Victoria. The first Victorian environmental education strategy was released over 10 years ago. The Department of Sustainability and Environment is currently developing an environmental education and behavioural change strategy. The Committee has recommended that performance indicators be included in the strategy to facilitate regular monitoring of outcomes. The Department of Education and Training is developing an *Environmental Sustainability Strategy for Victorian Schools*. There is a gap in environmental education in the upper secondary and tertiary levels of the formal education system, including the vocational education and training system, which has significant implications for the implementation of policies such as the 5 star energy rating for new homes and sustainable housing design and construction.

The value of demonstration projects in reducing uncertainty, communicating sustainability concepts and encouraging behavioural change was highlighted by many witnesses. However, access to demonstration sites in rural and regional Victoria is currently limited. The Committee has recommended that education and practical demonstration sites be established across Victoria to promote sustainable household consumption.

Local and state governments have also been actively involved in delivering environmental education programs, with programs such as the City of Port Phillip's Sustainable Living at Home program and the Anglesea Neighbourhood Environment Improvement Plan. However local government argued that ongoing funding or opportunities for local government to raise funds, as is the case in NSW with the local government environment levy, is important for the success of community environment programs.

The findings from the numerous discrete reviews of environmental education in Victoria are set out in the third section of the chapter and highlight that environmental education in Victoria is fragmented and requires coordination and strategic direction. The Committee found that despite the reviews by KPMG, the Victoria Association for Environmental Education, Environment Victoria and the Office of the Commissioner for Environmental Sustainability, a comprehensive assessment of environmental education in Victoria has not been conducted.

The fourth section of the chapter discusses three key issues: institutional arrangements; performance management; and social research. The Committee found that there is no single organisation that provides state-wide leadership on environmental education in Victoria. The Committee

supports the comprehensive approach taken to environmental education by the NSW Government which has established the Environmental Education Council. The NSW *Environmental Education Plan* is underpinned by a social research program including a survey of community environmental knowledge and attitudes conducted every four years. Social research is the foundation of effective environmental education and behavioural change programs.

## Chapter 7: Promoting household waste prevention and resource recovery

The institutional and policy frameworks for managing household waste in Victoria are discussed in this chapter, including the role of EcoRecycle, local government and Regional Waste Management Groups. The draft *Towards Zero Waste* strategy is also outlined. There are multiple directives that regulate waste management in the European Union including directives on landfill, incineration, packaging waste and waste electric and electronic equipment.

The average Victorian household produces 886 kilograms of waste per year. About one-third of this waste is recovered. A significant proportion of waste going to landfill in Victoria could be recycled. Despite major advances in waste recovery through kerbside recycling over the last decade, the overall volume of waste generated continues to increase. The Committee was advised that efforts to manage waste in Australia have focussed on managing waste once it has been created, increasing the efficiency of existing collection systems and developing new treatment technologies rather than focusing on waste avoidance. Yet waste avoidance is the preferred method of waste management according to the waste hierarchy in the Victorian *Environment Protection Act* 1970.

Australian waste management lags behind that of Europe. As EcoRecycle explained, high recycling rates and low waste generation rates in some European countries have been attributed to the regulated recycling and packaging measures and economic instruments. The draft Victorian *Towards Zero Waste* strategy emphasises the importance of principles such as product stewardship and ecodesign, however the focus remains on waste disposal. The Committee has recommended that an integrated product policy be developed for Victoria by 2007.

The European Union directive on packaging waste contains provisions on the prevention of packaging waste, the re-use of packaging and targets for the recovery and recycling of packaging waste. The targets are to be achieved by 2008 and there are specific recycling targets for different waste fractions. The Committee has recommended that the *Towards Zero Waste* strategy should contain specific targets for glass, paper and cardboard, metals, plastics, wood, food and other biodegradable material. Similarly, the Committee believes that targets need to be established for the National

Packaging Covenant for specific waste fractions, the reduction of packaging waste and the phase out of non-recyclable packaging materials.

The amount of organic waste currently going to landfill in Victoria is regarded as a major barrier to achieving the targets set out in *Towards Zero Waste*. The low cost of landfilling household waste and the absence of a mature recycled organics market are additional challenges to developing more environmentally sustainable methods of waste management. The need to develop a recycled organics industry is dependent on the types of alternative waste treatment facilities that are established in Victoria.

A proposal is currently being considered by the Minister for Environment regarding the establishment of a single metropolitan waste management group and the development of a metropolitan resources waste strategic plan and business plan. Given that *Towards Zero Waste* has been in draft form for two years and the recent proposals will extend the existing policy vacuum for waste management in Victoria, the Committee has recommended that the new plans be finalised by 2007. The Committee also recommends that the relative merits of different waste management technologies, including energy recovery and alternative waste technologies that do not require the development of a recycled organics industry should be assessed and publicly reported on prior to the Government entering into a Partnerships Victoria arrangement. This will ensure that the state government is an informed buyer.

The Committee believes that the lack of information or misleading information about the recycled content of products is a barrier to waste reduction. The Committee has recommended that a national product labelling scheme indicating the recyclability and recycled content of products and packaging should form a central component of an integrated product policy.

## Chapter 8: Promoting water efficient households

The terms of reference required the Committee to identify barriers to households recycling and conserving water and examine how state and local government can promote the efficiency of water use and supply. The state government has released a comprehensive policy framework for water management – *Securing Our Water Future Together*. A target of reducing per capita drinking water consumption in Melbourne by 15 per cent by 2010 (based on the 1990s average of 423 litres) has been established.

Permanent water saving measures were introduced in Melbourne in March 2005. However the measures do not include a ban on watering private lawns or the requirement for hoses used to clean vehicles to be fitted with a high pressure cleaning unit, as was the case under stage two restrictions. The Committee has recommended that these former provisions be reviewed to ensure consistency with the principle of water conservation.

A national mandatory Water Efficiency Labelling Standards (WELS) scheme has been introduced. The Committee was advised that further significant water saving benefits would arise from the introduction of minimum efficiency standards for washing machines in Victoria. Therefore the Committee has recommended that the Victorian Government introduce a minimum efficiency standard for washing machines and seek to have a minimum standard for washing machines included in the national WELS scheme.

The requirement to inform home buyers or tenants of the water efficiency of houses and buildings has the potential to raise awareness, influence behaviour and stimulate markets for water efficient appliances and fittings. The Committee has recommended that the merits of a requirement for houses sold or rented in Victoria to meet minimum water efficiency standards be examined and that the water consumption of local and state government buildings should be displayed in a prominent public area.

The value of providing consumers with informative water bills was identified by witnesses as an important means of promoting water efficiency. A survey conducted by the Water Services Association of Victoria found that the majority of people underestimate the amount of water they use. Yarra Valley Water's accounts provide a comparison of the customer's average daily usage with that of a water efficient household and the Committee believes that all water utilities should provide this information to their customers by mid 2006.

The Committee received conflicting evidence regarding the use of water pricing as a means of managing consumption. Household water is an inelastic commodity until substantial price increases are made, as has been the case in Denmark and Hungary. In Melbourne a rising block tariff was introduced on 1 October 2004 but the impact on water consumption, estimated by three water utilities, is only in the order of a 1.5 to 2 per cent reduction over 2004-05. Accordingly the Committee recommended that the government, through the Essential Services Commission, further investigate the pricing of metropolitan water within the rising block structure, to promote water conservation.

The state government has set an ambitious target for 20 per cent of water to be recycled by 2010 in Melbourne. The main barriers to the uptake of alternative water supplies identified by witnesses to the Inquiry include public acceptance, economic and regulatory barriers, resistance from professional tradespeople such as engineers and planners and the quality of water for re-use. The re-use of greywater by households was identified as a specific problem with the current policy and regulatory framework proving inadequate and confusing. The Committee has made a number of recommendations directed at addressing these barriers.

In Belgium, non-governmental organisations have been conducting campaigns that not only address the quantity of water used by households but also the impact of household water use on the environment with

consumers encouraged to not degrade water through the use of certain types of garden fertilisers, washing powders and cleaning products. The Committee has recommended that current community education and information programs should not only focus on water savings but also the wider environmental impact of household water consumption.

In Melbourne approximately 35 per cent of household water is used on the garden. The potential of conserving water through changed gardening practices has not been fully explored as a management option. There is the need for a voluntary water efficiency labelling scheme for garden plants to be developed, to assist consumers in making informed decisions about water efficient gardening, at the point of purchase.

## Chapter 9: Promoting energy efficient households and renewable energy

The energy efficiency of housing is regulated by three levels of government. Traditionally regulation has been used in Australia to eliminate worst building practice. The minimum energy efficiency rating for houses under the National Building Code is expected to be revised to 5 stars by 2006. Under the state government's 5 star rating, from mid 2005, all new houses built in Victoria must comply with a 5 star rating for building fabric, incorporate water-saving measures and have either a rain water tank or a solar hot water system. The average house in Victoria built prior to 1991 has an energy rating of significantly less than 2.2 stars. Benchmarking of the Victorian legislation is required, as the evidence the Committee received strongly suggests that standards in Australia lag behind international best practice.

There is also scope for the Victorian regulations to be broadened to not only address energy efficiency and some water issues but other sustainable design elements, as is the case in New South Wales. Some progressive local governments, including Port Phillip and Darebin City Councils, have taken the lead in promoting sustainable housing design through the development of their own environmental sustainability assessment tools. However state government leadership and consistency between local governments is required. The sustainability assessment tool that is currently being formulated by the Department of Sustainability and Environment should be finalised and implemented across the state as a matter of priority.

There is a sound national system for regulating minimum energy performance standards for many household electrical and gas appliances and both a voluntary and mandatory system for labelling. The system is easy for consumers to understand and is regularly updated, which is not the case in Europe. However improvements could be made to the system to keep pace with the rapidly growing number and different types of appliances used in the home.

Local government has shown strong leadership to the community on the management of energy and greenhouse gas emissions through its

involvement in the Cities for Climate Protection program. Fifty eight out of Victoria's 79 councils are involved in the program which requires councils to actively reduce emissions from their own operations. The state government has emphasised the importance of leadership in the *Victorian Greenhouse Strategy Action Plan Update* (April 2005). However mandatory minimum environmental design for state government infrastructure projects, including schools, are required. Energy efficiency labelling of public buildings and homes for sale and rental should also be investigated to make energy more visible, promote energy efficiency and better inform consumers.

The energy services industry is undeveloped in Australia, including Victoria. Consumers rely on professionals such as builders, electricians, plumbers and architects for advice on sustainable housing design. However the Committee was advised that the main barrier to the implementation of environmentally sustainable housing is a lack of skills in the building and construction industries. TAFE and university curricula do not satisfactorily address environmental sustainability in the built environment. The absence of accreditation and performance standards for the installation of energy appliances and related fittings was also identified as a problem. The state government has an important role to play in fostering the energy services industry in Victoria.

Renewable energy currently accounts for 3 to 4 per cent of Victoria's electricity consumption although the state government has a target of increasing this to 10 per cent by 2010. One of the major drivers for the renewable energy industry is the federal mandatory renewable energy target (MRET). The target requires revision and the Committee believes that the Victorian government should establish medium and long term mandatory renewable energy targets. Witnesses advised that information on the environmental and economic performance of household renewable energy technologies needs to be provided to consumers. Reasons for the low take up of Green Power by consumers include lack of confidence in the accreditation system and the additional cost. The Committee believes that the pricing of Green Power and its promotion needs to be addressed.

Some energy retailers offer declining block tariffs which discourage energy conservation. Such tariffs should be discouraged and price signals established that promote energy saving. The Committee believes that consumers would benefit from the provision of further information on their energy bills, aside from greenhouse gas emissions. Information that allows households to benchmark their consumption with an energy efficient household of a similar size and location would encourage energy saving.

# Recommendations

## Chapter 3: The environmental impact of households

**3.1 The Department of Sustainability and Environment and Sustainability Victoria collect data on the energy consumption of Victorian households and greenhouse gas emissions from the residential sector at least every three years. The findings should be published in the Victorian Greenhouse Gas Inventory.**

*page 32*

**3.2 Water authorities, in cooperation with the Department of Sustainability and Environment and Sustainability Victoria, collect and publish data at least every three years on:**

- **the total volume of water consumed by households;**
- **water use by household activity; and**
- **water use by sector.** *page 37*

## Chapter 4: The role of government in promoting sustainable household consumption

**4.1 A mechanism through the Sustainability Accord be established to ensure close cooperation on early environmental program design and implementation.** *page 57*

**4.2 The Victorian Parliament develop an environmental management system as a matter of priority. Progress on the implementation and the outcomes of the system should be detailed in the annual report, commencing in 2006-07.** *page 60*

**4.3 The State and Local Government ensure that:**

**a) performance targets are integrated into all State and Local Government funded household energy, waste and water programs;**

**b) the outcomes of State and Local Government funded household energy, waste and water programs are regularly reported to the community; and**

**c) a formal mechanism is developed to facilitate the sharing of information on program outcomes between State and Local Government and non-governmental organisations as part of the Victorian Sustainability Framework.** *page 84*

## Chapter 6: Environmental education and a strategic approach to environmental sustainability

**6.1 The Victorian education and behavioural change strategy should contain performance measures that can be used to regularly monitor progress towards outcomes.** *page 115*

**6.2 The Victorian Government in cooperation with Local Government establish education and practical demonstration sites across Victoria to promote sustainable household consumption. The outcomes of the demonstration sites should be monitored.** *page 119*

**6.3 The Department of Sustainability and Environment, the Municipal Association of Victoria and the Victorian Local Government Association, examine the provision of environmental sustainability programs (including education and behavioural change programs) through revenue raised from levies, similar to the landfill levy.** *page 122*

**6.4 As a priority the State Government in conjunction with the Office of the Commissioner for the Environment conduct a comprehensive assessment of environmental education and behavioural change programs in Victoria across all sectors by 2007. The assessment should evaluate:**

**a) the coordination and integration of programs;**

**b) the content of programs;**

**c) resourcing of programs; and**

**d) the performance measures and outcomes of programs.** *page 130*

**6.5 The Victorian Sustainability Advisory Committee be asked to consult with representatives of state environment and natural resource management agencies, the Department of Education and Training, industry, local government and community sectors and professional associations of environmental educators in the development and implementation of Victoria's education and behavioural change strategy for environmental sustainability. Specifically to:**

**a) provide advice to government on environmental education and behavioural change;**

**b) provide advice to government on the monitoring and evaluation of the strategy and individual environmental education programs across Victoria; and**

**c) facilitate the professional development of environmental education and behavioural change practitioners.** *page 133*

**6.6 State Government, through Victoria's education and behavioural change strategy for environmental sustainability:**

**a) develop a consistent methodology for performance measurement of environmental education and behavioural change programs. This should consist of a range of social research tools appropriate for different scales of program (i.e. from local community to statewide);**

**b) require environmental education and behavioural change programs to incorporate robust performance measurement using recognised social and market research methodologies and measurement of change in resource use such as reduced water or energy consumption; and**

**c) provide adequate resources and training in the evaluation techniques to enable providers of environmental education to conduct effective performance measurement.**

*page 134*

**6.7 Sustainability Victoria, in partnership with other state agencies, local government and the non-government sector, develop and conduct a survey of the Victorian community to measure people's attitudes to, knowledge of, and skills and behaviour regarding environmental sustainability. Surveys should be conducted at regular intervals to provide longitudinal data to inform the development of policies and programs and the results made available in the public domain.**

*page 136*

## Chapter 7: Promoting household waste prevention and resource recovery

**7.1 The Environment Protection Authority:**

**a) conduct a comprehensive assessment of licensed and unlicensed landfills in Victoria to determine the extent of unlicensed premises and compliance with the *Environmental Protection Act* 1970; and**

**b) finalise its closure of unlicensed landfills program by 2008.**

*page 145*

**7.2 Sustainability Victoria and the Environment Protection Authority, in cooperation with industry, develop an integrated product policy by 2007 to reverse the upward trend in waste production.**

*page 164*

**7.3 The Victorian Government promote a national approach to integrated product policy through the Environment Protection and Heritage Council.** *page 165*

**7.4 The *Towards Zero Waste* strategy contain specific targets, based on European Union targets, on the various fractions of the waste stream including glass, paper and cardboard, metals, plastics, wood, food and other biodegradable material.** *page 166*

**7.5 The Victorian Government, through the Environment Protection and Heritage Council, take a lead role in developing targets for the National Packaging Covenant including:**

**a) a national target for the reduction of packaging waste within a defined timeline;**

**b) targets for individual waste fractions which include a reduction in packaging waste to landfill, an increase in the recycled content of products, an increase in the quantity of materials recovered and a reduction in the amount of material used in packaging; and**

**c) targets for phasing out non-recyclable materials.**

*page 168*

**7.6 Sustainability Victoria engage industry to lead the process of further developing the recycled organics industry in Victoria to ensure that both the risk and responsibility for outcomes is shared. The need to develop a recycled organics industry is contingent on the type of alternative waste treatment facilities developed.**

*page 172*

**7.7 The metropolitan resources and waste strategic plan and business plan be finalised by 2007.**

*page 176*

**7.8 Prior to finalising the metropolitan resources and waste strategic plan for Melbourne, the State Government examine the broader context of waste management and recovery including:**

**a) technological options;**

**b) community awareness/education;**

**c) capacity building of the Local Government sector;**

**d) market development of recycled products; and**

**e) pricing and environmental accounting of externalities.**

*page 177*

**7.9 Sustainability Victoria and the Environment Protection Authority assess and publicly report on the relative merits of various waste management technologies including world's best practice incineration with energy recovery and alternative waste technologies that do not require the development of a recycled organics industry before entering into any Partnership Victoria type arrangements.** *page 178*

**7.10 Sustainability Victoria, in cooperation with Local Government, actively promote home and community composting as a low cost option (compared with alternative waste technologies) of diverting organic waste from the waste stream, as a matter of priority.** *page 181*

**7.11 The Victorian Government, through the Environment Protection and Heritage Council:**

**a) take a lead role in developing a mandatory plain English labelling scheme indicating life cycle analysis information for consumer products and packaging;**

**b) the labelling scheme should be developed in cooperation with industry, the Australian Environmental Labelling Association and green procurement programs such as ECO–Buy;**

**c) a formal evaluation of the outcomes of existing environmental labelling schemes should be included in the development process; and**

**d) a national communication strategy should be developed for the labelling scheme.** *page 182*

**7.12 Sustainability Victoria redevelop the Waste Wise program to emphasise waste reduction and avoidance.** *page 184*

**7.13 A Waste Wise program be developed for the residential sector that:**

**a) focuses on assisting householders to purchase recycled and recyclable packaging and consumer items; and**

**b) includes a research component to identify barriers to purchasing recycled content and recyclable items.** *page 184*

**7.14 Sustainability Victoria review the costs and benefits of introducing measures such as Container Deposit Legislation in Victoria as part of the development of the proposed metropolitan resources and waste strategic plan for Melbourne.** *page 186*

## Chapter 8: Promoting water efficient households

**8.1 The State Government, through the Essential Services Commission closely monitor the impact of reduced consumer demand for household water on the revenue and financial viability of water authorities, particularly in regard to the maintenance and upgrade of water infrastructure.** *page 198*

**8.2 The ban on watering private lawns and the requirement for hoses used to clean vehicles to be fitted with a high pressure cleaning unit, be reviewed to ensure consistency with the principle of water conservation.** *page 201*

**8.3 The Victorian Government:**

**a) introduce a minimum efficiency standard for washing machines to be phased in over three years; and**

**b) seek to have a minimum efficiency standard for washing machines included in the national Water Efficiency Labelling and Standards scheme.** *page 203*

**8.4 The Victorian Government, through the Environment Protection and Heritage Council and other relevant forum, promote the development of a comprehensive national environmental labelling scheme for household products and appliances that includes energy and water efficiency.** *page 205*

**8.5 The State Government, through Sustainability Victoria:**

**a) examine the merit of a requirement for houses sold or rented in Victoria to meet minimum water efficiency standards; and**

**b) as an incentive for householders to move beyond a minimum standard, create a system of mandatory disclosure of water efficiency on the sale or lease of residential property.** *page 206*

**8.6 The level of water consumption of Local and State Government buildings be displayed in prominent public areas. The data should include a reference point to enable the public to make an assessment of performance.** *page 207*

**8.7 The State Government, in partnership with water authorities, follow Yarra Valley Water's lead and introduce customer accounts that provide a comparison of the customer's average daily usage with that of a water efficient household of similar size and location by mid 2006.** *page 210*

**8.8 The Essential Services Commission investigate the impact of 'smart' water meters on household water consumption, as a matter of priority.** *page 210*

**8.9 The State Government, through the Essential Services Commission:**

**a) further investigate the pricing of metropolitan water, within the rising block tariff structure, to promote water conservation, including discretionary use above essential indoor consumption;**

**b) pricing structures outside the metropolitan area should reflect the same principles; and**

**c) the revised water pricing structure should ensure a safety net is in place to protect low income consumers.**

*page 216*

**8.10 The review of the Victorian Planning Provisions and building approvals framework should be completed as a matter of priority, in order to ensure a consistent approach to sustainable urban water management**

*page 224*

**8.11 The Environment Protection Authority and the Department of Human Services review of the framework and guidelines for alternative water sources including recycled water, greywater, stormwater and rainwater, should be completed as a matter of priority.**

*page 224*

**8.12 The Department of Sustainability and Environment develop a comprehensive strategy to address the main barriers to the implementation of water sensitive urban design principles including public acceptance, economic and regulatory barriers, resistance from the relevant professional trades (e.g. engineers, planners, architects, developers, plumbers) and the quality of water for re-use. The strategy should be developed as a matter of priority and take into account the findings of:**

**a) the review of the Victorian Planning Provisions and building approvals framework; and**

**b) the Environment Protection Authority and the Department of Human Services review of the framework and guidelines for alternative water sources.** *page 224*

**8.13 The Department of Sustainability and Environment, as part of the strategy to address the barriers to the implementation of water sensitive urban design, develop an assessment tool to assist developers to determine the cost effectiveness of providing a third pipe system in new developments.** *page 224*

**8.14 The Department of Sustainability and Environment in collaboration with the Municipal Association of Victoria, Master Plumbers and Mechanical Services Association of Australia, the Housing Industry of Australia, water authorities and Local Government develop water sensitive urban development demonstration projects that will become models of best practice for Local Government, developers and the community:**

**a) these projects should be rigorously evaluated and the results from the evaluation widely publicised;**

**b) the demonstration projects should include the use of greywater, recycled effluent and stormwater and developments of different scales; and**

**c) the demonstration projects should integrate, where possible, with energy efficiency demonstration projects and extend across Victoria.** *page 225*

**8.15 The Department of Sustainability and Environment's strategy on the implementation of water sensitive urban design include:**

**a) an outline of the roles and responsibilities of various public authorities with regards to household greywater use;**

**b) a clear regulatory framework for the installation and maintenance of greywater systems for multi-unit dwellings;**

**c) a greywater communications strategy to inform householders of the risks, benefits and maintenance requirements for greywater diversion devices and treatment systems and the purposes for which greywater can be used safely. This strategy should be developed in cooperation with the Environment Protection Authority, Department of Human Services, Municipal Association of Victoria and other relevant authorities;**

**d) a training package on all aspects of domestic recycled water including greywater, for Local Government officers responsible for the assessment and approval of household greywater systems and for plumbers who install the systems;**

**e) a requirement for point of sale information to be provided with greywater systems that includes guidance on compatible bathroom/laundry/kitchen products and the importance of subsurface irrigation for food plants;**

**f) a review of the accreditation of greywater diversion and treatment systems and the need for accreditation of service technicians for greywater systems; and**

**g) a commitment by the Department of Sustainability and Environment to engage with appliance manufacturers and the plumbing industry to improve technologies for diverting greywater for appropriate household re-use.** *page 229*

**8.16 The Department of Sustainability and Environment and water authorities target water education and behavioural change programs to specific segments of the community identified as having been traditionally neglected in water conservation campaigns. These groups include the rental sector and young people.** *page 232*

**8.17 The individualised marketing approach adopted in the Our Water, Our Future Water Saver pilot program be further trialled to develop a cost effective methodology to encourage behavioural change.** *page 232*

**8.18 The Department of Human Services and the Department of Sustainability and Environment expand and promote the Smart Homes water audit program for low income households to water authorities throughout Victoria.** *page 233*

**8.19 The State Government and water authorities community education and information programs be extended to not only encourage household water saving, but also to minimise the wider environmental impact of household water consumption.** *page 233*

**8.20 The Department of Sustainability and Environment review the list of drought tolerant plants it recommends to the community to ensure no weeds are listed.** *page 235*

**8.21 The Department of Sustainability and Environment initiate a research and development program, to develop and promote efficient low cost irrigation techniques and technology for municipal and residential gardens, in cooperation with the horticultural industry, nursery industry and research institutes.** *page 237*

**8.22 The Department of Sustainability and Environment's Water Saver Garden Centres pilot program, if successful be significantly expanded to nurseries and garden centres across the state and include bulk household garden suppliers.** *page 238*

**8.23 A voluntary water efficiency labelling scheme for garden plants, similar to the Water Miser plant labelling system or the 6 star scheme for appliances, to assist consumers in making informed decisions about water efficient gardening at the point of purchase, be developed and implemented by the Department of Sustainability and Environment, in conjunction with water authorities, Local Government, the nursery industry and non government sector.** *page 238*

**8.24 State and Local Government introduce a policy of planting low or no-water gardens at all public buildings.** *page 238*

## Chapter 9: Promoting energy efficient households and renewable energy

**9.1 Sustainability Victoria, as a matter of priority, benchmark the Victorian 5 star energy rating scheme for houses against international best practice. The findings should be made publicly available.** *page 248*

**9.2 a) The Victorian Government take a lead by revising the 5 star energy rating scheme for new houses to include:**

- **major renovations; and**
- **major pieces of fixed equipment and appliances.**

**b) The scheme should consider the occupancy/house size ratio, as is the case with the New South Wales Building Sustainability Index system, and be comprehensive by including provisions, for example, on water management, indoor environmental quality and building materials.** *page 248*

**9.3 The scope of the Victorian Sustainability Assessment Tool be made more comprehensive to encompass a broad range of design features including sustainable materials and indoor environmental quality. The Sustainability Assessment Tool be finalised and implemented as a matter of priority.** *page 250*

**9.4 Sustainability Victoria review every three years requirements for appliance manufacturers and importers to meet minimum energy performance standards, as is currently the case regarding safety requirements. The review findings should be presented to the National Appliances and Equipment Energy Efficiency Program Committee as a matter of priority and identify additional household products that should be included in the program.** *page 253*

**9.5 Sustainability Victoria facilitate the introduction of a statewide revolving fund based on the Sustainable Melbourne Fund 'Payment by Savings' model to promote sustainable consumption by the residential and other sectors.** *page 256*

**9.6 Mandatory minimum environmental design standards be developed for State Government infrastructure projects, including schools.** *page 257*

**9.7 The State Government, through Sustainability Victoria investigate the introduction of a system of compulsory disclosure of energy efficiency on the sale or lease of residential property.** *page 260*

**9.8 A system of minimum environmental performance standards be investigated for application to rental properties, similar to the French system.** *page 260*

**9.9 The environmental performance, including energy consumption of Local and State Government buildings, be displayed in prominent public areas. The data should contain a reference point to enable the public to make an assessment of performance and as an awareness raising tool.** *page 260*

**9.10 The State Government investigate the introduction of regulatory standards to ensure buildings are orientated to maximise energy efficiency and solar control.** *page 261*

**9.11 The Victorian Government introduce a framework that provides incentives for energy retailers to promote energy saving and energy management advice.** *page 265*

**9.12 The State Government conduct an audit of the coverage and adequacy of training on environmentally sustainable design in Victorian TAFE, university and industry courses on the built environment. The audit should also investigate the status of sustainable design skills in the planning, design and building sectors; best practice in other jurisdictions; and contain recommendations on how to address the current shortcomings in the training curriculum.** *page 267*

**9.13 The Department of Sustainability and Environment, Sustainability Victoria, in cooperation with the housing and building industries, develop accreditation and performance standards for the installation of energy appliances and related fittings such as insulation, to ensure consumers are protected.** *page 267*

**9.14 The Victorian Government, take a lead by achieving a mandatory renewable energy target of 10 per cent by 2010. Targets for the medium (20 years) and long term (50 years) should also be established.** *page 272*

**9.15 Sustainability Victoria produce information for consumers on the financial and environmental performance of household renewable energy technologies including solar hot water heaters and photovoltaic systems.** *page 274*

**9.16 Sustainability Victoria support community groups such as the Central Victorian Greenhouse Alliance, in producing a plan for the development of renewable energy technologies and energy sources in rural and regional settings with priority given to those regions that do not have access to the electricity grid and natural gas.** *page 275*

**9.17 A pricing model be developed that provides incentives for the uptake of Green Power rather than conventional electricity from fossil fuels.** *page 278*

**9.18 Sustainability Victoria design and implement an ongoing promotional campaign for Green Power that includes meaningful performance indicators.** *page 279*

**9.19 Electricity bills should contain information on how to purchase Green Power.** *page 279*

**9.20 By 2010, the State Government should increase its purchase of Green Power to 25 per cent.** *page 279*

**9.21 The Victorian Government introduce a pricing framework that promotes energy conservation and discourages energy retailers from offering declining block tariffs to consumers.** *page 280*

**9.22 Electricity retailers introduce customer accounts that provide a comparison of the customer's average daily usage with that of an energy efficient customer of a similar size household and location.** *page 281*

# Definitions and Abbreviations

## Definitions

Biodegradable waste
: Waste that is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, paper and cardboard

Biomass
: Biomass is the term used to describe the generation of energy from organically based sources. The energy stored in plants or animals can be captured for energy generation by several different methods such as decomposition, combustion or gasification.

Decoupling
: Breaking the link between environmental degradation and economic growth

Ecodesign
: The process of designing products and product-systems in order to minimise environmental impacts over the total lifecycle

Energy efficiency
: Using less energy to achieve the same or greater levels of output, for households the level of output may be the level of comfort in relation to cooling, warmth and light

Energy services industry
: the suppliers of energy services and products to consumers rather than just the supply of energy. It includes energy performance contractors, energy management consultants, energy auditors, energy efficient equipment manufacturers and suppliers

Extended producer responsibility
: An environmental policy approach where a producer's responsibility for a product is extended to the post consumer stage of a product's life

Fit for purpose water
: Matching water quality with water usage

Garbage
: Residual waste or general waste materials including animal and vegetable matter and other refuse that is disposed of in landfill

Green Power
: Electricity generated from renewable energy sources such as solar, wind, biomass and hydro power. When consumers elect to purchase Green Power from their supplier, the supplier is required to purchase the equivalent amount of energy from renewable sources

Green waste — Waste materials such as plants, leaves, grass clippings, tree cuttings and prunings which can be processed into mulch, compost or soil conditioners

Greenhouse gas emissions
: Carbon dioxide, a by product of burning petroleum, is an example of a greenhouse gas. Greenhouse gases build up in the Earth's lower atmosphere and prevent heat from rising from the surface into space. Scientific research predicts that increasing concentrations of greenhouse gases will increase the average global temperature, leading to changes in the world's climate and weather patterns

Greywater — The waste water from kitchen sinks, washing machines, laundry tubs, hand basins, spas, the shower and bath. Greywater is mildly contaminated with organic materials and pathogens, bacteria and virus' from human contact and from chemical cleaning products. Handled appropriately greywater can be successfully and safely used to water gardens

Integrated Product Policy
: An approach which seeks to reduce the life cycle environmental impacts of products from the mining of raw materials to production, distribution, use and waste management

Landfill — A facility used for disposal of waste to land, a tip

Lifecycle approach/analysis
: The environmental impacts of products, processes or services, through production, usage and disposal

Mandatory renewable energy target
: The federal mandatory renewable energy target was introduced on 1 April 2001. It was created as a result of the passing of the *Commonwealth Renewable Energy (Electricity) Act* 2000. This Commonwealth legislation requires the generation of 9,500GWh of extra renewable energy each year by 2010

Mechanical Biological Treatment (MBT)
: The mechanical sorting of waste with biological treatment and aims to extract the maximum amount of value out of each type of waste

Municipal kerbside waste
: Kerbside domestic waste, including garbage, recyclables and hard waste

Other municipal waste

Waste from council services such as street sweepings, parks and gardens services, litter, construction waste (owner/occupier), renovations, residential 'self-haul' waste; other non-industrial waste collected by local government, such as waste from commercial premises

Product Stewardship

A principle that directs all participants involved in the lifecycle of a product to take shared responsibility for the environmental impacts that result from the production, use and end-of-life management of the product

Putrescible waste

Waste containing a significant proportion of material able to be decomposed by bacterial action

Recycled Material

Material that has been reprocessed from recovered (reclaimed) material by means of a manufacturing process and made into a final product or into a component for incorporation into a product

Recyclables — Waste materials such as paper and cardboard: glass, metal and some plastic containers which can be recycled and processed to make other products

Recovered material

Material that would have been otherwise disposed of as waste or used for energy recovery, but has instead been collected and recovered (reclaimed) as a material input, in lieu of a new primary material, for a recycling or manufacturing process

Renewable Energy

Clean energy that can be replenished or replaced from natural sources and produces little greenhouse pollution. Types of renewable energy include solar, wind and hydro power

ResCode — ResCode is a Victorian package of provisions for residential development. ResCode is not a single document - the ResCode provisions are incorporated into planning schemes and the Building Regulations

Retrofit — Resource consumption in the home can be dramatically improved by retrofitting, incorporating the very best techniques and technologies of sustainable living through the replacement of infrastructure and technology, for example the installation of water and energy efficient appliances

Sold industrial waste

Industrial waste, commercial waste, building waste from commercial operations

Standby power — the electricity consumed by end-use electrical equipment when it is switched off or not performing its main function

Stationary energy — energy that is generated and consumed at fixed sources

Sustainable community

A healthy, sustainable community is one that has an explicit systemic (adaptive) approach to the integration of ecological, social, cultural and economic features to meet the needs of the present without compromising the needs of the future. It uses principles of inclusivity, connectivity, equity, security, and precaution to make decisions about the use and distribution of resources and services

Sustainable consumption

The consumption of goods and services that meet basic needs and quality of life without jeopardising the needs of future generations

Sustainable Development

Development that meets the needs of the present without compromising the ability of future generations to meet their own needs

State of Environment (SoE) Reporting

SoE reporting identifies pressures on the environment, uses indicators to assess the current status of the environment and trends and contains recommendations to achieve environmental improvements

Third pipe system — used to supply recycled water for uses such as garden watering and toilet flushing. The ‘first and ‘second pipe’ carry the traditional water supply to and from a house

Waste recovery — Any management operation that diverts a waste material from the waste stream and which results in a certain product with a potential economic or ecological benefit. Recovery mainly refers to material recovery (recycling), energy recovery, biological recovery and re-use

# Abbreviations

| | |
|---|---|
| ABS | Australian Bureau of Statistics |
| ACF | Australian Conservation Foundation |
| ACRR | Association of Cities and Regions for Recycling |
| AGO | Australian Greenhouse Office |
| ALGA | Australia Local Government Association |
| ATA | Alternative Technology Association |
| ATSE | Australian Academy of Technical Sciences and Engineering |
| AWT | Alternative Waste Technologies |
| BASIX | Building Sustainability Index (NSW) |
| BEAT | Banyule Energy Action Team |
| BIEC | Beverage Industry Environment Council |
| CBSM | community based social marketing |
| CCP | Cities for Climate Protection Program |
| CDL | container deposit legislation |
| CEE | Council on Environmental Education (NSW) |
| CERES | Centre for Education and Research in Environmental Strategies |
| CMA | Catchment Management Authority |
| COAG | Council of Australian Governments |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DEA | Danish Energy Authority |
| DEC | Department of Environment and Conservation (NSW) |
| DEH | Department of the Environment and Heritage (Federal) |
| DEPA | Danish Environmental Protection Agency |
| DET | Department of Education and Training |

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|---|---|
| DHS | Department of Human Services |
| DoI | Department of Infrastructure |
| DSE | Department of Sustainability and Environment |
| EEA | European Environment Agency |
| EEC | Energy Efficiency Commitment (UK) |
| EMS | Environmental Management Systems |
| EPA | Environment Protection Authority |
| EPHC | Environment Protection and Heritage Council |
| ESC | Essential Services Commission |
| ESD | Ecologically Sustainable Development |
| EU | European Union |
| EV | Environment Victoria |
| GL | Gigalitre (GL) = One thousand million litres, or a volume of approximately 444 Olympic swimming pools. |
| GDP | Gross Domestic Product |
| Gwh | gigawatt hours |
| HIA | Housing Industry Association |
| ICLEI | International Council for Local Environmental Initiatives (Europe) and/or Local Government for Sustainability (Australia) |
| IEA | International Energy Agency |
| IGAE | Inter-Governmental Agreement on the Environment |
| IÖW | Institute for Ecological Economy Research (Germany) |
| IPP | integrated product policy |
| KL | kilolitre or 1,000 litres |
| LCA | life cycle analysis |
| MAV | Municipal Association of Victoria |
| MBT | mechanical biological treatment |

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|---|---|
| MEPS | minimum energy performance standards |
| ML | Megalitre = 1,000,000 litres, or a volume of approximately one Olympic sized swimming pool |
| MRET | Mandatory Renewable Energy Target |
| NABERS | National Australian Built Environment Rating System |
| NAEEEP | National Appliance and Equipment Energy Efficiency Program |
| NatHERS | National Housing Energy Rating Scheme |
| NEIP | Neighbourhood Environment Improvement Plan |
| NEPM | National Environmental Protection Measure |
| NFEE | National Framework for Energy Efficiency |
| NPC | National Packaging Covenant |
| NWC | National Water Commission |
| NWI | National Water Initiative |
| OECD | Organisation for Economic Cooperation and Development |
| PAEC | Public Accounts and Estimates Committee |
| RAVC | Royal Automobile Club of Victoria |
| RMIT | Royal Melbourne Institute of Technology University |
| ROU | Recycled Organics Unit |
| RWMGs | Regional Waste Management Groups |
| SAT | sustainability assessment tool |
| SEAV | Sustainable Energy Authority Victoria |
| SLAH | Sustainable Living at Home |
| SMEs | small and medium enterprises |
| SoE | State of the Environment |
| TAFE | Technical and Further Education |
| UBA | German Federal Environment Agency |

| | |
|---|---|
| UNCED | United Nations Conference on Environment and Development |
| UNEP | United Nations Environment Program |
| UNESCO | United Nations Educational, Scientific and Cultural Organisation |
| VAEE | Victorian Association for Environmental Education |
| VCAA | Victorian Curriculum Assessment Authority |
| VCE | Victorian Certificate of Education |
| VPP | Victoria Planning Provisions |
| WELS | Water and Efficiency Labelling and Standards |
| WMAA | Waste Management Association of Australia |
| WSAA | Water Services Association of Australia |
| WSUD | water sensitive urban development |
| WWF | World Wildlife Fund |

Chapter

1

# Inquiry in context

## Background to the Inquiry

On 27 April 2004 the Environment and Natural Resources Committee received a reference under the *Parliamentary Committees Act 2003* on Sustainable Communities.

The terms of reference state that the Committee is:

> To inquire into and report to Parliament on opportunities to promote changes in the ways we use energy, water and other natural resources at the local community (not including industries) and household level to reduce environmental impact.
>
> In particular, the Committee is requested to:
>
> 1. Examine what practical low cost initiatives State or Local Governments can encourage that will:
>    - promote efficiency of water use and supply and use of energy;
>    - reduce greenhouse gas emissions;
>    - increase the rate of recycling;
>    - foster renewable energy use; and
>    - improve energy efficiency.
> 2. Identify the barriers to increasing the rate of participation by individuals and households in recycling and conserving water, energy and other resources, and improving energy efficiency.
> 3. Identify other low cost opportunities for communities to participate in promoting and encouraging environmental sustainability.
>
> The Committee is to report to Parliament by 31 March 2005.

On 3 November 2004, the Governor in Council under section 33 of the *Parliamentary Committees Act 2003*, amended the reporting date to 31 May 2005, by Order in Council.

Individuals and households have an impact on the environment through everyday activities including bathing, travelling to work, purchasing goods and services and disposing of waste. The production and supply of goods involves habitat disruption, resource extraction, pollution and waste creation. The use and disposal phases of products also have an environmental impact. Energy and water consumption and waste production by

households, the focus of this Inquiry, are of particular concern to policy makers and worthy of examination.

The environmental impacts of individual households are relatively minor compared to the impacts of industry and the public sector. Nevertheless, the combined impact of many households is an important contributor to a number of environmental problems including air and water pollution, waste generation, habitat alteration and climate change.[1]

Furthermore, progress in managing household water and energy use and waste production has been outweighed by substantial increases in the levels of consumption with environmental impacts from household consumption set to grow over the next twenty years.[2] These trends are driven by many factors including economic growth, socio-demographic changes and advances in technology.

The issues of sustainable household consumption are common to all industrialised nations and many western democracies face similar policy challenges in achieving more sustainable levels of household consumption. In Australia, these issues have been the focus of several recent inquiries.[3]

In international discussions of sustainable development and consumption, three ongoing concerns have been identified:

- that consumption growth is depleting renewable and mineral resources, and causing irreversible damage to the environment. Current consumption and production levels have been estimated to be 25 per cent higher than the earth's sustainable carrying capacity;

- that a large proportion of the world's population has been left out of the transformation in quality of life seen by industrialised countries. The United Nations Commission on Sustainable Development states that 15 per cent of the world's population living in high-income countries account for 56 per cent of the world's total consumption, while the poorest 40 per cent, in low-income countries, account for only 11 per cent of consumption; and

[1] Organisation for Economic Cooperation and Development, 2002, Policy Brief: Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, p. 21

[2] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, pp. 11-12

[3] Refer to NSW Standing Committee on Public Works, March 2004, Inquiry into Energy Consumption in Residential Buildings; Victorian Public Accounts and Estimates Committee, April 2004, Report on the Review of the Auditor-General's Performance Audit Report no. 65 – Reducing Landfill Waste Management by Municipal Councils; Victorian Outer Suburban Interface Service Development Committee, September 2004, Inquiry into Sustainable Urban Design for New Communities in Outer Suburban Areas; and forthcoming House of Representatives Standing Committee on Environment and Heritage Inquiry into Sustainable Cities report. The Productivity Commission is undertaking inquiries into energy efficiency, which include the residential sector and reform of building regulation, which includes sustainability issues.

- that improving the economic standard of living does not necessarily lead to an improvement in the broader quality of life.[4]

The Department of Sustainability and Environment (DSE) advised the Committee that the environmental sustainability of Victoria is significantly affected by the consumption patterns of individuals and communities.[5] In 1999 consumption of energy in the home accounted for 30 per cent of Victoria's stationary energy related greenhouse emissions[6], which is equivalent to a quarter of the State's total energy related emissions.[7] Victoria's electricity production has a high greenhouse gas intensity due to a reliance on brown coal for electricity generation.[8] Passenger motor vehicles account for 68 per cent of transport related greenhouse emissions.[9]

Despite the fact that recycling levels are increasing in Organisation for Economic Cooperation and Development (OECD) countries, household waste generation levels continue to rise along with economic growth.[10] Australia is a high per capita producer of municipal waste - 650 kilograms per person per year - among OECD countries, ranking second only to the United States (730 kilograms).[11]

Australia is one of the largest extractors of fresh water in the OECD owing, in part, to its extensive agricultural industry and predominantly dry climate.[12] The average annual water consumption in Melbourne was 339 litres per person per day in 2004.[13] However, by contrast the average daily domestic water consumption per person in the European Union is about 150 litres.[14] The residential sector accounts for 60 per cent of Melbourne's potable water consumption.[15] By 2030, Melbourne will potentially have one million more people and at current per capita usage rates, demand will exceed the capacity of the city's water supply. Most regional centres and coastal

[4] Michaelis, L and Lorek, S., 2004, Consumption and the Environment in Europe: trends and futures, p. 5 and United Nations Commission on Sustainable Development, 2003, Sustainable Production and Consumption: Fact Sheet

[5] Department of Sustainability and Environment, submission no. 70, p.5

[6] Stationary energy can be defined as the energy that is generated and consumed at fixed sources. The dated nature of this data is discussed in chapter three

[7] George Wilkenfeld and Associates, 2002, Victoria's Greenhouse Gas Emissions 1990, 1995 and 1999: end-use allocation of emissions, report to the Department of Natural Resources and Environment, p. 55

[8] Department of Sustainability and Environment, submission no. 70, p. 7

[9] George Wilkenfeld and Associates, 2002, Victoria's Greenhouse Gas Emissions 1990, 1995 and 1999: end-use allocation of emissions, report to the Department of Natural Resources and Environment, pp. 75-77

[10] Organisation for Economic Cooperation and Development, 2002, Household energy and water consumption and waste generation: trends, environmental impacts and policy responses, p. 57

[11] Organisation for Economic Cooperation and Development, 2004, OECD Key Environmental Indicators 2004, p. 19

[12] National Urban Water Efficiency Program: Urban Water Use Statistics in Australia. Department of Environment and Heritage website www.deh.gov.au/water/urban/statistics.html accessed February 2005

[13] Gray, D, 2005, 'Water curbs relaxed after almost two years', The Age, February 22, 2005

[14] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Consumption? Trends and policies in OECD Countries, p. 49

[15] Department of Sustainability and Environment, submission no. 70, p. 19

settlements will also grow in population and this will increase demand for domestic water.

The impacts of unsustainable consumption patterns on the environment were acknowledged by the international community at the 1992 United Nations Conference on Environment and Development (UNCED) and reflected in Agenda 21.[16] Chapter 4 of Agenda 21 focuses on promoting patterns of consumption and production that reduce environmental stress and meet the basic needs of humanity; and developing a better understanding of the role of consumption and how to bring about more sustainable consumption patterns.[17]

Since UNCED, the environmental impacts of consumption have received increasing attention in international discussions on sustainable development. At the subsequent United Nations World Summit on Sustainable Development held 10 years after UNCED, countries reiterated their commitment to addressing sustainable consumption through the Johannesburg Plan of Implementation.[18] This resulted in the establishment of the Marrakech process to promote sustainable production and consumption on an international basis. Several international organisations including the United Nations Environment Program (UNEP), the OECD and European Environment Agency (EEA) have also been working to understand the drivers of consumption and effective strategies governments can adopt to promote sustainable consumption.

It is widely recognised that governments have a critical role to play in promoting sustainable household consumption. However some commentators, including the OECD, would argue that:

> Governments could play a more active role in facilitating household action [on sustainable consumption] than they currently do. In particular, they will need to clarify objectives for household action, reinforce existing policies and improve the co-

[16] Agenda 21 is a global agreement that was negotiated over a period of two years and adopted by over 178 countries at the UNECD in 1992. Agenda 21 is described as a blueprint for action to be taken by Government, United Nations organisations, development agencies, non-governmental organisations and independent-sector groups, in every area in which human activity impacts on the environment. Source: United Nations, 1992, Agenda 21: Programme of Action for Sustainable Development, Introduction

[17] United Nations, 1992, Agenda 21: Programme of Action for Sustainable Development, section 4.7

[18] Chapter III of the Johannesburg Plan of Implementation call for actions at all levels to:

> *Encourage and promote the development of a 10-year framework of programmes in support of regional and national initiatives to accelerate the shift towards sustainable consumption and production to promote social and economic development within the carrying capacity of ecosystems by addressing, and where appropriate, delinking economic growth and environmental degradation through improving the efficiency and sustainability in the use of resources and production processes and reducing resource degradation, pollution and waste. All countries should take action, with developed countries taking the lead, taking into account the development needs and capabilities of developing countries, through mobilization, from all sources, of financial and technical assistance and capacity-building for developing countries (paragraph 15).*

> ordination and consistency of policies in order to help households to develop less material and pollution intensive lifestyles.[19]

The Municipal Association of Victoria (MAV) advised the Committee that local government plays an important role in community sustainability and environmental management. The environmental activities of councils include both traditional infrastructure and service functions such as stormwater management and litter and waste management. The MAV noted that the role increasingly involves community environmental education, greenhouse abatement and energy conservation, natural resource management and sustainability planning.[20]

The DSE submission to the Inquiry states that governments have an important role in influencing community sustainability through policy and regulatory frameworks.[21] Urban planning and environmental performance standards such as energy efficiency standards for buildings are two important elements of the regulatory framework which affect communities.[22] In some cases Government has a role in price setting and influencing the market to support environmentally sustainable technologies and services and increase householder access to them.[23] The provision of information to the community is an important function of government.

DSE also advised the Committee that despite growing awareness of environmental issues, concern for the environment and extensive government and other education and behaviour change programs, environmentally sustainable practices have not been widely adopted by communities.[24] The barriers preventing people from changing their behaviour are examined in detail in subsequent chapters of this report.

## Scope of the Inquiry

Many definitions of sustainability incorporate the environmental, economic, social and cultural dimensions of the environment. However, while it is recognised that these elements are interconnected the Inquiry has focussed primarily on environmental sustainability.

The first term of reference for the Inquiry requires the Committee to examine "low cost" initiatives to encourage and promote sustainable behaviour. The third term of reference also requires the Committee to identify other "low cost" opportunities for communities to participate in promoting and encouraging environmental sustainability. There are many dimensions to the concept of "low cost" when considering measures to improve

[19] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, p. 13
[20] Municipal Association of Victoria, submission no. 28, p. 4
[21] Department of Sustainability and Environment, submission no. 70, p. 25
[22] Ibid, p. 25
[23] Ibid, p. 25
[24] Ibid, p. 23

environmental sustainability. For example the cost of an action may be defined in economic terms only or considered in terms of its environmental and social impacts as well. An action which may be perceived to have a high initial cost may result in long term environmental, economic and social benefits that far outweigh the initial costs. Another aspect of the concept of low cost is the question of who bears the cost of a particular initiative or action. Two of the key barriers identified by DSE to participation in sustainable behaviour are low disposable income and perceived cost.[25]

The DSE submission to the Inquiry provides a useful treatment of the term "low cost". The submission states that low cost can be considered in two categories: low cost to the householder and low cost to government.[26] The term low cost to the householder includes initiatives which require little or no up-front investment by the household or require up-front investment but will pay for themselves in relatively short periods of time through savings in water, energy and other costs. Low cost to government refers to actions which require little or no up-front investment by government or require some up-front investment for project initiation but do not require on-going support or are more expensive but cost-effective in terms of environmental outcomes and have a high payback ratio.[27] The Committee in making its recommendations has been mindful of this.

The terms of reference for the Inquiry focus on sustainability at the individual, household and community level but exclude industry. The consumption of water and energy and the generation of waste by households are inextricably linked to the waste management, recycling, packaging, water and energy industries. Therefore, the Inquiry considered the role of industry in influencing day-to-day household consumption. For example, the ability of a household to purchase Green Power (electricity produced from clean renewable sources) depends upon the products offered by the energy suppliers.

Small and medium enterprises (SMEs) are an integral part of the community and the Committee was advised that this sector is often neglected in environmental sustainability policy. SMEs experience unique and significant barriers to adopting environmentally sustainable practices. The environmentally sustainable consumption and production of SMEs is beyond the scope of this Inquiry, but warrants further attention.

The third term of reference requires the Committee to "identify other low cost opportunities for communities to participate in promoting and encouraging environmental sustainability". However, given the breadth of the first two terms of reference, it was necessary for the Inquiry to focus on the key issues of residential waste, water and energy management.

[25] Ibid, p 23
[26] Ibid, p. 5
[27] Ibid, p. 5

The Committee has investigated transport within the context of identifying opportunities at the household level to improve energy efficiency and reduce greenhouse emissions. However the complexity and scale of transport issues has meant that a detailed examination was not possible. This subject warrants further attention.

## Inquiry process

The Committee advertised the terms of reference and called for written submissions in Melbourne and regional Victorian newspapers in July 2004. The Committee received 82 written submissions (listed in Appendix one).

At the outset of the Inquiry the Committee received a briefing from the Department of Sustainability and Environment, the department with primary carriage of environmental sustainability at the State government level. Public hearings were held in Melbourne, Bendigo, Ballarat and Anglesea between June and December 2004. Meetings were also held in Newcastle, Sydney and Canberra. Details of the hearings and meetings are contained in Appendix two. The Committee took evidence from and met with 131 people representing 68 organisations during the course of the Inquiry including Federal and State government departments; statutory authorities responsible for the management of energy, waste and water; Local Governments; non-government environmental organisations; peak industry groups; academics; research institutes and community groups.

The Committee undertook site visits to the Centre for Education and Research in Environmental Strategies (CERES) in East Brunswick; the City of Darebin's Reservoir Civic Centre; the Inkerman Oasis residential development in St Kilda and an energy efficient house in Clyde North. Committee staff attended conferences and seminars on a range of issues relevant to the Inquiry. These are listed in Appendix three.

In February/March 2005 the Committee undertook a two-week study tour to Denmark, Germany, France and Belgium. The details of this trip are set out in Appendix two. There are groundbreaking developments occurring in household energy, waste and water management in Europe of relevance to Victoria, which are outlined in this report.

Many individuals and organisations contributed to this Inquiry by making written submissions and participating at hearings and meetings. The Committee is grateful to all these people for generously sharing their expertise and ideas.

## Key issues raised during the Inquiry

Several key issues were raised by witnesses during the course of the Inquiry and are examined in detail in this report. They include the following:

- household consumption of energy and water and the production of waste is an important policy issue. The direct impact of households is relatively minor compared to industry. For example agriculture accounts for 80 per cent of global water consumption. Municipal waste constitutes only 10-15 per cent of the world's total waste stream. However the demand for energy and water and the production of waste by industry is largely driven by households;

- there are multiple federal, state and local government programs as well as industry and non-government organisation initiatives that address household and community energy, waste and water management. This diversity provides choice and the opportunity to tailor projects. However, a number of witnesses advised the Committee that there is often little integration within and between these programs;

- the measurement of the outcomes of education and behavioural change programs, while inherently difficult and complex, is important and should be built into every program. However a number of witnesses advised that in Victoria, the monitoring and evaluation of the outcomes of environmental education or behavioural change programs has been minimal. The exceptions include the Waste Wise Schools program and the advertising campaign promoting water conservation by households. This problem is not unique to Victoria and is consistent with information gathered by the Committee overseas;

- a comprehensive approach to sustainable household consumption policy including the use of regulation, economic instruments (incentives and penalties), infrastructure and information is needed. Stand alone information-based campaigns to raise awareness of environmental issues rarely produce significant or sustained behavioural change;

- the level of concern for the environment is high in the community as is environmental knowledge and awareness. However often people do not make the connection between their own day-to-day activities and their impact on the environment. Witnesses advised that there are numerous impediments to households making environmentally sustainable choices. These barriers include knowledge gaps such as lack of understanding of energy efficient lighting; economic disincentives such as the low cost of energy and water; infrastructure barriers such as the lack of choices regarding packaged supermarket goods, and regulatory barriers such as conflicting rules regarding the re-use of greywater;

- consumers are a heterogenous group and only one of many groups in the production and consumption process. This has implications for the design of policy and management strategies. Some commentators argue that one of the most effective sustainable

consumption policies is to limit consumer choice by removing environmentally unsustainable products from the market, for example unleaded petrol;

- European policymakers and consumers are more attuned to the need to save energy and use renewable energy than their Australian counterparts. Energy policy is high on the political agenda in Europe. Energy efficient household products and expertise that is readily available in Europe is unavailable or expensive in Victoria;

- the development of an energy services sector in Victoria,[28] the promotion of Green Power, provision of incentives to energy retailers to encourage energy efficiency and improving consumers' knowledge of and access to energy efficient technologies were identified by witnesses as opportunities to improve residential energy efficiency;

- witnesses advised the Committee that the Victorian 5 star energy rating system for new houses represents a significant advance for the housing industry where progress on sustainable practices has been limited over the last decade. However, there is considerable scope for improvement of the system. Furthermore the Committee was advised that there are no compulsory environmental sustainability standards for major renovations and extensions to houses in Victoria, a market that constitutes approximately 60 per cent of domestic building work;[29]

- the Australian Capital Territory (ACT) system of mandatory disclosure of the energy efficiency of residential properties at the point of sale or rental was widely cited as a measure to improve the visibility of energy and residential energy efficiency, although shortcomings with the implementation of the ACT system were also identified. The labelling of not only households but also other buildings will become mandatory in the European Union in 2007. Denmark has introduced a robust and comprehensive residential labelling scheme which also includes water auditing;

- current lifestyles and western society's expectations of cleanliness and personal hygiene encourage water consumption. There is a need to rethink not only cultural attitudes regarding cleanliness but also the technologies that deliver water. Current technologies/infrastructure are designed to use and dispose of water rather than conserve and recycle it;

[28] The energy services industry can be described as the suppliers of energy services and products to customers rather than just the supply of energy. It includes energy performance contractors, energy management consultants, energy auditors, energy efficient equipment manufacturers and suppliers. Source: Mr A Pears, Policy Advisor, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, pp. 578-583

[29] Building Commission of Victoria, Building Activity Profile, Table 4, Domestic Building Work by Nature of Building Work and Value Range, March 2005 www.buildingcommission.com.au accessed March 2005

- the Committee was advised that while the installation of rainwater tanks, water recycling and re-use of greywater were important household water conservation measures, they were not always the most environmentally sound, practical or cost-effective solutions. Several witnesses commented that the most appropriate water saving measures for a particular household or community will depend on variables such as lifestyle, climate and geographical location;

- some councils and developers are reluctant to adopt Water Sensitive Urban Development (WSUD) principles because of cost, maintenance and safety issues. The Committee also received evidence that there were no incentives for developers to install water recycling schemes in residential developments. Furthermore responsibility for water, greywater, sewage, stormwater and water recycling rests with different authorities, making the development of residential water recycling systems a complex process. Local government and water authorities also advised the Committee that their staff, who may be handling planning applications or inquiries from the public, had limited operational knowledge of water saving technologies;

- in some European countries such as Hungary and Denmark, significant increases in the price of household water have substantially reduced consumption. However water pricing must be used in combination with the provision of information to consumers if it is to be an effective policy instrument;

- a number of witnesses advised that waste avoidance and changing consumption patterns are the most difficult future challenges in household waste management. In Western Europe there has been a fundamental shift in thinking regarding the role of the consumer towards ecodesign[30] and extended producer responsibility,[31] however, in Australia, preventative programs are limited. The Committee received evidence that the National Packaging Covenant, a key initiative to reduce packaging waste in Australia has not delivered sufficient gains in product stewardship and resource efficiency;

- the Committee received conflicting evidence on the efficacy of container deposit legislation (CDL). Some witnesses advised that CDL threatens the economic viability of kerbside recycling by diverting materials of value away from the system and leaving only high volume low value materials to be collected by the kerbside recycling scheme. The Committee was also advised that the redeemable deposit has encouraged a high return and recycling rate

[30] Ecodesign involves designing poor environmental choices out of the consumption equation

[31] Extended producer responsibility is the notion that producers should be made physically or financially responsible for the environmental impacts their products have at the end of their product life. Source: OECD, 2004, Economic aspects of extended producer responsibility, p. 21

in South Australia (the only state where CDL operates) and has resulted in a reduction of beverage containers in the waste stream and less littering;

- several witnesses advised that recoverable organic material remains a major component of waste going to landfill and that this remains a major challenge for waste management in Victoria; and

- the low cost of landfill in Victoria was identified as a major barrier to the uptake of more sustainable methods of municipal waste treatment. In Europe incineration with energy recovery is widely regarded as an environmentally superior method of waste treatment than landfill. This is reflected in European Union directives.

## Inquiry report

The aim of this chapter has been to highlight the significance of household energy and water consumption and waste production. This chapter has also provided an overview of the Inquiry process, the scope of the Inquiry and the key issues raised. Chapter two of the report provides an introduction to the concepts of environmental sustainability, sustainable consumption, and sustainable communities. This chapter also discusses the importance of measuring environmental sustainability and communicating this to the community in meaningful ways.

Chapter three of the report discusses how households contribute to energy and water consumption, greenhouse gas emissions and waste production in Victoria. Trends in household consumption patterns are also discussed. In chapter four, the role of government, including state and local government, in promoting sustainable households and communities and current policy frameworks and programs is examined.

Chapter five outlines the roles and responsibilities of consumers, barriers to households making environmentally sustainable choices and theoretical approaches to understanding household consumption and environmental behaviour.

The role of education in promoting sustainable household consumption and the development of an integrated strategic approach to sustainability are explored in chapter six.

Chapters seven, eight and nine address the first, second and third terms of reference. Although the issues of household energy, waste and water management overlap, they have been addressed in separate chapters. The nexus between these issues, for instance sustainable buildings and energy recovery from waste, is nevertheless explored in detail.

In chapter seven, methods of increasing the rate of recycling and waste prevention are discussed. The main barriers households and the community face in managing waste are also examined.

The terms of reference require the Committee to identify methods of promoting water efficiency and barriers to water conservation. These topics are explored in chapter eight along with the issue of alternative water supplies.

In chapter nine, the barriers to residential energy efficiency, the uptake of renewable sources of energy and the reduction of greenhouse gas emissions are discussed. Recommendations are made on improving the uptake of renewable energy and promotion of energy saving by households.

Chapter

2

# An introduction to sustainable communities

## Introduction

This chapter provides an introduction to the concepts of environmental sustainability, sustainable consumption and sustainable communities. The chapter discusses people's understandings of these concepts and their perceptions of household energy, waste and water. The importance of communities having tangible methods of measuring and understanding their impact on the environment is also discussed.

## Defining environmental sustainability and sustainable consumption

The release of the Brundtland report, *Our Common Future*, in 1987 resulted in the term 'sustainable development' being widely accepted and understood by the international community. The report defines sustainable development as the need to ensure that development meets the needs of the present without compromising the ability of future generations to meet their own needs.[1] The interdependence of ecological, economic and social issues is also emphasised in the Brundtland report which states that:

> The environment does not exist as a sphere separate from human actions, ambitions, and needs, and attempts to defend it in isolation from human concerns have given the very word 'environment' a connotation of naivety in some political circles.[2]

Since the late 1980s there have been literally thousands of definitions that have emerged of sustainable development, ecologically sustainable development and environmental sustainability. The terms are frequently used interchangeably, and vary according to the context and purpose to which they are applied.

However the essence of environmental sustainability is reflected in the commonly understood and valued principles of:

- intergenerational equity;

[1] The World Commission on Environment and Development, 1987, Our Common Future, p. 8

[2] Ibid, Chairman's Foreword, p. xv

- the precautionary approach;[3] and
- biodiversity conservation.[4]

The Victorian Commissioner for Environmental Sustainability in defining environmental sustainability has stated that:

> Throughout Australia and across the world, there is an increasing awareness about the impact of human activities on the environment. Environmental sustainability is about finding new [and] better ways of doing things to minimise this impact. It's about making sure the way we prosper now doesn't prevent others from prospering tomorrow.[5]

The 2003 New South Wales *State of the Environment* report notes that the wide use of the term 'sustainability' reflects a broad agreement that people living today have an obligation to protect the health, diversity and productivity of the environment for the benefit of current and future generations.[6]

The Committee was advised that environmental sustainability is an inherently difficult concept for people to understand. The Surf Coast Shire told the Committee that while there is considerable discussion and debate about the meaning of sustainability in professional and academic circles, for the general community, the jargon and technical information used when environmental sustainability is discussed can often be intimidating and discourage involvement in sustainable behaviour.[7] Surf Coast Shire's submission to the Inquiry states that because the concept of sustainability is complex and its definition unclear, it is difficult for people to identify sustainability targets on a household or community scale.[8] Environment Victoria also advised that people find it difficult to relate to environmental sustainability because of the sheer scale of issues such as the greenhouse effect.[9]

This evidence reflects the information provided to the Committee by the German Federal Environment Agency. An Agency study in 2002 found that although a large majority of Germans agree to the general principles of

[3] Where there are threats of serious or irreversible environmental damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. Decisions should be guided by careful assessment of risks to avoid serious or irreversible environmental damage. Source: Bayside City Council, 2002, Environmental Sustainability Framework, p. 13

[4] Source: www.deh.gov.au/esd/ accessed March 2005

[5] Department of Sustainability and Environment, undated, Commissioner for Environmental Sustainability: Frequently asked questions

[6] NSW Environment Protection Authority, 2003, State of the Environment 2003, Chapter 1

[7] Surf Coast Shire, submission no. 44, p. 2. Refer also to Mr D Voronoff, Director, Sustainable Living, Environment Victoria, transcript of evidence, 5 July 2004, p. 44; Ms C Evans, Education Team Leader, Centre for Education and Research in Environmental Strategies, transcript of evidence, 13 September 2004, p. 255; and Ms S Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 648

[8] Surf Coast Shire, submission no. 44, p. 2

[9] Mr D Voronoff, Director, Sustainable Living, Environment Victoria, transcript of evidence, 5 July 2004, p. 44

sustainability (i.e., the need to save resources, inter- and intra-generational fairness) the very concept of sustainability has remained largely unrecognised, with only a quarter of the people surveyed claiming to have heard of the term.[10] This finding clearly has implications for management and policy approaches to sustainable consumption. Similarly Mr Geoff Young, Manager of the Community Education Unit, Department of Environment and Conservation (NSW) advised that people do not understand the word 'sustainability' but they do understand the concept of change over time and that the environment might be deteriorating over a long time frame.[11]

People's limited understanding of the concept of sustainability and difficulties relating to it are not restricted to the general community. The City of Moreland stated that one of the key barriers to the adoption of more sustainable practices is the current poor understanding of sustainability principles by all stakeholders including the general community, building designers, housing developers and policy makers. In particular there is a lack of understanding of natural environmental cycles and the need to manage natural resources more sustainably.[12]

As with the case of 'sustainable development', over the years most of the work on sustainable consumption has shifted from discussing concepts and strategies to defining policy options.[13] It should however be noted that the concept itself – as well as the final goals and hence strategies to get there – so far has not been clearly defined. This observation the OECD made in 2002 remains accurate today. The organisation defines sustainable consumption as: *the consumption of goods and services that meet basic needs and quality of life without jeopardising the needs of future generations.*[14]

The European Environment Agency utilises the definition agreed to at the Oslo Roundtable on Sustainable Consumption and Production in 1994:

> Sustainable consumption is the use of goods and services that respond to basic needs and bring a better quality of life, while minimising the use of natural resources, toxic materials and emissions of waste and pollutants over the life cycle, so as not to jeopardise the needs of future generations.[15]

[10] Mr C Loewe, Desk Officer, Product Assessment and Ecolabelling, Federal Environment Agency (Germany), meeting, Berlin, 2 February 2005 and C. Loewe and M. Lichtl, undated, Overcoming the Communication Gap: Public-private Partnerships Towards Sustainable Lifestyles, p. 11

[11] Mr G Young, Manager, Community Education Unit, Department of Environment and Conservation, NSW, meeting, 26 October 2004, p. 465

[12] Ms N Krause, Team Leader, Sustainable Development, Moreland City Council, transcript of evidence, 23 August 2004, p. 222

[13] OECD Working Party on National Environmental Policy, July 2002, Policies to Promote Sustainable Consumption: an Overview, Policy Case Studies Series, p. 9

[14] Organisation for Economic Co-operation and Development, 2002, Towards Sustainable Household consumption? Trends and Policies in OECD Countries, p. 16

[15] Mr L Mortensen, Project Manager, Integrated Environmental Assessment, European Environment Agency, meeting, Copenhagen, 1 February 2005

But what does this actually mean for consumers, producers and governments? Individual consumers can reduce their impact on the environment by:

- purchasing and using fewer resources (for instance energy and water saving);
- purchasing and using more eco-efficient resources (for instance solar electricity);
- purchasing and using fewer products (for instance one television set instead of three);
- purchasing and using more eco-efficient products and services (for instance public transport); and
- producing less waste (avoid packaging and contributing to recycling schemes).[16]

The role of consumers, producers, governments and other stakeholders in household consumption will be discussed in chapters four and five.

## Sustainable communities

Governments worldwide are increasingly focussing their attention on the health and well being of communities. A community is commonly known as a group of people living in a specific locality and/or sharing similar interests. For instance, the theme of the Office of the Deputy Prime Minister in the United Kingdom is *Creating sustainable communities*. The concept of sustainable communities is described by the Office of the Deputy Prime Minister as follows:

> Creating sustainable communities requires a step change in the way our housing and communities are planned, designed and built. But creating sustainable communities is about much more than bricks and mortar. It is about good governance, public participation, partnership working and civic pride. It about learning from the mistakes of the past and linking social, economic and environmental programmes. [17]

Likewise in Canada[18] and the United States, programs and networks directed at promoting sustainable communities have been established. The not-for-profit Sustainable Communities Network in the United States describes sustainable communities as:

[16] Organisation for Economic Co-operation and Development Working Party on National Environmental Policy, 2002, Policies to Promote Sustainable Consumption: an Overview, Policy Case Studies Series, p. 12

[17] Office of the Deputy Prime Minister (UK) website at ww.odpm.gov.uk/stellent/groups/odpm_about/documents/page/odpm_about_025680_037477hcsp accessed May 2004

[18] The Sustainable Communities Knowledge Network, established by the Federation for Canadian Municipalities, provides guidance and information on a range of local environmental management issues including waste, water and energy

> integrative, inclusive and participatory. In many communities, large and small, rural and urban, issues are being addressed in an interconnected manner. They are demonstrating how innovative strategies can produce communities that are more environmentally sound, economically prosperous, and socially equitable.[19]

One of the more tangible definitions of sustainable communities comes from the Sustainable Communities Network program based at Edith Cowan University. The program states that:

> A healthy, sustainable community is one that has an explicit systemic (adaptive) approach to the integration of ecological, social, cultural and economic features to meet the needs of the present without compromising the needs of the future. It uses principles of inclusivity, connectivity, equity, security and precaution to make decisions about the use and distribution of resources and services. [20]

This definition is useful in that it incorporates the widely accepted World Commission on Environment and Development definition of environmental sustainability. The Department of Sustainability and Environment (DSE) in its submission to the Inquiry, defines sustainable communities as those that:

> ... use resources efficiently and maintain and invest in their region's natural assets. Sustainable communities will make connections between the impacts of their everyday actions and the short and longer term viability of their environment.[21]

The Committee was provided with an insight into many different types of communities working towards energy and water efficiency and the minimisation of household waste. Some communities were defined by their geographical location such as the Sustainability Street program; local government area; or township; for example the Anglesea Neighbourhood Environment Improvement Plan. Other communities were organised around social networks such as schools, for instance the Rutherglen Primary School Waste Wise Program and workplaces, such as Masterfoods in Ballarat.

The value and importance of tapping into existing social networks to promote environmental sustainability rather than just focussing on the individual consumer was emphasised in the evidence received by the Committee in Victoria and also overseas.[22] Dr Zoe Sofoulis, Senior Researcher, University of Western Sydney explained that discussions about daily living and water use occur in small groups of people:

> … in fact most of the real change … goes on in smaller clusters of people and at the middle levels of community organisation, whether it is the pseudo-public sphere

[19] Sustainable Communities Network website at www.sustainable.org/information/aboutusomhtml accessed May 2004

[20] Sustainable Communities Network website at http://scn.ecu.edu.au/about_us.php, accessed May 2004

[21] Department of Sustainability and Environment, submission no. 70, p. 5

[22] For example, WWF-Belgium is promoting household water conservation at the community level through existing social networks such as schools and sporting organisations as it is a more effective and straightforward process than trying to reach individuals separately. WWF European Policy Office, meeting, Brussels, 11 February 2005

> of the talkback radio, mums and dads at school groups or neighbours talking with each other. It is at that level that people start to talk about and question and change their own collective expectations about what is normal and how often you should shower, how often you should clean your clothes and how often you flush your toilets. That is probably the most vital level to get at, and that is the one that is usually missed in most research about water.[23]

Some witnesses argued that the process of developing sustainable communities is just as important as the environmental outcomes. For example, the Victorian Local Government Association advised that establishing relationships within communities and building the capacity of those communities to work together on environmental issues is a prerequisite for achieving environmental outcomes:

> sustainable communities are … environmentally sound with good programs on water and good programs on energy, but they are also communities that are economically robust and prosperous, and they are also communities that are engaged in the decision making that affects their own lives … that almost makes the other things possible – the greatest environmental outcomes and the greatest economic possibilities. Communities that are not engaged, that are not [taking ownership of] those projects and aren't part of the development and innovation of them, are in the long run not sustainable in themselves.[24]

However, one of the challenges for policy makers is the fact that many people do not view themselves as part of any particular community. The high level of personal mobility in today's society means that communities do not necessarily define themselves geographically. Schooling, shopping, employment and recreation may occur outside what was traditionally known as 'the community'; families rely less on community resources and current work patterns allow little spare time for community activities.[25] Consequently the level of enthusiasm for participating in sustainable communities is likely to vary depending on how strongly people identify with their neighbourhood.[26] The increasing trend towards individualism and the resulting impacts on household consumption are discussed further in chapter 3.

## Community perceptions of household energy, waste and water – the attitude-behaviour paradox

A sound understanding of community perceptions of energy, waste and water is essential for any government or organisation promoting sustainable consumption. This section highlights some of the key findings from the literature on community perceptions. However it is important to

[23] Dr Z Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, p. 600

[24] Mr J Osborne, Policy and Administration Officer, Victorian Local Government Association, transcript of evidence, 5 July 2004, p. 70. Refer also to Mr G Brown, Facilitator, Anglesea Neighbourhood Environment Improvement Program, transcript of evidence, 29 September 2004, p. 359

[25] Dr H. Blutstein, Director, Integrating Sustainability, submission no. 6, p. 17

[26] Ibid, p. 17

note that there is a fundamental disconnection between people's environmental attitudes or perceptions and behaviour, which has implications for management. Some of the reasons for this are explored in chapter 5.

An Australian Greenhouse Office (AGO) fact sheet states that changing household attitudes will not automatically lead to lower home energy use.[27] Several studies have noted there is a weak link between householders' attitudes to home energy use and the energy actions they undertake.[28] The AGO notes that people who believe conservation is the most important strategy for improving the future energy situation are no more likely than others to save energy.[29]

A report commissioned by the AGO on community perceptions of climate change found that:[30]

- 81 per cent of respondents regarded reducing their household's energy consumption as important or very important;
- factors that motivate people to reduce their energy use include financial benefits, understanding how the benefits outweigh the costs and health benefits; securing the environment for future generations, having proof that what one does will make a difference and feeling good because one is doing the right thing; and
- the main barriers to reducing household energy use identified by respondents were cost (25 per cent) and inconvenience (14 per cent). Twelve per cent of people advised that they did not know how to reduce energy consumption.

With regards to household consumption behaviour, the survey found that:

- the vast majority of respondents were prepared to pay a 5 per cent premium for an energy efficient appliance and half of these people would be prepared to pay a 20 per cent premium. Two thirds said they would be more likely to pay a premium if they knew the funds would help improve the environment; and
- the most common energy saving activities undertaken in the last six months were washing clothes in cold water (83 per cent), having the car serviced (79 per cent) and turning off unnecessary appliances at the power point (77 per cent). Less than one in ten people bought Green Power.

[27] Australian Greenhouse Office, undated, Motivating Home Energy Action, Fact Sheet 6 – Changing Household Attitudes

[28] Ibid

[29] Ibid

[30] Australian Greenhouse Office, 2003, Community Perceptions of Climate Change: a Report on Benchmark Research, prepared by Colmar Brunton Social Research and Redsuit Advertising

The Victorian Water Industry Association cited in their written submission research that provided some valuable insights into the community's perception of water.[31] One study categorised people according to their attitude towards water and found that the majority of people surveyed (65 per cent) either valued water highly as important to all aspects of their life or for its ecological function and indicated a concern for how much water is used and how much is being taken from the environment. However, a significant group (25 per cent) regard water as purely a consumer item or service similar to electricity or transport which should be available at all times with no limitations to its use. A third group (12 per cent) do not see water as being significant in any way to their lives.[32]

Research in Melbourne and Geelong found that the community values water most highly for personal consumption, personal hygiene and household cleaning. External uses (gardening and the environment) are of much less significance.[33] Interestingly, the Water Services Association of Australia found that the majority (90 per cent) of Sydney and Melbourne survey respondents believe their water consumption is either low or average which is a statistical impossibility.[34]

The Victorian community's attitudes to household waste will be explored further in chapter 7. However a survey commissioned for EcoRecycle reinforces the paradoxical pattern of perceptions and behaviours.[35] The survey was of 1,000 people across Victoria. The majority of respondents had strong positive attitudes towards waste reduction with people agreeing that kerbside recycling was an essential service; and that government had an important role to play in regulating products and packaging that lead to waste. Nevertheless, since a similar survey conducted in 1998, significant reductions were seen in the proportion of Melbourne residents agreeing:

- that governments had an important role to play;
- that consumers had influence over products sold;
- that manufacturers and distributors should contribute to the costs of recycling; and
- that there should be more opportunities to repair or recycle electrical appliances.

[31] Victorian Water Industry Association, submission no. 57, p. 2

[32] Nancarrow, B, Kaercher, J and Po, M, 2002, Community attitudes to water restrictions policies alternative sources: a longitudinal analysis 1988-2002, Australian Research Centre for Water in Society, CSIRO, p. 22

[33] Newton Wayman Chong and Associates, 2001, Customer Values Study, Quantitative Research Stage, Research report prepared for the System Security Standards Study Group, p. v

[34] Piccinin, C, 2004, Pricing for Water Conservation, Water Services Association of Australia Journal, Issue no. 1, p. 3

[35] EcoRecycle, 2001, Community Attitudes Survey, prepared by TNS Consultants, p. 67

Of concern is the finding that significantly more Melbourne residents stated that as long as rubbish was taken away, they were not concerned with what happened to it (18 per cent).

Importantly the Committee was told that many if not most people do not regard the issues of household energy and water conservation and waste reduction as discrete issues or even 'environmental' issues. Instead energy and water saving and waste minimisation are considered part of 'everyday living' and 'lifestyles'. For others, daily actions and choices to minimise environmental impacts have become habitual. As the German Federal Environment Agency explains:

> Regular representative [agency] surveys ... indicate a continuous (and marked) decline in the relevance of the environment issue in everyday policy. There is, on the other hand, also a permanent basic awareness and, to some degree, even a "routinisation" of environmentally oriented everyday behaviour.[36]

An example of this is people sorting waste fractions out of habit rather than a conscious decision to behave in an environmentally sustainable way.

## Measuring environmental sustainability and communicating outcomes

# Ecological footprint

A key theme to emerge during the Inquiry was that communities and individuals need to have a tangible way of understanding their impact on the environment in order to understand how to reduce that impact. The Australian Conservation Foundation (ACF) advised that consumers are generally unaware that their consumption of goods and services as individuals has a large impact on material flows, energy use and waste production.[37]

There are many well established methods of measuring and communicating progress towards environmental sustainability. One of the most popular and widely used models is the "ecological footprint". Developed in 1995, the ecological footprint was originally conceived as a simple method for comparing the sustainability of resource use of different populations. The consumption of these populations is converted into a single index - the land area that is needed to sustain that population indefinitely. This area is then compared to the actual area of productive land that the given population inhabits, and the degree of "unsustainability" is calculated as the difference between the available and required land.

[36] Loewe, C and Lichtl, M, undated, Overcoming the Communication Gap: Public-private Partnerships Towards Sustainable Lifestyles, p. 7

[37] Ms S Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 647

Unsustainable populations are populations with a higher ecological footprint than the available land.[38]

The method can be applied at a number of levels from an individual, to a household, council or country. Ecological footprint calculations are based on five assumptions:[39]

- it is possible to keep track of most of the resources people consume and the wastes they generate;
- resource and waste flows can be converted into the biologically productive area required to maintain the flows;
- different types of biologically productive areas can be expressed in the same unit once they are scaled proportionally to their productivity. In other words, each hectare of cropland, pasture, forest, and fisheries can be expressed in an equivalent area of world-average productivity;
- each standardised hectare represents the same amount of productivity and can be added up to a total. This total represents humanity's demand; and;
- the area for total human demand can be compared with nature's supply of ecological services, which may also be expressed in standardised units of productivity.

The AGO has used a number of different approaches in its programs to assist the community in understanding the link between energy use and greenhouse gas emissions.[40] The AGO's guide to reducing energy costs and greenhouse gases for households provides information on dollar and carbon dioxide savings that are achievable by switching to more energy efficient alternatives. The guide describes a kilogram of carbon dioxide as filling a large family fridge. A tonne of carbon dioxide would fill a family home. Each year, electricity for lighting the average Australian home generates about three-quarters of a tonne of greenhouse gas and costs about $90.[41]

The ecological footprint method has been criticised as an oversimplification of the environmental impacts of a community or population. In addition, the original method provided a single aggregated value which did not reveal

[38] Lenzen, M and Murray, S, 2003, The Ecological Footprint: Issues and Trends, University of Sydney, ISA Research Paper 01-03, p. 5

[39] Wackernagel, M; Monfreda, C and Deumling, D, 2002, Ecological Footprint of Nations November 2002 Update, How much do they use? How much nature do they have?, p. 3

[40] Ms B Pollock, Manager, Community Partnerships Team, Australian Greenhouse Office, meeting, 27 October, p. 550

[41] Australian Greenhouse Office, 2003, Global Warming, Cool It, a Home Guide to Reducing Energy Costs and Greenhouse Gases, pp. 3-4

where the impacts occur, their nature and severity and how these impacts compare with the restorative capability of the ecosystem in question, making it difficult to understand the specific reasons for the unsustainability.[42] However, the method has undergone significant development and modification over the last decade and at its most sophisticated uses the methodology of macro economics (input-output analysis). The accuracy of the measure is clearly dependent on the quality of data used.

The Environment Protection Authority (EPA) describes the model as a powerful communication tool as it quantifies the effect everyday activities have on the environment.[43] Australia's estimated footprint is 7.7 hectares, which compares unfavourably with the global carrying capacity of 2.2 hectares per person.[44] In 2001 the ecological footprint for the Australian population ranked fourth highest out of 150 countries.[45]

The Victorian Government's *Our Water Our Future* campaign describes water savings in terms of glasses of water. For instance reducing shower times from seven to four minutes saves 25,000 litres per person per year or 200 glasses of water per shower or every half-flush of a dual flush toilet saves 20 glasses of drinking water.[46] The Savewater website[47] uses the analogy of "average sized" domestic swimming pools (52,000 litres). For example, the average Melbourne household uses the equivalent of five domestic swimming pools per year of water.

The EPA has developed ecological footprint calculators for households, schools, offices and local governments. The calculators have been incorporated into a variety of community based programs in Victoria. The City of Port Phillip uses the EPA household ecological footprint calculator to measure the effectiveness of its Sustainable Living at Home program (SLAH). The program is designed to assist local residents to act cooperatively with their neighbours to reduce their impact on the environment.[48] Participants in the program made a commitment to reduce their footprint over a six month period.[49] The fourth SLAH program (run in

[42] Lenzen, M and Murray, S, 2003, The ecological footprint-issues and trends, University of Sydney, ISA Research Paper 01-03, p. 5

[43] Source: www.epa.vic.gov.au/Eco-footprint/default.asp accessed May 2004

[44] WWF, 2004, Living Planet Report 2004, p. 10 www.panda.org/downloads/general/lpr2004.pdf accessed March 2005

[45] Ibid. The WWF's Living Planet Report analyses the eco-footprint of 150 countries every two years. The 2004 report contains figures calculated for 2001. The United States had the second highest ecological footprint at 9.5 hectares per capita. The world average footprint was 2.2 hectares per person

[46] Our Water Our Future, Be A Water Saver, Saving Inside, www.ourwater.vic.gov.au/ourwater accessed February 2005

[47] Savewater website www.savewater.com.au accessed February 2005. The savewater website is a national website sponsored by the water industry, organisations from all levels of government, non government environmental organisations and manufacturers of water efficient technology

[48] City of Port Phillip, submission no. 45, p. 2

[49] Environment Protection Authority, submission no. 73, p. 7

2003-04) resulted in a total reduction in footprint over all 180 participating households of 8 per cent.[50] The City of Port Phillip advised the Committee that, when it first ran the SLAH programs, there was no means of measuring progress. However, the ecological footprint has provided a mechanism for the program to monitor changes in each participating household against pre determined targets.[51]

Bayside City Council calculated that the average ecological footprint for its residents was 8.3 hectares per person.[52] However the Council explained that this result did not resonate with all residents and did not challenge people's values and beliefs.[53]

The City of Newcastle has developed a computer based program called climatecam that tracks electricity, gas and water consumption, waste sent to landfill and number of registered motor vehicles in the municipality. The climatecam website[54] is updated monthly and can be accessed by the community. It also shows how the Council's sustainability programs are performing.[55]

## ICLEI ecoBudget

Another method of measuring the progress being made by local authorities on environmental sustainability issues was explained to the Committee by representatives from the Freiburg (Germany) office of Local Governments for Sustainability (ICLEI).[56] ICLEI describes the ecoBudget system as follows:

> In conformity with community (financial) budgeting, limited resources [such as] natural resources, air, climate, water, soil, animal and plant species, as well as human well-being – are budgeted by the community. The town or district council determines a periodic environmental budget which sets budgetary limits and environmental quality goals for the use and consumption of natural resources. The implementation of the environmental budget in the course of the environmental budgetary year is monitored, results are consolidated at the end of the year and an environmental balance sheet compiled and published in a report. This cycle is known as ecoBudget.[57]

Mr Holger Robrecht, Director for Sustainability Management, ICLEI explained that the concept is based on the premise that if artificial

[50] City of Port Phillip submission no. 45, p. 3

[51] Mr R. Palmer, Manager, Infrastructure and Environment, City of Port Phillip, transcript of evidence, 9 August 2004, p. 192

[52] Bayside City Council, 2004, Bayside's ecological footprint

[53] Mr M Dodd, Environment Policy Officer, Bayside City Council, transcript of evidence, 11 October 2004, p. 422

[54] Source: www.ncc.nsw.gov.au/services/environment/ameif/climatecam/main.cfm

[55] Ms K McIntyre, Project Manager, REFIT Program, City of Newcastle, meeting, 25 October 2004, p. 462.

[56] Mr H Robrecht, Director for Sustainability Management, Local Governments for Sustainability (ICLEI), meeting, Freiburg, 4 February 2005

[57] ICLEI, 2004, The ecoBudget guide, pp. 11-12

resources such as money can be managed through budgeting then natural resources can also be managed through this means. The concept is also designed to maintain the political momentum for sustainability concurrently with the annual financial budgeting process. The system applies to the whole of a municipality and requires council ratification to ensure political legitimacy. It is also a means of linking local action with global sustainability issues as well as political and community involvement. There are a number of local authorities implementing the system in Europe including the City of Växjö, Sweden and Lewes District Council, United Kindgom as well as a council in New South Wales.

## Decoupling

Another, albeit high level measure of progress towards environmental sustainability is the concept of decoupling. Decoupling refers to breaking the link between environmental problems and economic growth. Decoupling occurs when the growth rate of an environmental pressure is less than that of its economic driving force (e.g. gross domestic product) over a given period.[58] Examples of decoupling indicators include carbon dioxide emissions from electricity generation, discharges of nutrients from households into the environment versus total population and direct material input per unit of GDP.

The principle of decoupling has been incorporated into agendas of international organisations including the OECD and European Commission and some individual countries such as Austria, Italy and Japan. The EEA explained to the Committee that decoupling may be relative or absolute.[59] In the case of EU-15 countries,[60] relative decoupling has occurred on the measures of global use of material resources, fossil energy use and consumption of raw materials. However in absolute terms the use of resources remains unsustainably high. There are also issues relating to transferral of production problems overseas through imports.

Decoupling is a powerful concept because of its graphic simplicity. However there are limitations associated with the measure. For example the decoupling concept does not take into account the environment's capacity to sustain, absorb or resist pressures of various kinds.[61] As noted above, the cross-border flow of environmental externalities is not captured in the decoupling measure. Furthermore, the OCED states that:

> … the relationship between economic driving forces and environmental pressures, more often that not, is complex. Most driving forces have multiple environmental

[58] Organisation for Economic Cooperation and Development, 2002, Indicators to Measure Decoupling of Environmental Pressure from Economic Growth, p. 4

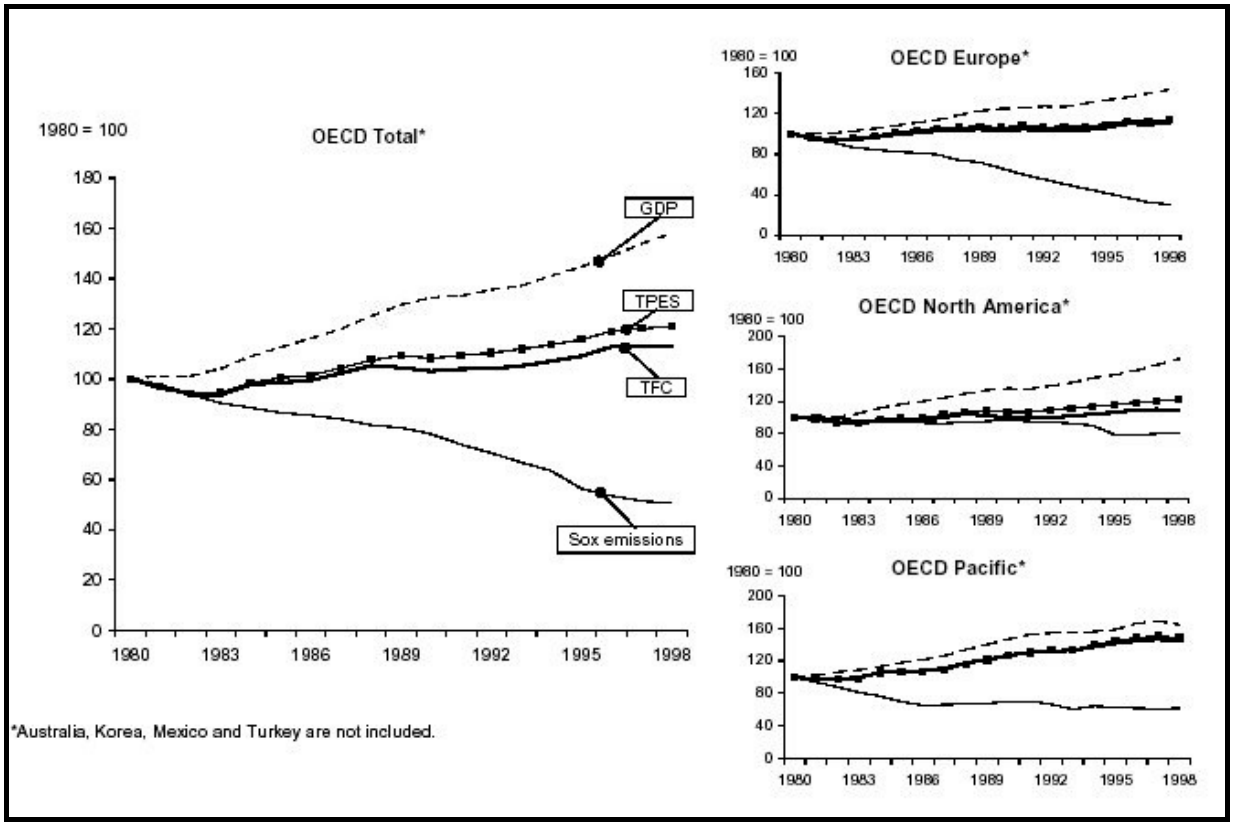
[59] This section is based on the Committee meeting with Mr P Kazmierczyk, Project Manager – Material Flows, European Environment Agency, Copenhagen, meeting, 1 February 2005

[60] The EU-15 countries are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and United Kingdom

[61] Organisation for Economic Cooperation and Development, 2002, Indicators to Measure Decoupling of Environmental Pressure from Economic Growth, p. 17

effects, and most environmental pressures are generated by multiple driving forces, which, in turn, are affected by societal responses…[62]

## Figure 1: SOx Emissions from Energy versus GDP, 1980-1998 [63]




Source: Organisation for Economic Cooperation and Development, 2002, Indicators to measure decoupling of environmental pressure from economic growth, p. 5.

[62] Ibid, p. 17

[63] SOx – sulphur oxides, TPES – total primary energy supply, TFC – total final consumption

Chapter

3

# The environmental impact of households

## Introduction

All householders have an impact on the environment through their day-to-day activities and decision making. What households consume, how they consume and the by products of this consumption affect the environment. Household consumption is relatively minor when compared to industry, however the environmental impact of households is significant in the areas of energy and water use, waste generation and travel.[1] In Victoria there has been a trend toward increased energy use and waste production in the home, and a decline in per capita water use, which is explored in this chapter. This chapter also provides an overview of how energy and water are used in the typical Victorian household, the type and volume of waste households produce and the environmental impacts of household consumption.

## The residential and industrial sectors

In Victoria the industrial sector uses the largest proportion of the state's energy. Victorian households account for just over one third of the total energy that is consumed in the state.

The construction and demolition sector is the largest producer of waste in Victoria. Municipal sources of waste, which include households and public areas such as parks and gardens, contribute nearly 30 percent of all the waste that is produced in Victoria.

The agriculture industry is the highest consumer of water in Victoria, accounting for over 50 per cent of the state's total water usage. Household water use makes up just under 7 per cent.

Figures 2 and 3 provide a breakdown of energy and water use and waste production by sector, placing household consumption into context.

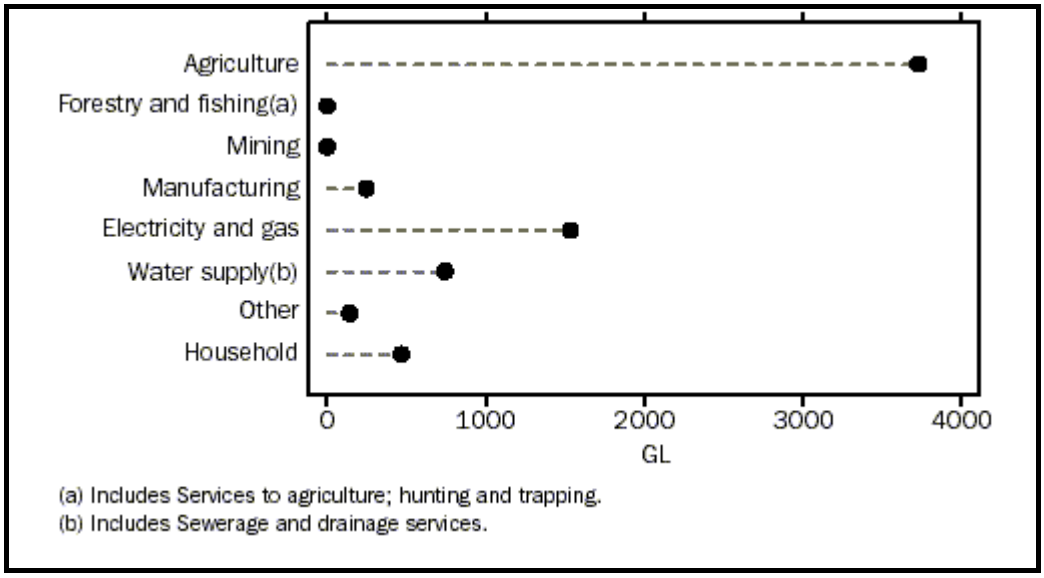
[1] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption:Ttrends and Policies in OECD Countries, p.21

## Figure 2: Energy Consumption and Waste Production by Sector in Victoria

| Type | Sector | Percentage |
|---|---|---|
| Energy Consumption[2] | Industrial | 55 |
| | Residential | 35 |
| | Commercial | 10 |
| Waste Generation[3] | Construction and Demolition | 43 |
| | Municipal | 29 |
| | Commerce and Industry | 28 |

Sources: Sustainable Energy Authority Victoria and EcoRecycle

## Figure 3: Water Consumption, Victoria 2000-01




Source: Australian Bureau of Statistics, 2004, ABS Water Account 2000-01, p. 11

The situation in Victoria reflects a national and international trend where industry rather than households dominates energy and water consumption, and waste generation. In this context the impact of an individual household on the environment may seem relatively minor. However what Figures 2

[2] 2000-01 data, Sustainable Energy Authority Victoria, Current Energy Situation, www.sea.vic.gov.au, accessed February 2005

[3] 2002-03 data. personal communication, Ms J Pickles, Manager Strategy and Regional Programs, EcoRecycle Victoria, 20 April 2005

and 3 also show is that cumulatively, households have a significant impact on total consumption and this is projected to intensify. Therefore decision making at the household level on whether to install insulation, convert to a water saving front loading washing machine, to drive or catch public transport to work, for example, can directly influence the contribution that the residential sector makes to energy and water consumption, and waste generation.

The link between household demand for goods and services and the activities of industry was highlighted throughout the Inquiry. Industry, including agriculture, uses energy and water as part of producing goods and services that are consumed by households, some obvious examples include food, textiles and clothing, and appliances. Ms Suzie Brown from the Australian Conservation Foundation told the Inquiry:

> Small things people can do in their lifestyles and that chain of impact through not consuming or demanding goods and services can really have a huge impact, to the point where we can avoid having to build huge amounts of infrastructure in the first place. [4]

In this sense, households have a much wider, indirect impact on energy and water consumption, and waste generation. This chapter however concentrates on household energy, waste and water with brief references to food consumption and travel.

## Household energy and water consumption and waste production

This chapter focuses on the occupation phase of a household, however the process of constructing a house also has an immediate impact on the environment and also influences the occupation phase.

Activities such as the construction, refurbishment and demolition of buildings directly impact on the environment through the use of resources like land, building materials such as timber, plastics, iron and steel, and energy use.[5] The level of environmental impact depends on the source of the building material, how it is produced and the material's lifespan.

House construction and demolition also produces large amounts of waste such as soil rubble, clay based waste such as bricks and tiling, concrete based masonry and plaster board which in Australia is often sent to landfill.[6]

The energy used by the construction industry is relatively low but the energy embodied in building materials is much higher. In construction terms, embodied energy is the total energy used in the processing of materials,

[4] Ms S Brown, Australian Conservation Foundation, transcript of evidence, 23 November 2005, p. 647

[5] Organisation for Economic Cooperation and Development, 2003, Environmentally Sustainable Buildings: challenges and policies, p. 14

[6] Australian Bureau of Statistics, 2003, Year Book Australia, Construction and the Environment, accessed online at www.abs.gov.au March 2005

manufacturing of building materials and components to be assembled on site, the transportation of building materials to the site, and their assembly on site.[7] Concrete and timber have the lowest embodied energy intensity, compared to stainless steel which has high energy content. In Australia, the energy embodied in the existing building stock is equivalent to about 10 years of the total energy consumption for the country.[8]

## Household energy consumption in Victoria

Electricity and gas are the main energy sources used within the home, however overall the household sector is becoming more electricity intensive- that is the use of electricity is increasing faster than the overall level of energy use.[9]

A typical Victorian household uses 5,330 kilowatt hours of electricity per year.[10] The 2001 Victorian Utility Consumption Survey found that all households surveyed used electricity and 94 per cent also used gas. Gas was used considerably more than electricity for hot water and heating purposes in Victorian households. Seventy eight per cent of households used gas for hot water and around 88 per cent used gas for heating. Many households used a combination of gas and electricity for cooking.[11]

The typical Victorian household uses 58 per cent of their total energy consumption to heat the house (Figure 5). This is greater than the Australian average due to the cooler southern climate.

Central heating is becoming more common in Victoria, with about 70 per cent of new homes built having central heating systems installed.[12] Figure 5 shows that the amount of energy used by households for cooling is small, but is expected to grow. On a national level, Mr Brad Page from the Energy Supply Association of Australia told the Committee:

> The growth of residential air conditioning in Australia is very substantial. We are seeing penetration rates in new housing developments approaching 60 per cent. We are seeing the installation of home air-conditioning in old developments rising at a very substantial level. [13]

[7] Organisation for Economic Cooperation and Development, 2003, Environmentally Sustainable Buildings: Challenges and Policies, pp. 24-25

[8] Australian Bureau of Statistics, 2003, Year Book Australia, Construction and the Environment, accessed online at www.abs.gov.au March 2005

[9] Clean Energy Future Group, 2004, A Clean Energy Future for Australia, p. 50

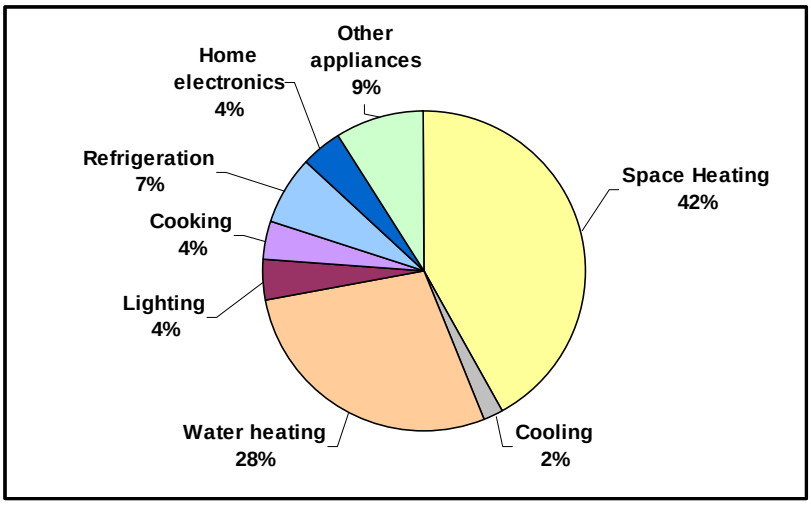
[10] Sustainable Energy Authority Victoria website www.seav.vic.gov.au/renewable_energy/wind/wind_guidelines/calculating_benefits.html accessed March 2005

[11] Victorian Utility Consumption Survey 2001, p. iii, prepared for the Department of Human Services 2002. Accessed online at http://hnp.dhs.vic.gov.au/wps/portal March 2005

[12] Sustainable Energy Authority Victoria, submission no. 72, p. 19

[13] Mr B Page, Chief Executive Officer, Energy Supply Association of Australia, transcript of evidence, 23 November 2004, p. 629

## Figure 4: Projected Residential Energy Use by Purpose (2005)




Source: Productivity Commission, 2005, Energy Efficiency Draft Report, p. 99[14]
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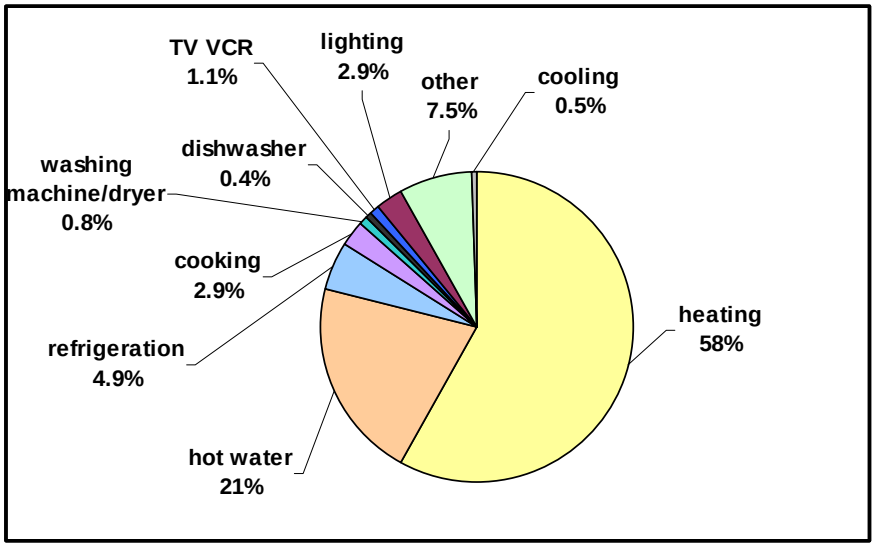
Energy used to heat hot water is substantial, totalling just over one fifth of total energy used in the home. Refrigeration also uses a considerable proportion of energy. One third of Australians have two or more fridges.[15]

Another way of understanding and communicating household consumption of energy is to look at reducing energy use and the associated cost savings. The average Victorian household spends $1,300 annually on energy.[16]

## Figure 5: Typical Victorian Household Energy Use (1999)




Source: Sustainable Energy Authority Victoria, submission no. 72, p. 7

[14] Prepared as part of the modelling work for the National Framework for Energy Efficiency
[15] Australian Greenhouse Office, 2003, Global Warming, Cool It! , p. 5
[16] Department of Sustainability and Environment, submission no. 70, p. 8

One of the problems the Committee encountered in evaluating the energy consumption of households and consequent greenhouse gas emissions was the lack of current data. The Committee sought up-to-date Victorian data from Sustainable Energy Authority Victoria, Department of Sustainability and Environment and the Department of the Environment and Heritage.[17] However the most recent dataset available is now six years old. Given that energy consumption is steadily rising in Australia and influenced by a number of emerging drivers, the Committee believes it is important that policy makers have access to current data, in order to make informed management decisions. The community also needs to be confident that policy decisions are well informed. Therefore the Committee recommends that:

**Recommendation 3.1**

**The Department of Sustainability and Environment and Sustainability Victoria collect data on the energy consumption of Victorian households and greenhouse gas emissions from the residential sector at least every three years. The findings should be published in the Victorian Greenhouse Gas Inventory.**

## Private household travel in Victoria

Personal travel choices are influenced by a complex set of interconnecting factors; transport technology, road systems and urban infrastructure, income, work patterns and leisure activities.[18]

After buying a house, a car is generally the second largest capital purchase a household will make. The use of this car is one of the most significant ways in which households will have an impact on the environment. Many different factors influence levels of car ownership, such as income level, car prices and demographic trends. Ownership levels are increasing in Victoria. In 2003 there were 573 passenger cars registered per 1000 people in Victoria, up from 516 cars per 1,000 people in 1993, one of the highest levels in Australia.[19] Although this trend may taper off, as has been the case in European countries where car ownership reaches saturation point at about 600 cars per 1,000 people.[20]

Figure 6 illustrates household dependency on private cars as a mode of transport. These figures are based on Melbourne data, however they are

[17] personal communication, Ms K Woolfe, Functional Leader, Best Practice and Standards, Sustainable Energy Authority Victoria, 10 March 2005; personal communication, Ms B Pollock, Manager, Community Partnerships Team, Department of the Environment and Heritage, 15 March 2005 and personal communication, Mr D Gladman, Senior Policy Officer, Greenhouse Policy Unit, Department of Sustainability and Environment, 5 April 2005

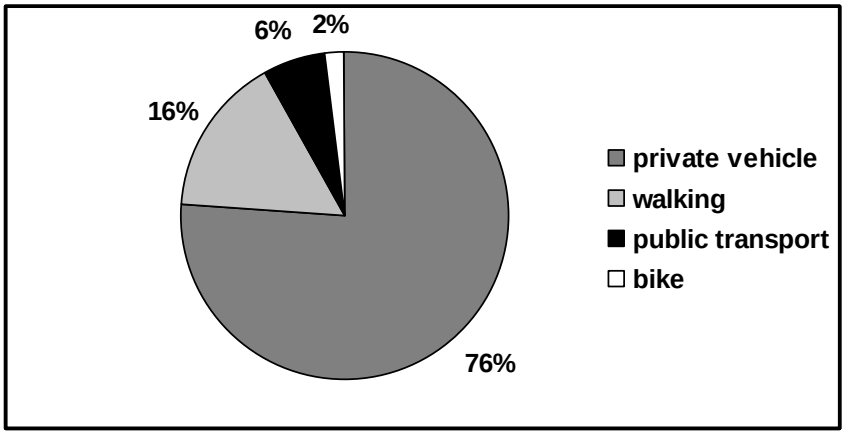
[18] Michaelis, L and Lorek, S., 2004, Consumption and the Environment in Europe: Trends and Futures, p. 37

[19] Australian Bureau of Statistics, 2004, Measures of Australia's Progress: transport. Accessed online at www.abs.gov.au, March 2005

[20] Mr Ruffing, Deputy Director, Sustainable Materials and Waste Management, National Policies, Environment Directorate, OECD, meeting, Paris, 7 February 2005

reflective of a state-wide reliance on private vehicles. Comparatively, the inner Melbourne area is less reliant on the private motor vehicle than the outer Melbourne urban areas. Provincial Victorian cities have similar private vehicle use to outer urban areas of Melbourne.[21]

## Figure 6: Personal Travel in Melbourne (percentage of trips)




Source: Victorian Activity and Travel Survey 1999, cited in Department of Sustainability and Environment, submission number 70, p. 11

Households use cars for three main reasons:[22]

1. commuting to work and work related travel;

2. family and civic excursions such as shopping; and

3. recreational trips.

Car use has become customary in society and it can be difficult to participate in employment and social activities without a car. For many households, car use has become habitualised regardless of the distance or purpose of a trip. Of the total car trips made in Melbourne, 40 per cent are less than three kilometres in distance.[23]

The amount of energy a car uses depends on a number of factors including the way it is driven. Excessive acceleration, high speed and stop-start driving is fuel inefficient.[24] The vehicle type also influences energy use, depending on engine size, the type of fuel used and fuel efficiency. The Committee was advised by Mr Ming Yang, Energy and Environment Economist, International Energy Agency that a manual four cylinder (2.2

[21] Mr A Parker, submission no. 15, p. 7. Provincial cities include Bendigo, Shepparton, Ballarat, Mildura, Latrobe Valley, Wodonga, Greater Geelong and Warnambool

[22] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption: Trends and Policies in OECD Countries, p. 35

[23] Coalition for Peoples Transport, submission no. 25, p. 19

[24] RACV website http://motoring.racv.com.au/service/environment8.cfm accessed February 2005

litre) car uses 40 per cent less fuel that a six cylinder automatic car.[25] In general fuel efficiency has improved in the past decade.[26] However there has been a growing demand for large luxury cars and four-wheel-drives which consume comparatively more fuel than smaller vehicles. In 1992 8 per cent of new cars sold nationally were four wheel drives, in 2002 this figure grew to 17 per cent.[27]

While private car use has the biggest environmental impact in relation to household travel, the impact of aviation is becoming increasingly significant. The environmental impact of air travel is beyond the inquiry's terms of reference, but worth noting.

Air travel is becoming increasingly popular in Australia and has been growing steadily, apart from a 12 month decline after the September 11 attacks in the United States. Over 36 million passengers travelled on domestic flights in Australia during 2003-04, an increase of 13 per cent on the year before. During 2003-04 the domestic aviation industry had 8 of their 10 busiest months in history.[28] Despite a decline after September 11 and Severe Acute Respiratory Syndrome in 2003, international inbound and outbound travel has also been increasing steadily.[29]

The size of Australia and the distances between major cities means that flying is frequently the most convenient and cost effective way of travelling. Air travel has also become more accessible internationally with the costs of flying declining significantly since the 1950s.[30] Globalisation has meant that air travel for work and recreational purposes has increased. Air travel has an impact on the environment through the burning of fuel which creates greenhouse gas emissions. A typical long haul flight involves burning half a tonne of fuel per passenger.[31]

## Household water use in Victoria

Despite being the driest inhabited continent, Australia is one of the largest extractors of fresh water in the OECD. Domestic water consumption in Australia is about 30 per cent higher than the OECD average.[32] Household water consumption in Europe averaged between 100-250 litres per person

[25] Mr M Yang, Energy and Environment Economist, Energy Efficiency and Environment Division, International Energy Agency, meeting, Paris, 8 February 2005

[26] The Australian Greenhouse Office, 2000, National Greenhouse Gas Inventory, Transport Fact Sheet, p. 2

[27] Australian Bureau of Statistics, 2004, Measures of Australia's Progress: transport

[28] Bureau of Transport and Regional Economics, 2004, Australian Domestic Airline Activity 2003-04, pp. 1-3

[29] Bureau of Transport and Regional Economics website www.btre.gov.au/statistics/aviation/international.aspx , accessed March 2005

[30] European Environment Agency, meeting, Copenhagen, 1 February, 2005

[31] Michaelis, L and Lorek, S., 2004, Consumption and the Environment; trends and futures, p. 41

[32] Department of Environment and Heritage, Urban Water Statistics in Australia. Accessed online at www.deh.gov.au/water/urban/statistics.html February 2005

per day in the mid to late 1990s.[33] The average Melbournian used 423 litres per day in the 1990s.[34] In 2004, that figure dropped to 339 litres per day.[35]

Comparatively, Melbourne uses less water per capita than Sydney and Perth.[36] However, if Melburnians continue to use water in the future at the same rate and in the same way as they did in the 1990s, the city may approach its supply limits within 15 years.[37]

The Committee experienced difficulties in accessing consistent and reliable data on household water use. Household water consumption is hard to measure accurately as households are one of several groups drawing water from the public water supply. In addition methods of measurement and reporting on water use differ between organisations and countries, making comparisons difficult. Some measurements are per capita, others per household. Some measurements are based on the total amount of water supplied, others only include water supplied to the residential sector. For example, the per capita water use statistics in the State government's water white paper include water allocated to residents and industry.

Central Highlands Water described the problems they encountered regarding water use data when reviewing their wastewater treatment plant in Daylesford. The University of Ballarat was engaged to conduct a study which included typical household water use. Central Highlands Water Chief Executive Officer, Mr Neil Brennan, told the Committee:

> We had people keeping diary entries of how often they used a dishwasher, how many showers they had and how often they flushed the toilet. There is no data out there that gives you those sorts of results. We all talk in percentages.[38]

Ms Shirley Gato from RMIT University advised a Museum Victoria seminar Water future: re-imagining the suburb, that there is a lack of residential water end use data.[39] She presented the findings from a limited Yarra Valley Water survey of 25 Yarra Valley Water staff, conducted over 3 weeks in February 2001. The authority is currently collecting further data. The RMIT study found that average daily water use of households participating was 1,023 litres. Per person, the daily average water use in the home was

[33] European Environment Agency, 2003, Europe's water: an indicator-based assessment, Topic report 1/2003, p. 89

[34] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 96

[35] Gray, D, 'Water curbs relaxed after almost two years', The Age, 22 February 2005 p. 3

[36] Mr Tony Kelly, Yarra Valley water, transcript of evidence, 8 November 2004 p. 594

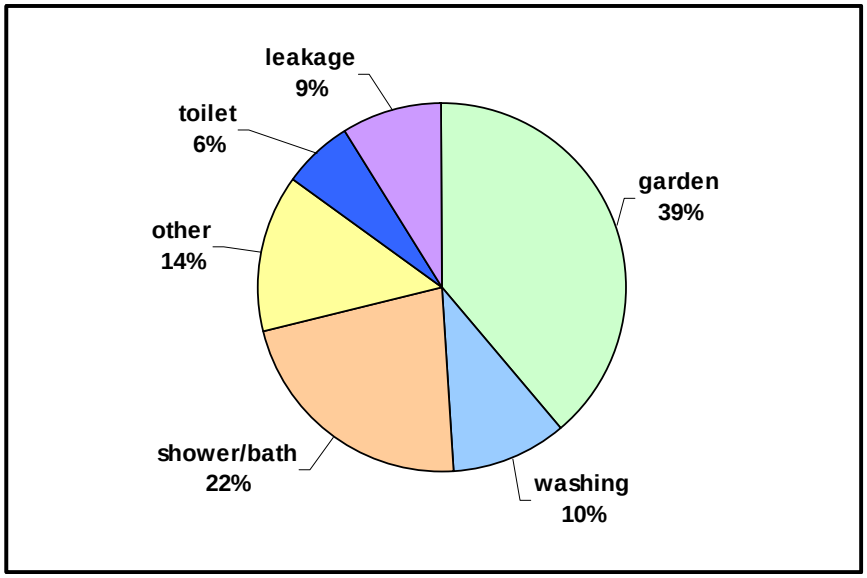
[37] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 94

[38] Mr N Brennan, Chief Executive Officer, Central Highlands Water, transcript of evidence 28 September 2004, p. 330

[39] Ms S Gato, PhD Student, RMIT University, Water futures: re-imagining the suburb, 19 October 2004, Museum Victoria

308 litres.[40] The end use of water by households involved in the study is summarised in Figure 7.

## Figure 7: Household Water Use by Activity




Source: Gato, S.A., et al, 2004, Understanding Residential Water Use. Paper presented to the ENVIRO04 Convention and Exhibition, 28 March – 1 April 2004, Sydney, NSW, Australia

The Committee received information from several sources regarding typical household water use, each varying slightly.[41] A consistent theme was that water use outdoors, in particular on gardens, is the biggest single area of use. In Melbourne for example English style gardens, which are not drought resistant and require regular watering, are popular. The bathroom was the second largest area of water use in the home with old style showerheads using 20 litres of water a minute, a running tap 9 litres of water a minute, and a single toilet flush up to 11 litres. In other areas of the house, washing machines use about 120 litres of water per load and a dishwasher uses between 16 and 32 litres per load.[42]

While the Committee found inconsistencies in data relating to household water use (the total volume and by activity), there was also a difficulty accessing recent data comparing water use by sector in Victoria. For example the statistics available on water consumption that are used in the *Securing Our Water Future Together* Green Paper [43] and cited in the Department of Sustainability and Environment's submission, are based on water use data from 1996-97.[44] As in the case of household energy

[40] Gato, S.A., et al, 2004, Understanding Residential Water Use. Paper presented to the ENVIRO04 Convention and Exhibition, 28 March – 1 April 2004, Sydney, NSW, Australia p. 5.

[41] For example, the Department of Sustainability and Environment submission cited data on residential water use from the 21st Century Melbourne: a WaterSmart City, p.40 which listed usage as: garden 35%; bathroom 26%, toilet 19%; laundry 15%; and kitchen 5%

[42] Our Water, Our Future website (www.ourwater.vic.gov.au/ourwater/dsenowof.nsf/LinkView ) accessed February 2005

[43] Department of Sustainability and Environment, 2003, Securing Our Water Future Green Paper for Discussion , p. 20

[44] National Heritage Trust, 2000, National Land and Water Audit

consumption, the Committee believes that management decisions should be based on sound up to date data. Such data is also important for gauging the effectiveness of water policies and programs. Therefore the Committee recommends that:

**Recommendation 3.2**

**Water authorities, in cooperation with the Department of Sustainability and Environment and Sustainability Victoria, collect and publish data at least every three years on:**

- **the total volume of water consumed by households;**
- **water use by household activity; and**
- **water use by sector.**

## Household waste production in Victoria

Of OECD countries Only the United States produces more waste per capita than Australia.[45] It is estimated that each Victorian household produces 540 kilograms of garbage a year.[46]

In Victoria, over 50 per cent of waste materials are recovered for reprocessing, and Victorian households recycle on average 34 per cent of their waste, in particular paper, plastics and glass. [47] However, what is not recycled usually ends up as landfill, and the Committee was advised by the Australian Conservation Foundation that around 60 per cent of all household purchases end up in landfill within six months.[48]

Figure 8 shows the type of waste being collected from Victorian households through kerbside waste collection. It is clear that garbage makes up the majority of household waste. Of the waste that is recycled, paper constitutes the largest proportion by weight (55 per cent), followed by glass (26 per cent) and plastic, steel and aluminium (19 per cent).[49]

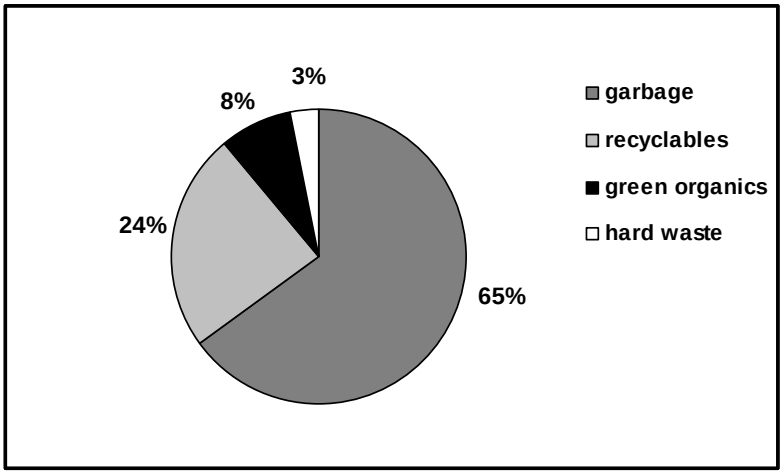
Green household waste was identified by witnesses to the Inquiry as an area where recycling rates could be improved. Currently half of metropolitan Melbourne and one of the three major provincial cities are provided with a green collection service, and during 2002-03 the equivalent of 96 kilograms of green waste per household was collected.[50]

However, of the waste going to landfill from Victorian households, 10 per cent is green waste that could have been diverted to compost or mulch.

[45] Department of Sustainability and Environment, submission no. 70, p. 13
[46] EcoRecycle website, www.ecorecycle, accessed February 2005
[47] EcoRecycle, 2004, Local Government Data Collection, 2002-2003, Waste Management Series, p.ii
[48] Ms K Noble, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 648
[49] EcoRecycle, Municipal Waste, www.ecorecycle.vic.gov.au, accessed February 2005
[50] Ibid

One of the problems with disposing of green waste is that it emits methane, which is 20 times more potent than carbon dioxide as a greenhouse gas.[51] There are a number of issues surrounding the collection and recycling of green waste in Victoria which will be discussed in Chapter 7.

## Figure 8: Composition of Waste Processed through Kerbside Service, Victoria 2002-03




Source: EcoRecycle website, www.ecorecycle.vic.gov.au, accessed March 2005

## Trends in household energy and water consumption and waste production

Victoria's trends in household energy and water use and waste production follow those of other OECD countries, as follows:

- household energy demand continues to grow, although at a slower rate than in the past, despite efficiency gains for many household energy end uses;
- household water consumption has stabilised or declined in a number of OECD countries; and
- the generation of household waste continues to grow and is projected to increase further to 2020.[52]

Victorian household energy consumption is projected to rise and the average rate of energy consumption growth in Victoria per year was identified by various Inquiry witnesses as being between 2.2 and 2.5 per cent.[53] The Australian Bureau of Agriculture and Resource Economics

[51] Ibid

[52] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, p. 45

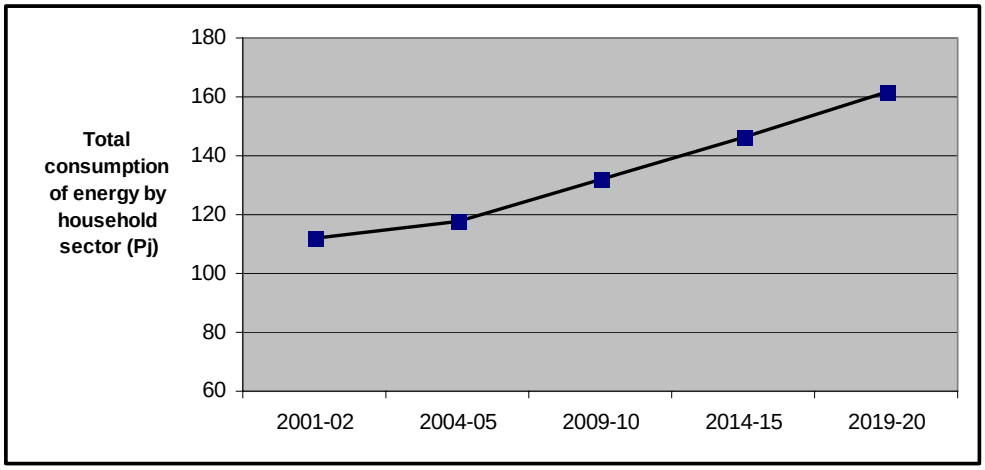
[53] Department of Sustainability and Environment, submission no. 70, p. 8 and Energy Supply Association of Australia, transcript of evidence, 23 November 2004, p. 634

predicts a similar increase in household energy consumption in Victoria, as illustrated in Figure 9.

Private car use has been increasing while public transport use has declined in Melbourne. Of particular interest is the growing number of car trips being made with only one occupant.[54]

Water use per household in Victoria is declining. In Melbourne, the daily per capita consumption of water dropped by about 100 litres between the 1990s and 2004.[55] However, the trend is toward a greater amount of water being used by the residential sector because of an increase in population. It is estimated that by 2030 Melbourne will potentially have one million more residents and at current per capita usage rates the city will use 659 gigalitres a year, exceeding the capacity of Melbourne's water supply.[56]

## Figure 9: Projected Primary Energy Consumption by Victorian Households [57]

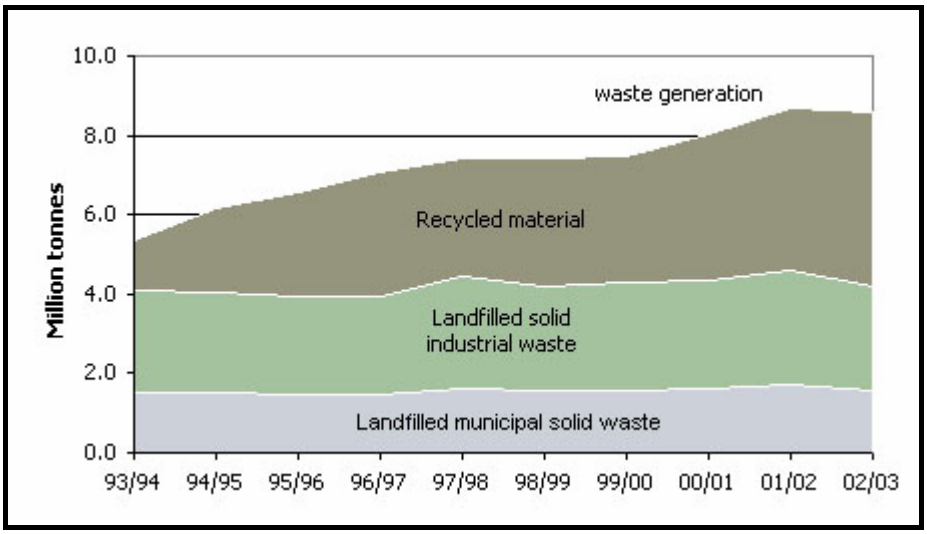



Source: derived from ABARE, 2004, Australian Energy National and State projections to 2019-2020, p. 70

Recycling rates in Victoria have been improving. In 2002-03, 95 per cent of Victorian households had kerbside recycling systems.[58] In the same period Victorians diverted 34 per cent of their kerbside waste from landfill.[59] However, Figure 10 illustrates that while an increasing proportion of waste is being recycled the total amount of waste in Victoria is increasing.

[54] Mr A Parker, submission no. 15, pp. 5 and 10
[55] Gray, D, 'Water curbs relaxed after almost two years', The Age, 22 February 2005, p. 3
[56] Department of Sustainability and Environment, submission no. 70, p.18
[57] These figures do not include transport related energy use
[58] EcoRecycle website, Municipal Waste (www.ecorecycle.vic.gov.au) accessed February 2005
[59] Ibid

## Figure 10: Solid Waste Generation in Victoria 1993/94-2002/03




Source: EcoRecycle Annual Report 2003-04, p.24

While energy and water use, and waste generation impact on the environment, households have an even greater impact on the environment through food consumption. It is estimated that close to half of the impact of human activity on the environment is directly or indirectly related to food production and consumption.[60] Ecological footprinting of the average Australian shows that 42 per cent of an individual's impact on the environment is through food consumption.[61]

The purchase, preparation, storage and disposal of food have an environmental impact. Householders use the car when shopping for food, use water and energy to wash and cook food, store food in a refrigerator or freezer and then dispose of food scraps and packaging waste.[62] Households have a large indirect environmental impact through the food supply chain. Food production and distribution involves a series of activities, with the agricultural sector producing the food, which is then transported to be processed and packaged, then transported to retail outlets. Resources such as soil, animal feed, energy, water, fuel, and packaging materials are used during this process which results in soil loss, polluted runoff, greenhouse gas emissions, solid waste and waste water production.[63]

Some recent trends in food consumption include an increased demand for exotic foods and out of season fruits which has transport implications, an

[60] Michaelis, L and Lorek, S, 2004, Consumption and the Environment in Europe: Trends and Futures, p. 12

[61] Australian Conservation Foundation website www.acfonline.org.au, accessed February 2005

[62] Michaelis, L. and Lorek, S., 2004, Consumption and the Environment in Europe: trends and futures, p. 11

[63] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, pp. 25-26

increase in pre-prepared and frozen meals which require packaging, and an increase in eating out.[64]

Food has been examined by the OECD and European Environment Agency studies of sustainable consumption, but is beyond the Committee's terms of reference.

There are a number of common social, economic and demographic changes that are driving household energy and water consumption, private transport decisions, and waste production in Victoria and other western countries. Mr Lars Mortensen from the European Environment Agency (EEA) advised the Committee that since the 1960s a greater proportion of household expenditure is spent on housing, water, electricity, gas and fuels; transport; recreation and culture and restaurants and hotels.[65] Household expenditure overall has also increased markedly since the 1960s. The driving factors, identified by the EEA, behind consumption are also changing with:

- step change developments in economic and technological factors (growth, globalisation, internal markets and the internet);
- significant developments in demographic factors (household size reductions, ageing); and
- socio-cultural factors (marketing, fashion, cultures of consumption).

These factors are explored in further detail below.

## Social changes

Household consumption is part of a whole set of behavioural practices and shared norms.[66] Dr Zoe Sofoulis told the Committee that household consumption should not be separated from culture, attitudes and technology. She gave the example of the changing expectations of cleanliness, and the multiple roles and activities of people (such as exercising, working and socialising often with showering in-between) which have contributed to a more water intense lifestyle.[67]

Tied in with culture and attitudes is the trend several social commentators have identified towards growing individualism in society, where people withdraw from the wider community and involve themselves with a select circle of family and friends. Robert Putnam's book *Bowling Alone* looks at this trend in the USA through levels of membership in social groups and

[64] Michaelis, L and Lorek, S, 2004, Consumption and the Environment in Europe: trends and futures, pp. 22-23

[65] Mr Mortensen, Program Analyst, Sustainable Consumption, European Environment Agency, meeting, Copenhagen, 1 February 2005

[66] Organisation for Economic Cooperation and Development, 2002, Household Energy and Water Consumption and Waste Generation: trends, environmental impacts and policy response, p. 9

[67] Dr Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, pp. 598-599

clubs. He found that while the number of groups are growing, the number of members declined, as did active participation in the activities of that group.[68] He concluded that people are establishing fewer social bonds that bind them to community, but that disassociation and re-engagement in the community is an ongoing cycle.

Social researcher, Hugh Mackay, identifies a similar trend toward individualisation in Australia, whereby what was once considered 'traditional community' has declined. His concern is that with no community we feel no moral responsibility toward other people who are not in our selected group.[69] This has implications for the environment with people disassociating themselves from the community and the environmental impact of their consumption.

## Increase in population

As the population grows so too does the total amount of energy and water used by the household sector, and the amount of waste produced. By 2030 Melbourne is expected to accommodate over one million additional people and regional Victoria another 350,000 people.[70]

## Changing household composition

Changes in household composition have seen many more single person dwellings. In the 20 years to 2001, the percentage of people living alone in Australia has risen from 18 per cent to 24 per cent.[71] Total water and energy use in the house depends on the number of inhabitants, however as the number of inhabitants per household declines, the amount of energy and water used per person increases. For example a Royal Melbourne Institute of Technology (RMIT) study of residential water use found that the average daily indoor water use per person in households with only one occupant is 175 litres per day, but this amount decreases to 123 litres per person per day in a household with 5 occupants.[72]

Often households share a car, so an increase in one person households is likely to also mean an increase in car numbers.[73]

The increase of single person dwellings combined with the general growth of population has also seen the total number of households rise. It is

[68] Putnam, R, 2000, Bowling Alone: collapse and revival of American Community, p. 49

[69] Mackay, H, 1999, Turning Point: Australian's choosing their future, pp. 251-261

[70] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 9

[71] Lane, B, 'Single dwellers expose urban myth', The Australian, 7 February 2005

[72] Gato, S.A., et al, 2004, Understanding Residential Water Use. Paper presented to the ENVIRO04 Convention and Exhibition, 28 March-1 April 2004, Sydney, NSW, Australia, p. 8

[73] Australian Bureau of Statistics, 2004, Measures of Australia's Progress: transport. Accessed online www.abs.gov.au March 2005

estimated that in Australia the number of households will increase by between 38 and 46 per cent during 1996-2021.[74]

## Increases in house size and residential density

There is a nationwide trend towards larger houses. The average new house built in Australia 20 years ago covered 162 square metres. The average house built in Victoria is now 222 square metres, an increase in size of around 37 per cent.[75] This has implications for the amount of energy used to heat and cool a house.

Residential density has risen, with the construction of more apartments and bigger houses on smaller blocks which has reduced outdoor water use.[76]

## Household appliances

Appliances that use water more efficiently than earlier models are becoming a viable economic option for households, for example front loading washing machines. While many individual appliances have become more energy efficient, the total number and range of appliances in the home is increasing[77] with the purchase of more powered goods such as televisions, DVDs, personal computers, laptops, mobile phones, stereos and kitchen appliances.[78]

Appliances which in the past were considered a luxury are now regarded as a necessity by many, for example dishwashers, clothes dryers, microwaves and second fridges.

## Rising household incomes

Increasing levels of material consumption are closely linked with rising personal incomes. In recent years households have spent most increases in income on consumption.[79]

In general, higher income households tend to consume more than lower income households.[80] In relation to energy consumption, this is because wealthier households tend to have larger living spaces and own more appliances. Car ownership increases with income and the type of car a

[74] Australian Greenhouse Office, 2002, Cool Communities: motivating home energy action, Fact sheet 2

[75] The Weekend Australian, 22-23 January 2005, p. 5

[76] Department of Environment and Heritage, Urban Water Use Statistics in Australia., accessed online at www.deh.gov.au/water/urban/statistics.html February 2005

[77] Michaelis, L and Lorek, S., 2004, Consumption and the Environment in Europe: Trends and Futures, p. 26

[78] Mr L Mortensen, Program Analyst, Sustainable Consumption, European Environment Agency, meeting, Copenhagen, 1 February 2005

[79] Michaelis, L and Lorek, S., 2004, Consumption and the Environment in Europe: Trends and Futures, p. 9

[80] Australian Greenhouse Office, 2002, Cool Communities: motivating home energy action, Fact Sheet 2

household buys also depends on income level. The volume of household waste tends to increase with economic growth and rising incomes.[81]

The growth in consumer credit has provided people with more flexibility to purchase goods and services.[82] People tend to save less and consume more, buying on credit and paying for it later.

The City of Bayside is one of the highest residential water-consuming municipalities in Melbourne. During 2001-02 the Council recorded and mapped their residents' average residential water usage. The map showed that there was a correlation between high income pockets of Bayside and high water consumption. Mr Michael Dodd, the Council's Environment Policy Officer explained the data to the Committee:

> In Bayside the appearance of people's properties, especially at the high-water use areas, is the key value behind their water consumption. People want to have a beautiful, lush-looking garden. They believe they are performing almost a community service by having these lush European-style gardens which often use up to three or four times the Melbourne average in terms of their water use.[83]

There is also a correlation between higher household income and ownership of water intensive household goods such as swimming pools. In general this is driven by changing lifestyles that accompany income growth.[84]

## Technology and automation

The technology used in appliances is changing. Many appliances are digital and operated by remote control. This has resulted in a growing number of appliances being left on standby mode and drawing electricity when not in use.[85]

There has also been an increase in the automation of activities which mean people may not notice that they are using energy and water.[86] Hot water systems can be set once, outdoor watering systems can be operated by timers, as can central heating systems and air conditioners.

Technology has also changed expectations of cleanliness, comfort and convenience.[87] Where previously households may have been satisfied with heating only selected rooms in winter, technology such as timed central heating allows the whole house to be heated to the same temperature.

[81] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption: Trends and Policies in OECD Countries, p. 53

[82] Michaelis, L and Lorek, S., 2004, Consumption and the Environment in Europe: Trends and Futures, p. 55-56

[83] Mr M Dodd, Environment Policy Officer, City of Bayside, transcript of evidence 11 October 2004, p. 421

[84] Organisation for Economic Cooperation and Development, 2002, Household Energy and Water Consumption and Waste Generation: Trends, Environmental Impacts and Policy Response, p. 42

[85] Sustainable Energy Authority Victoria, submission no. 72, p. 7

[86] Michaelis, L and Lorek, S., 2004, Consumption and the Environment in Europe: Trends and Futures, p. 24

[87] Ibid, p. 24

Peoples' tolerance for temperature variation has also declined over time. The Committee was advised by a representative from the International Energy Agency of a study conducted in Florida which showed that there is a one degree celsius temperature variation that is acceptable to people before they turn to artificial heating or cooling.[88]

## Consumer awareness

Consumer awareness will be discussed in more detail in chapter 5, however one point to mention here is that community education programs can be successful in changing consumer behaviour. In Melbourne, an increase in community awareness has contributed to the decline in per capita water use.[89]

## Disposable products and packaging

Over time, the composition of household waste has changed. There is a clear trend towards increased packaging waste, particularly from pre-packaged foods and food service packaging, and an increase in disposable products.[90]

In addition to the legitimate need for product packaging to protect goods while being transported from factories to shopfronts, and to minimise product tampering, there are social factors influencing how products are packaged. There has been an increase in the popularity of processed foods like heat-and-serve meals and snack foods. Fruit and vegetables are also being bought pre-packaged. Ms Helen Lewis, Director of the RMIT Centre for Design told the Committee:

> Our lifestyles are changing and we are relying more on packaging, which is going completely in the wrong direction as far as sustainability is concerned. With an ageing community we are getting smaller serves, we are getting longer-life products, we are getting the eat-away-from-home; all these trends are causing increases in packaging. [91]

# Impact of households on the environment

This section sets out the types of impacts household energy and water consumption, and waste generation has on the environment.

The more water households use, the more wastewater is produced. Wastewater is the water that goes down the sink when having a shower, doing the dishes, using the washing machine and flushing the toilet. It is a source of water pollution as it contains organic and non-organic nutrients,

[88] International Energy Agency, meeting, Paris, 8 February 2005

[89] Victorian Government, 2002, 21st Century Melbourne: a WaterSmart City, p. 40

[90] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption: Trends and Policies in OECD Countries, pp. 54-55

[91] Ms H Lewis, Centre for Design, RMIT, transcript of evidence, 6 July 2005, p. 79

infectious agents, toxic organic and inorganic wastes and sediments.[92] Wastewater is treated through a series of processes to remove the pollutant materials from the wastewater. It is then returned to the environment.

Water consumption has environmental implications through abstraction, diversion and depletion.[93] Professor John Langford from the Melbourne Water Research Centre told the Committee that the expected increase in Victoria's population and climate change would strain existing water resources, and that Victoria will need to look for new sources of water in the future to meet demand.[94]

Most household garbage in Victoria is disposed of to landfill. As household waste increases, the amount of land needed to accommodate landfill also increases. As cities and towns grow, more land is used for residential purposes and it becomes more difficult to find suitable and acceptable landfill sites. Landfill sites can cause a number of environmental problems, even when properly managed, which can persist long after the site is closed.[95] Liquids can seep from the buried rubbish, polluting the soil and ground and surface water. Mr Henrik Harjula, Principal Administrator, Sustainable Materials and Waste from the OECD described landfill as a 'last resort' for waste management as even landfills constructed to high standards with plastic linings pose a long term risk.[96] Decomposing waste also releases greenhouse gas emissions into the atmosphere although many landfill sites in Victoria capture methane.[97] Energy is wasted in the production and disposal of waste.

Vehicle use produces air pollution mainly through the combustion of fuel, but also through the wear of tyres and brakes. Oil leaks and detergents used to wash vehicles can end up polluting waterways through run off.[98] The building of roads to accommodate the growing reliance on cars also leads to land alteration.

Household energy use affects the environment primarily through the burning of fossil fuels either directly or in the generation of electricity. Harmful greenhouse gases contribute to climate change and global warming. Global warming is expected to lead to a reduction in rainfall and increased incidence of bushfire and a 6 degree rise in temperatures in Victoria by

[92] Watershed Connections, what happens to Wastewater? http://outreach.ecology.uga.edu/watershed/wastewater.html, accessed March 2005

[93] Organisation for Economic Cooperation and Development, 2002, Household Energy and Water Consumption and Waste Generation: Trends, Environmental Impacts and Policy Response, p. 51

[94] Professor J Langford, Melbourne Water Research Centre, University of Melbourne, transcript of evidence, 23 November 2004, p. 639

[95] Northern Territory Government, Managing our household waste, fact sheet, www.lpe.nt.gov.au/enviro/Fact/faq7.htm, accessed March 2005

[96] Mr H Harjula, Principal Administrator, Sustainable Materials and Waste Management, National Policies Division, OECD, meeting, Paris, 7 February 2005

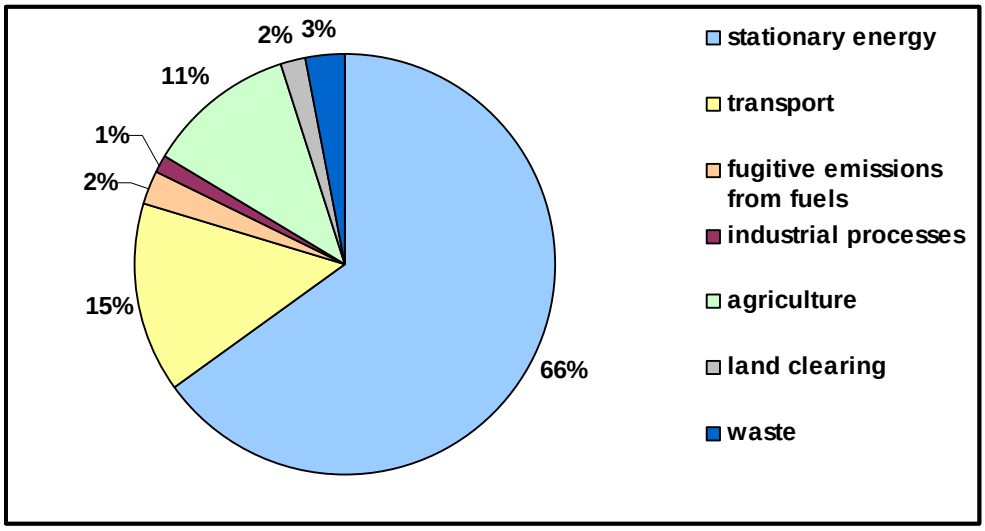
[97] Organisation for Economic Cooperation and Development, 2002, Household Energy and Water Consumption and Waste Generation: trends, Environmental Impacts and Policy Response, p. 66

[98] RACV website www.racv.com.au/racvm/service/environment1.cfm, accessed February 2005

2070.[99] In Victoria energy consumption has a high greenhouse gas intensity due to the state's reliance on brown coal for electricity generation.[100] Australia has the highest level of greenhouse gas emissions per capita, and is more than double the average, for industrialised countries.[101] Victoria produces close to 25 per cent of all of Australia's greenhouse pollution.[102]

Figure 11 shows the overall greenhouse gas emissions by sector in Victoria.

## Figure 11: Greenhouse Gas Emissions in Victoria by Sector (1999)




Source: derived from Department of Sustainability and Environment, 2002, Victorian Greenhouse Strategy, p. 17

Households make a significant contribution to greenhouse gas emissions as the residential sector uses 35 per cent of Victoria's stationary energy.[103] The transport sector accounts for a significant proportion of the state's greenhouse gas emissions. Within the transport sector, passenger motor vehicles account for over half of the emissions.[104]

On a national level, the amount of greenhouse gas emissions from stationary energy and cars has increased between 1990-2003. Emissions from stationary energy during this time have increased by 37 per cent and

[99] Department of Sustainability and Environment, Why Sustainability Matters. www.dpi.vic.gov.au/dse/nrence.nsf/FID/, accessed February 2005

[100] Department of Sustainability and Environment, submission no. 70, p. 7

[101] In 2001 27.2 tonnes of carbon dioxide equivalent was emitted per person in Australia, compared with 21.4 tonnes in the USA, 11.5 tonnes in Germany and 12 tonnes in Russia and the UK. H Turton, 2004, The Australia Institute, Greenhouse Gas Emissions in Industrialised Countries: where does Australia stand?, pp. vi-vii

[102] Sustainable Energy Authority Victoria website ww.seav.vic.gov.au/sustainable_energy_challenge/current_energy_situation.asp, accessed March 2005

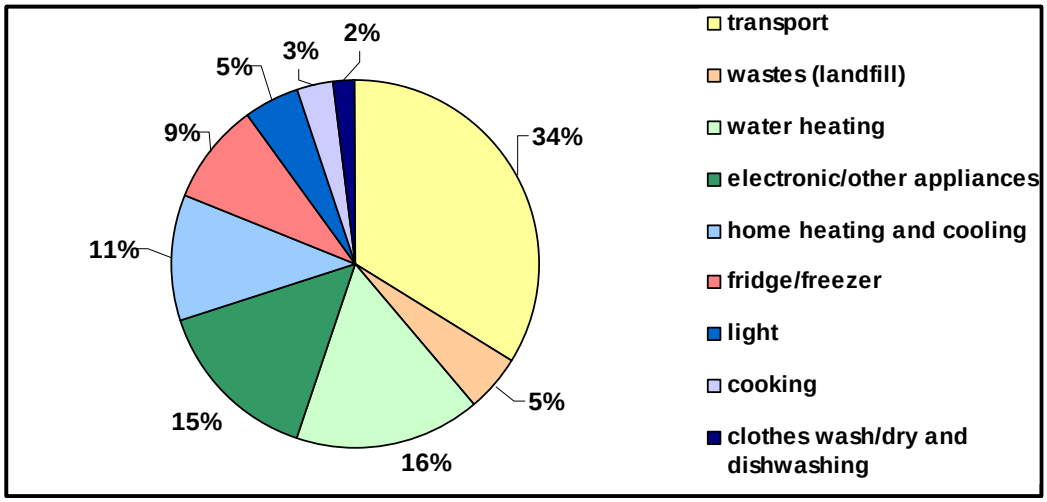
[103] Sustainable Energy Authority Victoria, submission no. 72, p. 5

[104] Department of Environment and Heritage, Transport Sector Greenhouse Gas Emission projections 2004 www.greenhouse.gov.au/projections/pubs/transport2004.pdf, p.10, accessed February 2005

from cars 25 per cent.[105] The Victorian Greenhouse Strategy identifies similar trends in Victoria which are expected to continue.[106]

Figure 12 details the contribution of various household activities to greenhouse gas emissions.

## Figure 12: Household Greenhouse Gas Emissions




Source: Australian Greenhouse Office, 2003, Global Warming Cool It!: a home guide to reducing energy costs and greenhouse gases p. 3
Copyright Commonwealth Government of Australia reproduced by permission

Transport is the largest single source of household greenhouse gas emissions, followed by water heating and appliances.

[105] Australian Greenhouse Office, 2003, National Greenhouse Gas Inventory Fact Sheets 2003, Fact Sheet 1 and 2, Energy

[106] Department of Natural Resources and Environment, 2002, Victorian Greenhouse Strategy, p. 16

Chapter

4

# The role of government in promoting sustainable household consumption

## Introduction

Governments can influence the decisions made by householders and communities through policy and regulatory frameworks; influencing markets to support more environmentally sustainable technologies and services; and the provision and distribution of information.

This chapter explores the role of all levels of government, including local government in promoting sustainable communities.

Policy options available to government, such as economic, regulatory and social instruments are discussed, including their merits and shortcomings. This chapter focuses on current Victorian policy frameworks and community based sustainability programs. Finally the chapter outlines gaps in current knowledge about the effectiveness of different management options designed to improve household sustainability.

While the task of encouraging diverse communities to manage energy, waste and water sustainability is challenging, the Committee received substantial evidence that this may be achievable through cooperation between government, industry and community groups and a combination of policies. Government, community based organisations and industry have different but complementary roles aimed at achieving environmentally sustainable communities. In attempting to encourage and facilitate community sustainability the challenge is to influence consumers to make choices that reduce environmental impacts, in other words to coordinate individual behaviour for the "common good".[1]

## The role of government

Many factors influence household consumption of water and energy and the production of waste. Government is one stakeholder that can shape consumption and production patterns. It is widely recognised that government has a vital role to play in providing leadership on household consumption issues, and frameworks that are consistent and conducive to

[1] Environment Victoria, submission no. 80, p. 3

sustainable consumption and promoting the value of environmentally sustainable consumption. In a recent report on sustainable consumption, Professor Jackson from the University of Surrey argues that:

> Government policies send important signals to consumers about institutional goals and national priorities. They indicate in sometimes subtle but very powerful ways the kinds of behaviours that are rewarded in society, the kinds of attitudes that are valued, the goals and aspirations that are regarded as appropriate, what success means and the worldview under which consumers are expected to act. Policy signals have a major influence on social norms, ethical codes and cultural expectations. In particular, the consistency or inconsistency of government actions can have a profound effect on the success or viability of pro-environmental messages and interventions.[2]

Similarly Mornington Peninsula Shire Council advised the Committee that:

> We believe that [Shire Council] leadership is very important because the Mornington Peninsula Shire Council itself accounts for a small percentage of energy used on the peninsula and while we are very serious about reducing our energy dependency and our carbon dioxide generation, we see that the big impacts will be through the community. It is by leading that we can get the community to do similar works and to reduce the impacts across the whole of the peninsula.[3]

The mechanisms by which government can influence household consumption are discussed later in this chapter and the nexus between government and consumers is examined in chapter 5. This section sets out the current role of the three levels of government in environmental management in Australia. There has been a trend towards increased harmonisation of policy on issues such as energy and water management. Nevertheless, the observation made in the *Australia State of the Environment 2001* report, that the planning and management of the environment is often highly uncoordinated between the Commonwealth, the states and territories and local government, remains accurate.[4]

## Federal Government and tripartite arrangements

Although the terms of reference of the Inquiry specifically relate to the roles of State and Local Government, the Committee considers that it is not possible to consider the subject of sustainable communities without reference to role of the Federal Government. For example, the Federal Government coordinates the implementation of state-based regulations which require industry to meet minimum energy and water efficiency performance standards and to disclose the energy efficiency of selected products though appliance labelling.

[2] Jackson, T, 2005, Motivating Sustainable Consumption, A report to the Sustainable Development Research Network, Centre for Environmental Strategy, University of Surrey, UK, pp. 130-131

[3] Mr C Cinquegrana, Manager, Infrastructure Strategy, Mornington Peninsula Shire Council, transcript of evidence, 11 October 2004, p. 411

[4] CSIRO Publishing on behalf of the Department of the Environment and Heritage, 2001, Australia State of the Environment 2001, Part 2a, p. 16

Despite the lack of a specific environment power in the Australian Constitution, in practice the Federal Government has extensive powers over the states in environmental matters and is increasingly playing an influential role in the management of the environment.[5] However, the Commonwealth has been reluctant to use its powers unilaterally to address environmental issues at the national level, preferring a cooperative approach with the states in almost all cases.[6] This cooperative approach has been evident in the institutional arrangements developed over the past decade to address environmental issues[7] commencing with the Inter-Governmental Agreement on the Environment (IGAE). The IGAE was established in 1992 and signed by the three levels of government (federal, state and the Australian Local Government Association). It is a statement of the roles and responsibilities of all levels of government and provides the basis for a coordinated approach on environmental issues.[8] It represents an acknowledgement that the three levels of government have different but complementary roles in protecting the environment.[9]

According to the IGAE, the responsibilities of the Commonwealth include:

- negotiating and entering into international agreements relating to the environment and ensuring that international obligations are met;
- ensuring the policies and practices of a State do not result in significant external environmental effects; and
- facilitating the co-operative development of national environmental standards and guidelines.[10]

The responsibilities of individual states relate to matters which do not affect the Commonwealth or any other states and the management of natural resources within the state. The states have an interest in the development of Australia's position in relation to international agreements of environmental significance and a responsibility to participate in the development of national environmental policies and standards.[11]

The IGAE states that local government has an interest in their local environment and the environments to which they are linked and an interest in the development and implementation of regional, state-wide and national policies, programs and mechanisms which affect more than one local

[5] Wells, K, 2004, Greening the Australian Federation, a report prepared for the Australian Conservation Foundation. ACF website: www.acfonline.org.au/docs/general/00898.pdf , p. 6

[6] Ibid, p.8

[7] Ibid, p.8

[8] Senate Environment, Communications, Information Technology and the Arts References Committee, 1999, Commonwealth Environmental Powers: Report of the Senate Environment, Communications, Information Technology and the Arts References Committee, May 1999, Parliament of the Commonwealth of Australia, Chapter 6, p. 75

[9] Ibid, p. 75

[10] Ibid, chapter 6, p. 3

[11] Australian Government, Department of Environment and Heritage, 1992, Intergovernmental Agreement on the Environment

Government.[12] Local government has a responsibility for the development and implementation of locally relevant environmental policies within its jurisdiction in cooperation with other levels of government and the community.

In 1997 the Council of Australian Governments (COAG) reviewed the IGAE.[13] COAG subsequently endorsed a *Heads of Agreement on Commonwealth and State Roles and Responsibilities for the Environment* to deliver more effective measures to protect the environment, remove duplication and result in a more efficient development approvals process.[14] The objective of the Heads of Agreement was to remove uncertainty regarding the roles of state and commonwealth governments by delimiting the commonwealth's role in relation to a defined set of matters of national significance.[15] The major role of the commonwealth is to establish, in consultation with the states, environmental goals, objectives, priorities, strategies and frameworks and performance measures.[16]

COAG has developed communiqués on climate change, greenhouse gas emissions, energy policy, the environment and water resources policy and reform. Ministerial Councils develop policy reforms for consideration by COAG and oversee the implementation of such reforms.[17] For instance, one of the most recent initiatives that is of relevance to the Inquiry is the National Framework for Energy Efficiency, endorsed by the Ministerial Council on Energy.

While in some instances the environmental management role of the federal government is clear through developing overarching national strategies and funding programs, there is also significant overlap between the federal, state and local levels of government. For example:

- the Commonwealth funds the Cool Communities program, delivered by the Australian Greenhouse Office in collaboration with non-government organisations. The government's role is to provide communities with funding, advice, information and a framework for working towards a goal; and

[12] Ibid

[13] COAG is the peak intergovernmental forum in Australia and its membership comprises the Prime Minister, State Premiers, Territory Chief Ministers and the President of the Australian Local Government Association (ALGA). The role of COAG is to initiate, develop and monitor the implementation of policy reforms that are of national significance and which require cooperative action by Australian governments source: www.coag.gov.au/about.htm, accessed April 2005

[14] Senate Environment, Communications, Information Technology and the Arts References Committee, 1999, Commonwealth Environmental Powers: Report of the Senate Environment, Communications, Information Technology and the Arts References Committee, May 1999, Parliament of the Commonwealth of Australia, Chapter 6, p. 8

[15] Ibid, Chapter 6, p. 8

[16] Australian Government, Department of Environment and Heritage, Heads of Agreement on Commonwealth and State roles and responsibilities for the environment, 1997, p. 14

[17] Source: www.coag.gov.au/ministerial_councils.htm, accessed March 2005

- the Cities for Climate Protection (CCP) program is a collaborative arrangement between the International Council for Local Environmental Initiatives (ICLEI) and the Australian Greenhouse Office. The AGO assists local government in reducing greenhouse emissions from their own activities and community activities. In rural Victoria, however, the CCP program is a collaboration between the State government and ICLEI.[18]

## Victorian government

The government's environmental priorities are set out in the documents *Growing Victoria Together* and *The Sustainable State: Labor's Plan for a Greener Victoria*. The *Growing Victoria Together* statement notes that: *We need to think differently about how we design our goods and services and go about our daily lives, to use less energy, water and materials*.[19] The measures of progress are: the reduction of greenhouse gas emissions from the production and use of energy; that Melbourne's water usage will be reduced by 15 per cent on a per capita basis from the 1990 average by 2010; and the quantity of solid waste generated will be reduced and the amount recovered for re-use, recycling and energy generation will increase.[20]

The Department of Sustainability and Environment (DSE) is responsible for implementing the state government's responsibilities for the management of Victoria's environment. DSE:

- provides strategic advice, analysis and support to government on all environmental issues;
- leads the management, protection and care of the state's natural and heritage assets, biodiversity and ecological processes and urban development;
- develops and implements policy based on sound research, evidence and analysis;
- delivers market, regulatory and institutional reform across its areas of environmental responsibility for the overall public good of present and future generations;
- engages Victorians in the long-term sustainable use and conservation of public and private land;
- influences all levels of government to strive for responsible economic, social and environmental outcomes, from their diverse activities;

[18] Source: www.lgfocus.com.au/deitions/2003/june/iclei.shtml , accessed March 2005

[19] State of Victoria, March 2005, Growing Victoria Together: a Vision for Victoria to 2010 and Beyond, p. 13

[20] Ibid, p. 14

- administers government programs efficiently, effectively, and responsibly; and

- actively engages in intergovernmental and international forums and negotiations to advance the environmental interests of Victoria.[21]

In its submission to the Inquiry DSE states that government has an important role in influencing community sustainability.[22] The submission further states that:

> Consumers/householders have a significant role to play in creating more sustainable communities. To some extent, Government and industry can create sustainable choices, ensure that external barriers are removed and that sustainable communities will ultimately depend on consumers choosing more sustainable lifestyles and adjusting their behaviour accordingly.[23]

DSE defines the role of the government in terms of the mechanisms it can use to influence household consumption, through:

- policy and regulatory frameworks;

- price setting and influencing markets to support more environmentally sustainable technologies and services; and

- the provision and distribution of information.[24]

The department is responsible for administering over 79 Acts of Parliament addressing natural resources and environment management, conservation and sustainable utilisation. Some pieces of legislation that relate to this inquiry include the *Water Efficiency Labelling and Standards Act 2005*, the *Environment Protection Act 1970* which sets out the waste management hierarchy and the *Electricity Industry (Wind Energy Development) Act 2004* which facilitates the development and construction of wind generation facilities in Victoria.

State of the Environment (SoE) reporting is a key role for government. SoE reporting identifies pressures on the environment, uses indicators to assess the current status of the environment and trends and contain recommended actions to achieve environmental improvements.[25] National SoE reports were produced in 1996 and 2001. SoE reporting enables the development and review of environmental policies based on the most current and accurate data.[26] Victoria has not published an SoE report since 1992 but now has a legislative obligation to produce an SoE report every five years. It is the role of the Victorian Commissioner for Environmental Sustainability

[21] Department of Sustainability and Environment, 2003, DSE Corporate Plan 2003-06, p. 7
[22] Department of Sustainability and Environment, submission no. 70, p. 26
[23] Ibid, p. 30
[24] Ibid, p. 25
[25] Commissioner for Environmental Sustainability, 2004, State of the Environment Reporting in Victoria, Consultation Guide and Background Paper, p. 8
[26] Ibid, p. 16

to prepare an accurate and current report on the state of Victoria's environment. On a local scale some Local Government agencies have produced SoE reports to guide environmental policy and inform their communities about key environmental issues facing municipalities.

A agreement to commence discussions on the development of a *Sustainability Accord* between state and local government was signed by the state government and five local government bodies in September 2004.[27] The Victorian Local Sustainability Committee is responsible for developing the Accord by August 2005. The Committee will seek to develop an integrated framework for the management of environmental sustainability issues at local and state levels; clarify the roles and responsibilities of the two spheres of government in relation to environmental sustainability and develop strategies and action plans to address local environmental sustainability issues.[28]

The Victorian Local Sustainability Committee states that the Accord will improve coordination of sustainability programs of state government and local government, develop more consistent approaches and allow community needs to be met more effectively. The Accord also seeks to provide a clearing-house for the resolution of jurisdictional issues that arise in sustainability matters between local government and state government agencies.[29]

## Local government

The state government advised that local government has an important role in energy, waste and water management through council operations, regulations and land use planning, traffic management, waste management, street lighting, drainage and stormwater management.[30] The role that councils play in leading the community in sustainable practices is also reflected in documents such as the Victorian Government White Paper *Securing Our Water Future Together*[31] and the *Victorian Greenhouse Strategy*.[32]

Local government legislation in Victoria does not specifically define an environmental management role rather the *Local Government Act 1989* is an enabling act which allows a broad and varied response by local government to environmental issues.[33] Councils are also affected by and have responsibilities under the provisions of the *Planning and Environment*

[27] Municipal Association of Victoria, 2004, Environment Bulletin, Edition 31, 3 September 2004, p. 1

[28] Victorian Local Sustainability Committee, undated, Terms of Reference, p. 1

[29] Victorian Local Sustainability Committee, 2005, Victorian Local Sustainability Accord consultation workshops with Local Governments, p. 1

[30] Department of Sustainability and Environment, submission no. 70, p. 25

[31] Victorian Government Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 105

[32] State of Victoria, Department of Natural Resources and Environment, 2002, Victorian Greenhouse Strategy, p. 64

[33] Municipal Association of Victoria, submission no. 28, p. 6

*Act 1987*, the *Environment Protection Act* 1970 and the *Catchment and Land Protection Act* 1994.[34] A broad number of council functions can influence household energy, waste and water management.

According to the Australian Bureau of Statistics, in 2002-03 Victorian Local Government spent a combined $314 million on environmental protection, of which $248 million was expended on solid waste management.[35] A further $191 million was spent on natural resource management.[36]

As noted, the environmental activities of councils include both the traditional infrastructure and service functions such as stormwater management and litter and waste management and, increasingly, roles such as community environmental education, greenhouse abatement and energy conservation, natural resource management and broader sustainability planning.[37] Local government advised the Committee that it is uniquely placed to promote household environmental sustainability, as one of the core businesses of local government is to engage the community in a range of issues including environmental sustainability. Therefore councils have an extensive knowledge of the social, economic and cultural characteristics of their communities and have well developed links to the community.[38]

With regards to the relationship between local and state government, the MAV stated that local government often does not have primary carriage for regulating buildings, appliance labelling or water pricing. However, by working cooperatively state and local government can avoid duplication and confusion over responsibilities and messages to households.[39] Local government often plays a supporting role in modelling and conveying coordinated state-wide messages (from the state and federal government) at a local level.[40] In the view of local government, state government and its agencies are not only better resourced but have the overarching responsibility to undertake community education and information programs, such as the current state-wide campaigns on water conservation.

Importantly the MAV also stated that often local government is not included in early environmental program design or implementation and as a result state programs often duplicate, conflict or do not align with local programs and regulation.[41]

[34] Ibid, p. 6

[35] Australian Bureau of Statistics, 2004, Environment Expenditure Local Government 2002-03, p. 10

[36] Ibid, p. 17

[37] Municipal Association of Victoria, submission no. 28, p. 6

[38] Mr A Rowe, Chief Executive Officer, Victorian Local Government Association, transcript of evidence, 5 July, 2004, pp. 71-72

[39] Mr P Lyon, Senior Policy Advisor, Environment, Municipal Association of Victoria, transcript of evidence, 5 July, 2004, p. 57

[40] Municipal Association of Victoria, submission no. 28, p. 7

[41] Ibid, p. 37

**Recommendation 4.1**

**A mechanism through the Sustainability Accord be established to ensure close cooperation on early environmental program design and implementation.**

In working with households and communities, councils often combine regulatory approaches such as statutory planning with community education. In its submission to the Inquiry, the MAV described the role of local government in promoting environmentally sustainable communities. The key elements include:[42]

- the development of strategies, policies and plans that establish a framework within which sustainability issues can be addressed;
- leading the community through demonstrating the importance council attaches to a program or an issue and providing a role model and practical assistance (such as demonstration sites or incentives) to the community to adopt sustainable practices. For example through the Cities for Climate Protection program, councils are reducing their greenhouse emissions and improving the energy efficiency of their own operations;
- the provision of education and information on energy and water efficiency and waste reduction; and
- the development of appropriate environmental regulations. For example, some councils are developing local performance standards and assessment tools for the environmental sustainability of residential developments.[43]

However, the Committee was also advised that the capacity of councils to both undertake community sustainability initiatives, and to reduce their own environmental impact, varied greatly throughout Victoria. Some of the constraints identified are set out below:[44]

- many rural councils have limited rate bases and do not have the resources to develop environmental sustainability initiatives. While 63 per cent of metropolitan councils have developed overarching environmental strategies, only 15 per cent of rural councils have similar strategies;

[42] Ibid, p. 7

[43] Moreland City Council, submission no. 64, p. 6

[44] Municipal Association of Victoria, submission no. 28 p. 36; City of Moreland, submission no. 64, p. 6; Mr C McKiernan, Environment Coordinator, Surf Coast Shire, transcript of evidence, 29 September 2004, p. 374, Mr P Lyon, Senior Policy Advisor, Environment, Municipal Association of Victoria, transcript of evidence, 5 July 2004, p. 58

- there are limited funds and resources to implement environmental programs. Many councils reported that the external funding of sustainability programs is short term;

- many local government agencies advised of the need for a framework and broader institutional support at state and federal levels of government to be able to deliver effective sustainability programs to their communities. For example, there is no overall coordination of sustainability education programs;

- councils are often the first point of community contact on a wide range of environmental issues but may not have the technical skills in house to provide advice on issues such as greywater management; and

- the current statutory planning process is relatively limited in its ability to require certain levels of sustainability performance (beyond the 5 star minimum standard for new dwellings). Individual councils negotiating with developers to improve sustainability design features is a resource intensive process and can lead to uncertain outcomes.

## Sustainability of government activities

Mr Fritz Balkau, Head of the Production and Consumption Branch, United Nations Environment Program Division of Technology, Industry and Economics emphasised the importance of Parliamentary and government leadership on sustainable consumption issues.[45] He stated that the single most important policy by which government and the Parliament should lead by example, is through their procurement policy.

The activities of state government are large scale and have potentially significant environmental impacts.[46] The Victorian Government has set sustainability targets for its operations which will be reported on annually.[47] Since 2002, the principal state government agencies have been required to adopt environmental management systems (EMS) which include the minimisation of greenhouse gas emissions, reducing waste, conserving energy and other resources. The role of the workplace in driving cultural change is also recognised in the agency EMS program, as is the importance of government leading by example.[48]

The Victorian Commissioner for Environmental Sustainability is required to conduct annual strategic audits of the environmental management practices

[45] Mr F Balkau, Head of the Production and Consumption Branch, United Nations Environment Program Division of Technology, Industry and Economics, meeting, Paris, 9 February 2005

[46] State of Victoria, Commissioner for Environmental Sustainability, 2005, Strategic Audit of Victorian Government Agencies' Environmental Management Systems, Victorian Government Melbourne, p.36

[47] Dr I McPhail, Commissioner for Environmental Sustainability, transcript of evidence, 8 November 2004, p. 567

[48] State of Victoria, Commissioner for Environmental Sustainability, 2005, Strategic audit of Victorian government agencies' environmental management systems, Victorian Government Melbourne, p. 4

of government agencies. Agencies are also required to have their EMS audited annually by an independent auditor and provide these to the Commissioner for inclusion in the strategic report.[49]

Due to the fact that the government's EMS program is at an early stage, agencies are at different stages of implementing their EMS. Therefore the first strategic audit of agency environment management systems which was produced in January 2005, reported on the government's progress in implementing the EMS program, rather than on the quantitative progress towards meeting targets. Data on the performance of each individual department is not included.

The purchasing power of both state and local Government is considerable. Governments can influence the markets for recycled and greenhouse friendly products and send a clear message to the community about sustainable consumption through their purchasing policies. In Victoria the MAV promotes an extensive program of green purchasing for local government known as ECO-Buy. The program has increased the expenditure of local government on green products from $5.9 million in 2001 to $36.7 million in 2004, with over 70 per cent of Victorian councils participating.[50] Vehicle purchasing policies and fleet management can significantly reduce the environmental impacts of government activities. Some state agencies and local government have implemented initiatives such as including LPG vehicles in their fleets, purchasing of more fuel efficient vehicles, reducing fleet numbers and encouraging the use of video conferencing facilities.[51] In order to have credibility the government should lead by example.

## Sustainability of Parliamentary activities

There is also a clear role for Federal and State Parliaments in providing leadership and setting social and cultural norms that encourage sustainable consumption.

Both the Federal and a number of State Parliaments have undertaken initiatives aimed at reducing the environmental impact of their operations. For example the South Australian Parliament has successfully trialled a waterless urinal and plans to gradually replace standard urinals with waterless ones.[52] Solar panels are to be installed on the roof of the South Australian Parliament in May/June 2005 which will reduce the electricity bill by approximately 25 per cent. A display panel on the ground floor of the Parliament is being installed for educational purposes and will show the power generated, the power entering the grid and annual cost savings.

[49] Ibid. p. 5

[50] Department of Sustainability and Environment, 2005, Victorian Greenhouse Strategy Action Plan Update, p. 20

[51] State of Victoria, Commissioner for Environmental Sustainability, 2005, Strategic Audit of Victorian Government Agencies' Environmental Management Systems, Victorian Government Melbourne, p. 16

[52] Personal communication, Mr D Hickson, Building Services Manager, South Australian Parliament, 2 December 2004 and 14 April 2005

In New South Wales extensive water saving infrastructure has been installed at Parliament House including low flow showerheads, water flow restrictors (to all public toilets), digital controls to monitor the water used in the cooling towers and sensors to control the flushing of urinals. There is a joint proposal being considered by the NSW Parliament and Sydney Water for the capture of rainwater for use on gardens and in toilets.[53]

The Federal Parliament has a detailed environmental policy and an EMS which includes the sustainable management of energy and water and waste reduction.[54] Since mid 1988 the Federal Parliament has reduced electricity use by 45 per cent, gas consumption by 73 per cent and its greenhouse gas emissions by 48 per cent.[55]

The Victorian Parliament harvests rainwater which meets 20 per cent of the watering requirements of the grounds. Ten percent of electricity purchased by Parliament is Green Power. However the Victorian Parliament approach to the environmental sustainability of its operations has been ad hoc, relying on the initiative of a handful of employees to implement change in discrete areas of Parliament. Therefore the Committee recommends that in line with the requirements of Victorian Government departments and best practice:

**Recommendation 4.2**

**The Victorian Parliament develop an environmental management system as a matter of priority. Progress on the implementation and the outcomes of the system should be detailed in the annual report, commencing in 2006-07.**

## Policy instruments to encourage sustainable consumption

Policy to encourage sustainable consumption can be directed at households (i.e., water restrictions), manufacturers (i.e., mandatory appliance or packaging standards) or entire industries (water and energy efficiency standards for housing). Policies directed at industries or producers indirectly affect individuals through changes in the quality and price of goods and services. The most effective point at which government can intervene in sustainable consumption and production processes is subject to debate and varies from case to case. The OECD has argued that, from a global perspective:

> Whatever [policy] instruments prevail, it should be noted that the number of individuals on the demand side - potentially to be influenced – is approximately 6 billion worldwide. The number of decision-makers on the supply side is far less.

[53] Personal communication, Mr A Leonard, Engineering Manager, NSW Parliament, 14 April 2005

[54] www.aph.gov.au/jhd/ems/index.htm

[55] Personal communication, Mr R Mellor, Environmental Management Coordinator, Federal Parliament, 29 November 2004

> From an efficiency point of view in terms of steering, this would suggest to focus efforts on the supply side.[56]

This point is relevant from a domestic perspective and will be briefly discussed in chapter 5.

Three types of policy instruments - regulatory, economic and social - can influence sustainable consumption. In addition, government can influence residential waste, water and energy management through changes in infrastructure and the promotion of new technologies.

Throughout the Inquiry the Committee received consistent evidence[57] that these measures work together as a whole and that an exclusive reliance on one or a few measures can be limiting. Each of the policy instruments governments can use to influence sustainable behaviour has its own strengths and weaknesses and none is sufficiently flexible to address all sustainability issues in all contexts.[58] However, information provision is essential to the success of all policy instruments. For example, the community may not accept and indeed ignore regulations if the reasons for regulation are not well understood.

The OECD program on sustainable consumption concludes that the nature of the policy mix will depend on the issues or household activities being addressed and the urgency or 'seriousness' of those issues but, whatever combination of policy instruments is used, the desired outcome should be to make more sustainable behaviour a rational and easy choice for consumers.[59]

Another key element that contributes to the success of policy mixes to promote environmental sustainability is that they must be consistent with government policy and signals in other areas. The OECD points out that consumers and producers are influenced by a multitude of factors in addition to environmental policy.[60] Other government policy areas such as land use planning, construction, energy, water, agriculture, transport, media and communication policies and health regulations all have a long term impact on infrastructure and technology and influence the choices that can be made at a household level.[61] Inconsistent messages from government erode the credibility of and community confidence in government as an environmental manager.

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[56] Organisation for Economic Cooperation and Development, 2002, Policies to Promote Sustainable Consumption: An Overview, Policy Case Studies Series, p. 30

[57] For example refer to Mr G Brown, Facilitator, Anglesea Neighbourhood Environment Improvement Plan, transcript of evidence, 29 September, 2004, p. 359; Mr S Ray, Executive Director, Environs Australia Projects, transcript of evidence, 9 August 2004, p. 184

[58] Young, M D, et al., 1996, Reimbursing the future: An evaluation of motivational, voluntary, price-based, property-right and regulatory incentives for the conservation of biodiversity, Department of Environment and Heritage, Biodiversity Series Paper No. 9., Chapter 7, p. 1

[59] Organisation for Economic Cooperation and Development, 2002, Programme on Sustainable Consumption, Policies to Promote Sustainable Consumption, p. 25

[60] Ibid, p. 23

[61] Ibid, p. 23

# Regulation

Regulatory instruments have the potential to change consumption and behaviour patterns relatively quickly.[62] The types of regulations designed to influence household consumption of energy and water and waste production are extensive. For example, there are building regulations (i.e., insulation); standards for water and energy efficient appliances and products; regulated targets and feed-in tariffs for renewable energy; product bans; extended producer responsibility requirements[63] and targets for reducing waste to landfill.

However, regulation, if it is aimed directly at the consumer, may also be perceived as limiting individual choice and, if regarded as unfair, may alienate consumers and elicit resistance.[64] In general the literature suggests that regulatory approaches are most effective when used as precautionary instruments or to set standards which underpin incentive based and motivational instruments.[65]

However, there is likely to be a minority of people who, in the absence of more directive policies will continue to pursue unsustainable practices. This group cannot be ignored as its actions may influence the level of motivation of other members of the community.[66] Young et al. conclude that, in relation to biodiversity conservation, regulation provides a level playing field which may be the key to the success of other instruments such as economic incentives and behavioural change. In other words, where persuasion and education, economic incentives and voluntary measures fail, regulation may be the only technique capable of exerting pressure and compelling resource users and others to act to protect the environment.[67] The Committee was advised that in some instances, industry welcomes regulation as it means competitors must also comply.[68]

Regulation can also influence products, services or infrastructure available to consumers. For example, the market conditions established by government for the production, distribution and supply of energy have an impact on the kinds of energy preferred by or available to consumers and the extent to which energy efficiency is cost-effective for households. These

[62] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 624

[63] Extended producer responsibility is the concept that producers should be made physically or financially responsible for the environmental impacts their products have at the end of product life. Source: Organisation for Economic Cooperation and Development, 2004, Economic Aspects of Extended Producer Responsibility, p. 21

[64] Young, M D et al., 1996, Reimbursing the future: An evaluation of motivational, voluntary, price-based, property-right and regulatory incentives for the conservation of biodiversity, Department of Environment and Heritage, Biodiversity Series Paper No. 9., Chapter 7, p. 6

[65] Ibid, p. 10

[66] Ibid, p. 10

[67] Ibid, p.11

[68] Refer to Ms H Lewis, Director, Centre for Design, RMIT, transcript of evidence, 6 July 2004, pp. 78-79 for a discussion on the recycling of televisions and computers

market conditions have the potential to support energy efficiency and renewable energy or to discourage it.[69]

The Committee was advised by Mr Philip Harrington, formerly of the International Energy Agency that regulation is an under-utilised energy demand management tool in Australia.[70] Mr Harrington argued that:

> People accept things like building and electrical safety standards without thinking about them, and would be annoyed if they were not there … I think there is … a need for smart but ultimately regulatory processes that take away choices that if exercised at the wrong time become impossibly expensive. Anything to do with building standards, double glazing [of windows], insulation and the basic orientation of the house could be considered. You can orientate a house and insulate it correctly for essentially no additional cost when you build it; if you wanted to do it a year later you would have to rebuild the house.[71]

## Economic instruments

Current markets do not internalise the environmental costs of goods and services and markets do not set price signals that encourage sustainable choices or behaviour. For example, the low price of water discourages water conservation[72] and solar hot water systems are costly and difficult to access compared with conventional electric systems.[73] Government has a role in price setting and influencing the market to support more environmentally sustainable technologies and services and increase householder access to them.[74] The introduction of volumetric charging for household water is common. Volumetric water charges are based on the amount of water consumed. Currently, most OECD countries use two-part tariffs (i.e. fixed and volumetric components) with the volumetric portion making up at least 75 per cent of the total water bill.[75] Household water and sewage disposal prices have increased significantly in industrialised countries in an attempt to reflect the full cost of water service provision.[76]

Economic instruments can be used to create a financially attractive and voluntary environment that encourages cooperation with regulations introduced by government. According to Young et al. financial incentives

[69] Jackson, T, 2005, Motivating Sustainable Consumption, A report to the Sustainable Development Research Network, Centre for Environmental Strategy, University of Surrey, UK, p. 129

[70] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 623

[71] Ibid, p.623

[72] For example refer to Mr T Kelly, Managing Director, Yarra Valley Water, transcript of evidence, 8 November 2004, p. 595

[73] For example refer to Mr A Pears, Policy Advisor, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

[74] Department of Sustainability and Environment, submission no. 70, p. 25

[75] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, p. 126

[76] Ibid, p. 49

can act as circuit breakers during the transition to a new regime.[77] For example, rebates on the purchase of water or energy efficient appliances may precede the transition to requiring all new or replacement appliances to be water or energy efficient. Initial participation in financial incentive schemes is usually voluntary, resulting in community acceptance of the change to the new system.

Incentives to stimulate the production and consumption of renewable energy – the green power market – are an example of the use of economic instruments to foster new industries and create a climate where renewable energy is an attractive option. Germany, for example has established a minimum premium to operators of renewable power plants and a program of financial incentives to assist householders to install rooftop solar electricity systems. These programs have been widely supported by the community.[78]

Environmental taxes have been used increasingly in OECD countries since 1990.[79] These include energy taxes levied on producers and passed on to consumers,[80] and fees and taxes on household waste.[81] Waste fees include fees directly imposed on households based on the number of occupants or volume of waste produced ('pay as you throw' schemes) or landfill and incineration taxes imposed on municipalities, which theoretically provide economic incentives for waste recovery.[82] Municipalities then pass these taxes on to households in the form of increased waste collection charges.

While the potential of economic instruments to influence consumer behaviour is widely acknowledged[83] the literature suggests that the economic approach has met with mixed success in encouraging long-term environmental changes.[84] For example, there are numerous subsidies for environmentally sustainable choices, but these options are not taken up by large numbers of consumers.[85] There is also a large group of consumers for whom increasing the price of water, energy, or waste fees for example, will have no effect on their consumption. This group consists of high income

[77] Young, M D et al., 1996, Reimbursing The Future: An evaluation of motivational, voluntary, price-based, property-right and regulatory incentives for the conservation of biodiversity, Department of Environment and Heritage, Biodiversity Series Paper No. 9, Chapter 7 p. 6

[78] Organisation for Economic Cooperation and Development, 2002, Programme on Sustainable Consumption. Sector Case Studies. Household Energy and Water Consumption and Waste Generation: Trends, Environmental Impacts and Policy Responses, p. 30

[79] Ibid, p. 25

[80] Ibid, p. 26

[81] Ibid, p. 77

[82] However in Victoria this economic incentive does not influence disposal to landfill as landfill costs are very low

[83] Organisation for Economic Cooperation and Development, 2002, Programme on Sustainable Consumption, Policies to Promote Sustainable Consumption: an Overview, p.17

[84] Jackson, T, 2005, Motivating Sustainable Consumption, a Report to the Sustainable Development Research Network, Centre for Environmental Strategy, University of Surrey, UK, p. 121

[85] Ibid, p. 121

earners who are prepared to pay for their consumption and believe they do not need to limit their resource use.[86]

## Social instruments

The OECD notes that governments frequently use social instruments such as information and awareness campaigns to promote environmentally sustainable behaviour. However, social instruments alone, are unlikely to achieve change. On the other hand the OECD suggests that economic instruments, while advocated widely, are generally under-utilised in the policy mix.[87] The OECD argues that governments need to focus more on developing economic and regulatory approaches to sustainability rather than rely heavily on the more acceptable but less certain social instruments.[88] A recent United Nations report also recommends that greater use of economic instruments and market-based approaches be applied to enhance the conservation and sustainable use of ecosystems and their contribution to human well-being, for example the carbon market.[89]

Information, awareness raising and environmental campaigns to persuade consumers to adopt sustainable behaviour have been widely used by governments over the past decade. However, there is substantial evidence in the literature,[90] and this was reinforced by a number of witnesses during the Inquiry, that while such motivational instruments may result in increased awareness and changed attitudes, this does not necessarily translate to changed practices and decisions in relation to household consumption and waste generation.

Raising awareness may not result in changed behaviour by itself but may, along with changes in infrastructure or technology, create an environment where sustainability regulations are widely accepted. The strength of social instruments is that they reinforce each of the other mechanisms in the policy mix and are therefore a fundamental component of the suite of policy instruments to promote sustainable behaviour.[91]

The NSW Department of Environment and Conservation (DEC) emphasised the importance of the credibility of information provided to the community and public confidence that the information provided is accurate. DEC's survey of environmental knowledge and attitudes shows that people regard

[86] Mr L Robinson, Consultant, Enabling Change, meeting, 26 October 2004, p. 495

[87] Organisation for Economic Cooperation and Development, 2002, Programme on Sustainable Consumption, Policies to Promote Sustainable Consumption: an Overview, p. 30

[88] Ibid, p. 30

[89] Millennium Ecosystem Assessment Panel, March 2005, Millennium Ecosystem Assessment Synthesis Report, p. 159

[90] For example refer to McKenzie-Mohr, D and Smith W 1999, Fostering Sustainable Behaviour, New Society Publishers, pp. 9-14; Dr E Phillips, Manager, Neighbourhood Environment Improvement Program, Environment Protection Authority, transcript of evidence, 29 September 2004, p. 389

[91] Young, M D et al., 1996, Reimbursing The Future: An evaluation of motivational, voluntary, price-based, property-right and regulatory incentives for the conservation of biodiversity, Department of Environment and Heritage, Biodiversity Series Paper No. 9. , p. 8 www.deh.gov.au/biodiversity/publications/series/paper9 accessed May 2004

government (particularly local government) as a trusted source of information.[92] However, despite clear evidence that a large amount of information on household sustainability is available in the public domain, paradoxically, many witnesses commented that lack of information is one of the key barriers people face to adopting more sustainable behaviours.[93] Clearly, consumers are not getting access to useful information when important decisions are made, for example when the hot water service needs replacing.

It has been argued that the failure of information campaigns to foster sustainable behaviour is partly the result of a failure to understand the complexity of the social and psychological influences on people's behaviour or the difficulty associated with changing behaviours.[94] As a response to this failure and in an attempt to address some of these complexities, social marketing has emerged as an alternative approach to information and awareness campaigns. The social marketing approach to behaviour change has been used extensively in the health sector and more recently in the environmental sector. As will be explained in chapter 5, social marketing is based on understanding the barriers that people perceive when attempting to engage in a given activity, for example inconvenience and unreliability may be perceived as a barrier to using public transport. Community based social marketing merges this approach with a recognition of the importance of social norms and community engagement in changing behaviours.[95]

## Infrastructure and technology

Ensuring that environmentally sustainable practices are easy for people to adopt, was cited by numerous witnesses as a key influence on the uptake of such behaviours.[96] This requires provision of infrastructure and technology to make sustainable choices easy. Recycling is frequently given as an example of how a combination of policy instruments can be used to achieve a successful environmental outcome. Effective, easy to use systems and infrastructure (i.e. recycling bins and kerbside recycling) supported by strong social norms, created through education and regulatory systems, has resulted in the large-scale adoption of recycling behaviour in Victoria. However, the key to the widespread adoption of recycling was the provision of infrastructure (large co-mingled recycling bins which do not require recycling to be sorted) and kerbside collection of recyclables. Once the

[92] Mr G Young, Manager, Community Education Unit, Department of Environment and Conservation, meeting, 26 October 2004, p. 465; NSW Government Department of Environment and Conservation, 2004, Who Cares About the Environment in 2003?, p. 53

[93] For example, refer to Mr C McKiernan, Environment Coordinator, Surf Coast Shire, transcript of evidence, 29 September 2004, p. 368

[94] Jackson, T, 2005, Motivating Sustainable Consumption, a report to the Sustainable Development Research Network, Centre for Environmental Strategy, University of Surrey, UK, p. 128

[95] Ibid, p.118

[96] For example, Mr L Robinson, Enabling Change, meeting, 26 October 2004, p. 496; Mr J Shevlin, Head, International Strategies Branch, Australian Greenhouse Office, Department of the Environment and Heritage, meeting, 27 October 2004, p. 550

infrastructure and technology were provided to make recycling easy, social norms ensured that recycling is adhered to:

> It [recycling] has more become a peer thing; it has been the normal thing to do, and people like to be normal, they don't want to stand out in a crowd. When you see how it has been transformed in 10 years.[97]

The Department of Sustainability and Environment highlighted the role of technology in driving community behavioural change and the interaction between technology (and infrastructure), regulation and information:

> Once you've increased community awareness of the issues, you have the circumstances in which you can create the demand for new technology; you can also create the acceptance of changed regulatory rules. Between regulation and technology, there is also an interrelationship in that foreshadowing the regulation can create a demand for new technology. But ultimately unless the technology is there and is cost-effective, we don't achieve the outcome of improved resource use.[98]

This relationship between regulation, awareness raising, technology and market forces was illustrated for the Committee by Mr Phillip Harrington, an international expert on energy efficiency policy.[99] In the case of high performance glazing and energy efficient building technologies in Europe and North America, Mr Harrington advised the Committee:

> Increasingly the market has demanded high...performance glazing...because it is required in the building standards. Arguably that is the quickest way to create mass need...when more [efficient] products are rolled out, more information is available...the demand increases, the product improves...that is how high [energy] efficiency has become the norm.[100]

However, although innovative sustainable technologies such as an alternative fuel or a compact fluorescent light bulb may appear to offer performance comparable with that of conventional technology, there may be many subtle differences in the way the technology fits in to the life of the user which mean that it is not widely accepted. For instance some compact fluorescent light bulbs may not fit into traditional light fittings. Some people dislike the 'institutional whiteness' of compact bulbs and they cost significantly more than regular bulbs. In addition, the difference in up-front costs may make the alternative technology unacceptable. Michaelis and Lorek note that government programs to introduce new technologies often have disappointing results because technological change also requires considerable behavioural change.[101] Technologies that have become 'locked in' are often connected with behavioural patterns which become similarly fixed. It then becomes very difficult for any alternative technology to compete. Energy efficient glazing provides an example where some

[97] Ms H Lewis, Director, Centre for Design, RMIT University, transcript of evidence, 6 July 2004, p. 83

[98] Mr J Collins, General Manager, Strategic Policy and Projects, Department of Sustainability and Environment, briefing, 17 May 2004, p. 4

[99] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 624

[100] Ibid, p. 624

[101] Michaelis, L and Lorek, S, 2004, Consumption and the Environment in Europe, Trends and Futures, Danish Environment Protection Agency, p. 59

European governments have used a number of inter-related policy instruments to overcome the resistance to alternative technology and promote wide-spread acceptance.

Ecodesign and the replacement of products with services are other means of changing both production and consumption patterns and reducing the environmental impact of households. These concepts will be introduced in chapter 5.

## Policy Frameworks for sustainable consumption in Victoria

# Energy and greenhouse

**Federal**

The National Greenhouse Strategy was endorsed in 1998. The strategy includes a range of greenhouse gas mitigation measures undertaken by the commonwealth and the state and territory governments. Actions pursued by the commonwealth government under the strategy include the Mandatory Renewable Energy Target (MRET),[102] efficiency standards for electricity generators and fuel consumption standards for motor vehicles. The strategy also outlines actions that are to be undertaken by all governments cooperatively, including the development of minimum energy performance standards for appliances, and actions that are the responsibility of individual state and territory governments.

The Commonwealth Government released its White Paper on Energy, *Securing Australia's Energy Future* in 2004. The White Paper sets out a comprehensive strategy for sustainable energy for the next 20 to 30 years. In relation to promoting energy efficiency in the residential sector, the White Paper states that the Commonwealth Government will:[103]

- improve price signals for demand side management as part of reforming Australia's energy markets;
- demonstrate the potential benefits of energy efficiency and market reform through major Solar Cities trials;
- expand the range of appliances and buildings subject to minimum energy performance standards;
- continue to improve the energy efficiency of Australian Government agencies;

[102] The Government's Mandatory Renewable Energy Target commenced on 1 April 2001. The Renewable Energy (Electricity) Act 2000 requires the generation of 9,500 gigawatt hours of extra renewable electricity per year by 2010

[103] Commonwealth Government, 2004, Securing Australia's Energy Future, Commonwealth Government, Canberra, p. 105

- increase the availability of information on the energy performance of appliances, buildings and vehicles;
- require large energy users to regularly identify and publicly report on energy efficiency opportunities; and
- streamline energy reporting requirements and participation in energy efficiency and greenhouse programs using the Greenhouse Challenge program as a single point of entry.

A Productivity Commission inquiry was established under the White Paper to provide further information on the potential benefits of, and policies to achieve, improved energy efficiency. This is due for completion in mid 2005. The White Paper also states that the Commonwealth Government will continue to work cooperatively with the states and territories on energy efficiency through the National Framework for Energy Efficiency process.

The National Framework for Energy Efficiency (NFEE) is currently being developed under the Ministerial Council on Energy.[104] Stage one of the NFEE is a three year program that consists of nine policy areas. Those relevant to this Inquiry address residential buildings, government energy efficiency, appliance and equipment energy efficiency, trade and professional training and accreditation and general consumer awareness. The policy package under appliance and equipment energy efficiency includes the National Appliance and Equipment Energy Efficiency Program (NAEEEP), a program aimed at developing a nationally consistent framework to improve household appliance energy efficiency. The main tools of the NAEEEP are mandatory minimum energy performance standards (MEPS), energy efficiency labelling enforced by law and voluntary measures including endorsement labelling, training and support to promote the best available products.[105]

Prior to the release of the White Paper on Energy, the Commonwealth Government had instituted the mandatory renewable energy target (MRET) to increase investment in renewable electricity production. The MRET places legal liability on the wholesale purchasers of electricity to proportionately contribute to the generation of 9,500 gigawatt hours of renewable energy per year by 2010.[106] This equates to supplying a city of 4 million people with electricity. The MRET was reviewed in 2003 and it was

[104] The Ministerial Council on Energy was established in 2001. One of its key tasks is to identify policies and programs to deliver significant improvements in energy efficiency through coordinated action by federal, state and local governments. Source: Sustainable Energy Authority Victoria website: www.seav.vic.gov.au/naeeec.htm accessed April 2005

[105] National Appliance and Equipment Energy Efficiency Committee website: www.energyrating.gov.au accessed April 2005. The National Appliance and Equipment Energy Efficiency Committee, consisting of officials from the commonwealth, state and territory government agencies and representatives from New Zealand, is responsible for managing the program. The Committee reports to other government structures and is ultimately directed by the Ministerial Council on Energy (the Energy Ministers from all jurisdictions)

[106] Office of the Renewable Energy Regulator website: www.orer.gov.au/about/overview.html accessed April 2005

recommended that the target be increased to 20,000 gigawatt hours by 2020 and beyond.[107] However, an extension or increase of the target was not included in the White Paper, which disappointed some commentators as it is a critical driver for the development of the renewable energy sector. A regulator has been appointed to ensure that the requirements of the MRET are met, including enforcing the legislation through imposing penalties and conducting audits.

The lead federal agency on energy efficiency and greenhouse matters is the Australian Greenhouse Office (AGO), within the Department of the Environment and Heritage. The AGO delivers programs under the Commonwealth Climate Change Strategy, which include research, industry based programs and promoting energy efficiency in the residential and Local Government sectors through a program called Local Greenhouse Action. Under this program, the Commonwealth delivers Cities for Climate Protection and the Cool Communities programs. The AGO is also involved in energy efficiency appliance labelling through provision of support for the activities of the National Appliance and Equipment Energy Efficiency Committee.

**Victoria**

Victoria's greenhouse policies and programs are outlined in the Victorian Greenhouse Strategy (2002).[108] The goals of the strategy include building awareness of greenhouse issues, to limit stationary and transport related emissions and supporting growth in the use of renewable energy.

The Government's energy statement - *Energy for Victoria* - also released in 2002, outlines key objectives of Victoria's energy policy. These include improving energy sustainability by facilitating increased energy efficiency and renewable energy production, the requirement for new homes built in Victoria to have a 5 star energy rating and to stimulate employment and innovation in industries supplying sustainable energy services and products.

In 2003, the Greenhouse Challenge for Energy project was established by the state government to determine how to achieve its commitments to reduce greenhouse gas emissions while maintaining a secure efficient energy supply. The Greenhouse Challenge for Energy process has involved extensive stakeholder consultation over two years and is integrating with other government energy-related environmental policy processes currently in development such as the National Framework for Energy Efficiency; the Government's Renewable Energy Strategy and the Renewable Buildings Strategy.[109]

[107] Mandatory Renewable Energy Target Review Panel, 2003, Renewable Opportunities: a review of the operation of the Renewable Energy Act 2000, Commonwealth Government Canberra, p. 129

[108] State of Victoria, Department of Natural Resources and Environment, 2002, Victorian Greenhouse Strategy

[109] Greenhouse Challenge for Energy, ibid, p. 2

A position paper on the Greenhouse Challenge for Energy was released in late 2004, outlining a package of energy efficiency and greenhouse gas abatement policy initiatives including support for a national emissions trading scheme; an energy efficiency strategy; a renewable energy strategy; support for expansion of the MRET; an energy technology innovation strategy and requirements for emissions reporting and disclosure by large greenhouse gas emitters.[110] Under Victoria's Greenhouse and Energy policies, the state government has set a renewable energy target of 10 per cent by 2010[111] (the national target is 2 per cent by 2010). In 2004, the Victorian Government introduced the *Wind Energy Development Act*, which facilitates the development of wind generation facilities in Victoria. The act also includes a provision to assist other small generators such as solar generators.[112]

In April 2005 the Government released the Victorian Greenhouse Strategy Action Plan Update. The document acknowledges recent developments in state, national and international policy settings and contains and builds on the actions and commitments initiated by the Victorian Greenhouse Strategy (2002).[113] New policy and program directions with relevance to this Inquiry include:

- supporting the development of a national emissions trading scheme;
- determining the best approach to managing growth in air conditioner use and summer peak electricity demand;
- enhancing climate change education in the tertiary sector;
- a major communications campaign to raise community awareness of climate change and the actions that can be taken by individuals to reduce emissions in the home;
- delivery of more targeted approaches for working with households;
- increased funding for the Cities for Climate Protection in Rural Victoria program, and supporting efforts by local councils to implement abatement actions in their local communities;
- establishing a northern metropolitan TravelSmart program and providing support for metropolitan car sharing programs; and
- using the government's purchasing power to influence the development of markets for 'greenhouse-friendly' products and services.

[110] Ibid, pp. 2-3
[111] Department of Infrastructure, submission no. 81. p. 4
[112] Ibid, p. 3
[113] Source: www.greenhouse.vic.gov.au, accessed April 2005

There are four key state government agencies involved in greenhouse and energy policies and programs that impact on the residential sector:

- the Department of Sustainability and Environment provides the greenhouse policy framework and works with other jurisdictions on national greenhouse issues. DSE implements community programs and is responsible for the management of forestry, biodiversity and climate impacts and for research into adaptation to climate change;

- the Environment Protection Authority (EPA) regulates emissions from industry, motor vehicles and solid fuel heating. The EPA has also developed a cooperative approach to reducing environmental impact (including reducing greenhouse emissions) through Environment Improvement Plans (working in partnership with industry), Neighbourhood Environment Improvement Plans (NEIPs, working in partnership with communities) and Sustainability Covenants;

- the Sustainable Energy Authority Victoria (SEAV) is a statutory authority established in 2000 under the *Sustainable Energy Authority Victoria Act* 1990. The authority implements policies and programs relating to renewable energy, energy efficiency and energy sustainability. SEAV provides information and guidance in regard to household energy use and administers a grants program (e.g. for solar hot water systems). There are plans for SEAV to merge with EcoRecycle Victoria to form a new statutory authority – Sustainability Victoria;[114] and

- the Department of Infrastructure (DoI) provides the energy policy framework, provides the transport policy framework and operates the TravelSmart behavioural change program. The DoI influences household energy consumption through a number of its functions including: a lead role in the national energy market reform process, facilitating effective competition in energy retailing and ensuring consumer protection and developing integrated policies with DSE.[115] The DoI is responsible for the Metropolitan Transport Plan and the Melbourne 2030 Strategy.

**Local Government**

Local government addresses sustainability, including energy efficiency and greenhouse mitigation, through a range of strategic plans. Councils prepare corporate strategies and municipal strategic statements in which they may set out their approach to environmental sustainability. Many councils have developed integrated sustainability strategies which may include policies on energy efficiency, greenhouse and transport.

[114] Minister for the Environment John Thwaites, MP, April 2005, Making Victoria a Sustainable State: Ministerial Statement on Environmental Sustainability, p. 8

[115] Department of Infrastructure, submission no. 81, p. 1

Local government develops plans for the specific issues they manage including street lighting and local facilities and public buildings. Councils can also influence the environmental sustainability of the built environment through the planning scheme.[116]

There is a great diversity of state, regional and corporate support programs that work with local government, households and communities (generally termed capacity building programs). The majority of Victorian councils are participants in the ICLEI Cities for Climate Protection program (CCP). This program provides a vehicle for councils to develop a strategic approach to the reduction of greenhouse emissions from their own activities and those of the broader community. Councils develop an action plan and set greenhouse emission reduction targets. These action plans include initiatives such as modifying council vehicle fleets, purchasing renewable energy and developing home energy audit programs for residents.

The Municipal Association of Victoria (MAV) conducts a range of activities to develop local government's role in effective environmental management. These include programs to assist councils to increase their purchasing of environmentally friendly products (ECO-Buy); the Clearwater program, which promotes sustainable environmental management of urban stormwater by local government and industry across Victoria, and the domestic wastewater program.[117] The MAV has developed policy positions on waste, water, planning and community sustainability[118] and is working with the state government and other environment and local government groups to develop the Local Sustainability Accord (discussed above).[119]

## Water

### Federal

The Australian Constitution gives responsibility for oversight of water matters to state and territory governments.[120] However, a number of recent initiatives by the federal government will significantly impact on urban water management in the states and territories. The National Water Initiative (NWI) was established by COAG in 2004. The initiative is a comprehensive national strategy addressing a broad range of water management issues including better and more efficient management of water in urban environments, for example through the increased use of recycled water and stormwater.[121] The National Water Initiative Agreement is currently under negotiation between the commonwealth and the states and Victoria signed the agreement in March 2005.

[116] Municipal Association of Victoria, submission no. 28, p. 8

[117] Ibid, pp. 14-15

[118] MAV website: www.mav.asn.au/environment/environment.htm accessed March 2005

[119] MAV submission, no. 28, p. 15

[120] Langford, J. and Piccinin, C, 2004, Institutional and regulatory arrangements in the Australian urban water industry in Water and the Australian Economy, Committee for Economic Development of Australia, p. 70

[121] National Water Initiative website www.pmc.gov.au/nwi/ accessed March 2005

The Australian Water Fund was established in September 2004 to help achieve the objects of the NWI. The $2 billion fund (over 5 years) is made up of three programs:

- Water Smart Australia which will fund a range of projects including those aimed at recycling and re-use of urban stormwater and greywater;[122]

- Raising National Water Standards project which will include facilitating a nationally consistent system for collecting and processing water data and establishing and promoting the Water and Efficiency Labelling and Standards (WELS) Scheme for household appliances and implementation of the Smart Water Mark system for household gardens;[123] and

- Australian Water Fund Communities program which will provide grants to communities to promote water conservation projects.

The National Water Commission (NWC) is a key element of the National Water Initiative. The NWC is an independent statutory agency, established by the Commonwealth Government in 2004 and responsible for driving water reform and providing advice to COAG and the Australian Government on national water issues.[124] The NWC is also responsible for implementing the National Water Initiative Agreement and will be responsible for the administration of two programs under the Australian Water Fund.

A voluntary water efficiency labelling scheme has been operating since 1988. The scheme is managed by the Water Services Association of Australia (WSAA). The coverage and impact of the scheme has been limited and, because the scheme is voluntary, few suppliers have chosen to label their products.[125] In 2004 the Commonwealth Government introduced the national Water Efficiency Labelling and Standards (WELS) Scheme funded under the Australian Water Fund which will require mandatory water efficiency labels on a range of appliances[126] and be administered through the states. This scheme will greatly assist consumers in selecting water efficient products. The star rating system similar to the system indicating energy efficiency, is well recognised and easy to understand.

**Victoria**

In Victoria the current institutional arrangements for urban water

[122] Ibid

[123] Ibid

[124] National Water Commission website: www.nwc.gov.au, accessed March 2005

[125] George Wilkenfeld and Associate, 2004, Regulation Impact Statement: Proposed National System of Mandatory Water Efficiency Labelling for Selected Products, prepared for the Department of Environment and Heritage, p. 3

[126] Mandatory labels will be introduced by late 2005 for all showerheads, washing machines, dishwashers, toilets, urinals, and some taps. Source: Department of Environment and Heritage, Water Efficiency Labelling and Standards Scheme Fact and Figures, Department of Environment and Heritage website: www.deh.gov.au/water/urban/facts.html, accessed March 2005

management are the result of a reform process whereby the water service provider for Melbourne was divided into a wholesaler (Melbourne Water) and three retailers. The remainder of the state is served by a number of regional water service providers (the result of amalgamations of smaller local government and independent water bodies), regional water utilities with a focus on water services.[127]

The Victorian Government's White Paper *Securing Our Water Future Together* (2004) is a major reform package that presents a comprehensive strategic plan for managing water resources in Victoria for the next 50 years. In relation to the residential sector, it sets out a policy framework for sustainable urban (and regional urban) water management, based on established methods of reducing residential water consumption and includes: pricing reform, permanent water saving measures (restrictions), education and awareness, water efficiency labelling for appliances, rebate schemes and ensuring the planning and regulatory framework supports water conservation.[128] These actions are discussed further in chapter 8.

The 5 star energy efficiency rating system for new housing in Victoria also includes water efficiency measures. From July 2005, all new housing must have either a rainwater tank or solar hot water system. In addition plumbing measures were introduced under the White Paper which require water conserving shower roses and taps to be fitted to all new housing and other buildings and for new fittings in existing buildings.[129]

Under the strategy, water authorities are required to prepare supply and demand strategies and introduce permanent water saving measures.

At the same time, stormwater and other recycled water is included in the water allocation framework for the first time.[130] The government has set targets for increasing the use of alternative water supplies including recycled water, stormwater, rainwater and greywater.[131] For example, there is a target to recycle 20 per cent of Melbourne's effluent by 2010 and a target for new development to achieve at least 25 per cent savings in water use.[132]

The key policies and programs that impact on urban water use in Victoria are administered by five government agencies:

- the Department of Sustainability and Environment is responsible for the *Securing Our Water Future Together* strategy and delivers the

[127] Langford, J. and Piccinin, C., 2004, Institutional and regulatory arrangements in the Australian urban water industry in Water and the Australian Economy, Committee for Economic Development of Australia, p. 72

[128] Department of Sustainability and Environment, 2004, Victorian Government White Paper, Securing Our Water Future Together, pp. 98

[129] Ibid, p 102

[130] Municipal Association of Victoria, 2004, Summary of Impacts Securing Our Water Future Together MAV website: http//mav.asn.au/environment/environment, accessed April 2005, p. 2

[131] Department of Sustainability and Environment, 2004, Victorian Government White Paper, Securing Our Water Future Together, p. 107

[132] Ibid, p. 104

*Our Water Our Future* community awareness campaign. DSE works with other jurisdictions on national water issues, allocates water resources, monitors the performance of water authorities and provides advice to government on the performance and future activities of the state's water authorities;[133]

- the State's Water Authorities, including the regional water authorities, metropolitan retailers and Melbourne Water are responsible for waterway management, urban water supply, rural water supply, sewerage and water recycling. The water authorities have a major role in promoting water conservation through awareness raising and behavioural change programs, delivered in cooperation with local government and community organisations;

- the Essential Services Commission regulates water prices and service quality;

- the EPA sets environmental standards and regulates environmental performance in relation to water management. The Department of Human Services Drinking Water Regulatory Unit regulates drinking water quality; and

- VicUrban, the Victorian Government urban development agency is responsible for promoting best practice in urban and community design and development, having regard to links to transport services and innovations in sustainable development.[134] For instance the Aurora residential estate in Epping North will have a third pipe system[135] supplying locally treated recycled water for toilet flushing and watering gardens and open spaces.

**Local Government**

Securing Our Water Future Together states that local government has a key role in residential water conservation through managing urban storm water, as a planning authority and through acting as role models and community educators. Councils are also significant water users through their management of public open space and other facilities.

Under *Securing Our Water Future Together*, local government is required to develop water conservation plans in conjunction with water authorities, and councils will integrate their stormwater management role with water authorities who are responsible for recycling and the use of stormwater.[136] In their statutory planning role, councils can integrate water sensitive urban development into the planning and building approvals process. Also, the

[133] Mr J Collins, General Manager, Strategic Policy and Projects, Department of Sustainability and Environment, briefing, 17 May 2004, pp. 3-4

[134] VicUrban, submission no. 60, p. 3

[135] A third pipe system is used to supply recycled water for uses such as garden watering and toilet flushing. The 'first' and 'second pipes' carry the traditional water supply to and from a house

[136] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 105

Victorian Planning Provisions and the building approvals framework will be reviewed to ensure they are consistent with sustainable water management. The MAV notes that local government will have a key role in this review process.[137]

## Waste

### The National Packaging Covenant

The 1999 National Packaging Covenant (NPC) is an initiative of the Environment Protection and Heritage Council (EPHC)138 which manages consumer packaging waste in Australia. The Covenant is the voluntary component of a co-regulatory agreement between the packaging industry, the state/territory governments and local government. The principle of the covenant is that government and industry should share the responsibility for reducing the environmental impact of packaging waste.

The covenant is not prescriptive however, to ensure signatories are not disadvantaged.[139] Companies that do not sign are subject to a National Environmental Protection Measure (NEPM) on Used Packaging Materials, which requires them to recover and re-use their products. The NEPM is the regulatory component of this agreement and is brought into effect by supporting legislation in each state. In Victoria, the supporting subordinate legislation is the *State Environment Protection Policy for Used Packaging Materials*.[140]

Under the covenant, companies must create action plans to improve the environmental outcomes of their packaging. In addition, companies must contribute to transitional funds for projects that improve the effectiveness of kerbside recycling systems.

State governments contribute an equal amount to the transitional funds. The transitional funds are made available to assist local government develop sustainable kerbside collection systems to recycle post-consumer packaging waste. These transitional funds are distributed amongst the states and are managed by Jurisdictional Recycling Groups in each state, which manage kerbside recycling programs.

The Covenant and the NEPM expire in 2005. The Covenant was extensively reviewed in 2004 and revised.[141] The revised covenant will be considered by the EPHC in April 2005. The new covenant, if accepted, will have a five

[137] Municipal Association of Victoria, 2004, Summary of Impacts Securing Our Water Future Together MAV website: www.mav.asn.au/environment/environment, accessed April 2005, p. 7

[138] comprising State and Federal Environment Ministers

[139] EcoRecycle, National Packaging Covenant, www.ecorecycle.vic.gov.au/default.asp?casid=208, accessed April 2005

[140] Ibid

[141] National Packaging Covenant Council, 2005, The National Packaging Covenant: A Commitment to the Sustainable Manufacture, Use and Recovery of Packaging 1 May 2005 to 30 June 2010, Department of Environment and Heritage website: www.deh.gov.au/industry/waste/covenant/pubs/npc-proposal-draft.pdf, accessed April 2005, p. 2

year lifespan. The NPC was criticised for not having achieved sufficient gains in reducing packaging waste over the past five years. Essentially, criticism centred on the lack of measurable objectives and clear targets, lack of a process for evaluating the performance of signatories,[142] lack of sanctions for non compliance or non performance and lack of state and federal government regulation of the packaging industry.[143] The Australian Local Government Association (ALGA) believes that the NPC has failed to require the packaging industry to take enough responsibility for packaging waste, leaving much of the burden for waste minimisation and recycling for local government.[144] The ALGA also believes that there should be more ways of recovering recyclable packaging waste including container deposit legislation.[145] These issues are discussed in detail in chapter 7.

Measures to strengthen implementation and compliance have been added to the revised NPC. These include specific environmental goals for the covenant and key performance indicators against which participants must report annually.

**EcoRecycle**

In Victoria, DSE coordinates policy across agencies and statutory bodies. EcoRecycle is the statutory authority responsible for implementing state policy on waste through developing state-wide strategies for municipal and industrial waste. EcoRecycle Victoria also administers grants programs to encourage best practice waste management.

EcoRecycle is developing a strategy for the management of solid waste in Victoria - *Towards Zero Waste: A Materials Efficiency Strategy for Victoria*. The draft strategy has been subject to public consultation since 2003. The strategy will coordinate the planning and responsibilities for the reduction and management of solid waste and set out the overall framework and targets for EcoRecycle, the Environment Protection Authority, Regional Waste Management Groups and local government. These targets include a 15 per cent reduction in waste generated by 2013; increasing the recovery rate in all solid waste from 48 per cent to 75 per cent by 2013 (with a priority on increasing recovery of organic waste).[146] EcoRecycle also coordinates waste education and behavioural change programs for schools and businesses.[147] As noted above, there are plans for EcoRecycle to merge with SEAV to form a new statutory authority – Sustainability Victoria.

Local Government is responsible for the delivery of domestic waste management services including kerbside recycling, green waste collection,

[142] Institute for Sustainable Futures, 2004, Review of National Packaging Covenant for the National Conservation Council of NSW, Department of Environment and Heritage website: www.deh.gov.au/industry/covenant/pubs/review-ncc.pdf, accessed March 2005, p. ix

[143] Australian Local Government Association website: www.alga.asn.au/newsRoom/opinion//20050303.php , accessed March 2005, p 1

[144] Ibid, p. 1

[145] Ibid, p.1

[146] EcoRecycle, 2003, Towards Zero Waste Summary Draft for Consultation, p. 4

[147] EcoRecycle website: www.ecorecycle.vic.gov.au

waste education, litter abatement and management as well as management of transfer stations and landfills.

**Regional Waste Management Groups**

Regional Waste Management Groups (RWMGs) are responsible for planning the management of municipal solid waste in Victoria. RWMGs are constituted with membership from local government within their regions. Most metropolitan and a number of regional councils contribute to the funding of RWMGs. Local government indirectly funds the groups through payment of the landfill levy on municipal waste.[148] The RWMGs are also funded by state grant programs.

There are 16 RWMGs in Victoria and each encompasses one or more municipalities. To coordinate and direct the waste management activities of its member councils, each RWMG produces a regional plan.[149] The RWMGs also implement waste education and behavioural change programs in schools and the community.[150]

Local government, through their RWMGs, is responsible for the development and management of waste management infrastructure including recycling depots, transfer stations, re-use centres and landfills. Local government is also responsible for kerbside recycling services. Kerbside recycling services are funded principally through local government rates or municipal waste charges. EcoRecycle has implemented the Best Practice Kerbside Recycling Program to assist local government to improve kerbside recycling. Local Government agencies that adopt the program are eligible for funding under the National Packaging Covenant.

The Environmental Protection Authority provides the statutory policy framework for waste management and enforcement, develops statutory agreements with industry, works with other jurisdictions on national waste issues and approves EcoRecycle and Regional Waste Management Group waste management plans. Waste management and landfills in Victoria are regulated by the EPA. The EPA also collects the landfill levy and regulates liquid and hazardous waste.

A proposal is currently being considered regarding the creation of a new institutional authority to manage Melbourne's metropolitan waste in place of the five regional waste management authorities.[151]

[148] Environment Protection Authority and Municipal Association of Victoria, 2001, Local Government Role in Waste Management, Local Government Case Studies in Environmental Management - Case Study no. 9, MAV website www.mav.asn.au/www.default.asp?casid=2547 accessed March 2005, p. 1

[149] Ibid, p.1

[150] Ibid, p 1

[151] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, p.704

## Related policy issues

Government can also influence household consumption through the formal education system, statutory planning and the housing industry.

Environmental sustainability is incorporated into Victorian schools at a number of levels. The Department of Education and Training (DET) advised the Committee that it is currently developing an Environmental Sustainability Strategy.[152] This strategy provides a framework for environmental programs in Victorian schools over five years and includes the establishment of a Victorian Environmental Education Network, representing major government and non governmental organisations that support schools in environmental education.[153]

The DET advised that the environment is integrated throughout the Victorian school curriculum. The Victorian Curriculum Assessment Authority (VCAA) is currently finalising the Victorian Essential Learning Standards, a framework for organising the Victorian school curriculum up to year 10. The DET advised that, within the new framework, understanding of the interaction between social, economic and environmental sustainability will be a core component of students learning across all disciplines. For example, environmental sustainability will be integrated into science, geography and economics programs.[154] At Victorian Certificate of Education (VCE) level, environmental science has also been revised by the VCAA.

The Sustainable Schools Pilot Program is a collaborative project between DET, the Gould League and the Centre for Education and Research in Environmental Strategies (CERES). The program provides a whole school planning approach to integrate curriculum planning and management of school facilities to encourage environmental sustainability throughout the school community.[155] The DET is developing indicators for environmental performance of schools both with the management of the school and within the broader community. The sustainability of school facilities and infrastructure is also being investigated through a number of pilot projects, including the Building Sustainable Schools project in collaboration with the Victorian Building Commission.[156]

At the vocational training level (TAFE system), a number of initiatives are in progress to integrate environmental sustainability training into the curriculum. The Victorian Government is party to the Australian Quality Training Framework which provides nationally agreed standards for vocational education. The DET advised the Committee that, as qualifications

[152] personal communication, Ms G Hart, General Manager, Corporate Services Division, Department of Education and Training, 14 April 2005

[153] Department of Education and Training, submission no. 79, p. 3

[154] Ibid, p. 6

[155] Ibid, p. 1

[156] Ibid, p. 2

are updated they are increasingly incorporating environmental sustainability competencies. Examples include electro-technology and plumbing training packages. Courses such as a graduate certificate in environmentally sustainable building design have been approved.[157] DET advised that three specialist vocational education centres have been established in Victoria focusing on environmental management, wind energy generation, sustainable housing waste management and hydrogen-based power.

The statutory land use planning system plays an important role in defining sustainability requirements for new development. The building approvals process is also an important vehicle for encouraging sustainable energy and water management in the residential sector. The Department of Sustainability and Environment is developing planning system approaches to sustainability through a number of projects including the Sustainability in the Built Environment project and the Sustainable Neighbourhoods project.[158]

At a national level, the Greensmart program is an initiative of the Housing Industry Association, the Australian Greenhouse Office and Environment Australia. The program focuses on educating builders, designers, product manufacturers and consumers about the benefits of environmentally responsible housing.[159] The Your Home project, also an initiative of the AGO in collaboration with government, building industry and community organisations, includes consumer and technical guide materials and tools developed to encourage the sustainable design, construction or renovation of homes.[160]

## Evaluation

The Committee was advised that the lack of evaluation of the outcomes of behavioural change and household consumption programs is a significant weakness of state and local governments as well as non-governmental organisations.

DSE's submission to the Inquiry emphasises that it is important for government to identify its most effective and appropriate roles in achieving community sustainability.[161] However, a KPMG survey of 88 DSE education and behavioural change programs found that 'monitoring and measurement were not strong in some areas - that is not to say all of … [the programs], but some were weak in those areas'. The DSE summary of the KPMG report findings states that:

[157] Ibid, p.1

[158] Department of Sustainability and Environment, submission no. 70, p. 27

[159] Mr W Gersbach, Executive Director, Planning and Environment, Housing Industry Association, meeting, 27 October, 2004, p. 532

[160] Australian Greenhouse Office, Your Home, AGO website: www.greenhouse.gov.au/yourhome accessed April 2005

[161] Department of Sustainability and Environment, submission no. 70, p. 27

> Although only four programs [of the 88 reviewed] had no performance measurement component, the effectiveness of this process is limited in many cases by a lack of effective measurement of program success.[162]

This is an ambiguous statement but suggests that the performance measures of some DSE programs are deficient in measuring outcomes. DSE also advised the Committee that performance measurement in education and behavioural change is inherently difficult because it involves the measurement of social change, a complex entity.[163] The Committee was advised that the cost-effectiveness of the TravelSmart program[164] has been relatively straightforward as the program relates to specific localities and one behaviour. However, programs which aim to promote more complex behavioural change over a wider community become far more difficult to analyse in terms of their cost-effectiveness.[165]

DSE described two programs - Waste Wise Schools and the Our Water Our Future advertising campaign encouraging households to save water as exemplars of good evaluation and program management.[166] In these evaluations, the implementation of the program (cause) was linked to a change in water consumption or waste generation. The Waste Wise Schools Program also resulted in flow-on effects in behavioural change beyond the school. Both programs used multiple methodologies to measure performance, which enabled detailed information about the effectiveness of different aspects of the programs to be collected.[167] These programs and their evaluation will be discussed in more detail in chapter 5. However the Public Accounts and Estimates Committee has recommended that performance indicators for the $225 million Our Water Our Future reform package, in its entirety, be developed.[168] Some new performance indicators for the Our Water Our Future initiatives have been developed and are included in the 2005-06 budget papers and reported quarterly to the Expenditure Review Committee.

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[162] Correspondence from Hon J Thwaites, Minister for Environment, received 7 December 2004, attachment 3

[163] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 6 December 2005, p. 664

[164] The TravelSmart program encourages the use of public transport through the provision of tailored information delivered to individual households

[165] Mr S Malcolm, Project Manager, Education and Behaviour Strategies, Department of Sustainability and Environment, transcript of evidence, 6 December 2004, p. 668

[166] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 6 December 2005, p. 664

[167] Ibid, p. 664

[168] The Public Accounts and Estimates Committee, 2004 Report on the 2004-05 Budget Estimates recommends that:

The Department of Sustainability and Environment:

a) develop and report performance indicators to monitor the progress of initiatives announced in Our Water, Our Future: Securing Our Water Future Together;

b) develop and report financial indicators that indicate whether funds raised by water authorities are expended on water conservation measures or are used to maintain and upgrade water infrastructure; and

c) monitor the impact of the water conservation initiatives against long-term projections for water consumption (recommendation 141).

The International Council for Local Environmental Initiatives (ICLEI) advised the Committee that many of the achievements of the environment movement over the last 20 to 30 years have, unfortunately, not been quantified and therefore the effectiveness of different management approaches have not been demonstrated.[169]

The MAV submission recommends that evaluation and monitoring approaches need to be developed to measure the effectiveness of community environment programs:

> Another strong emphasis in many community and local government environment programs is to develop strong evaluation and monitoring approaches to measure the effectiveness [of] programs. At a community level, such evaluation and monitoring is often fairly complex, and much work still needs to be undertaken to improve and assist local government with such approaches. Often councils struggle to gain access to data sets held by State agencies, and to undertake appropriate methodologies for data analysis, at the correct scale. An emphasis on improved access and robust methodologies for community based programs is essential to ensure cost effective outcomes against environmental targets and goals.[170]

The MAV also advised that despite the diversity of environmental programs at state and local levels, it is difficult to identify the most cost effective programs. Mr Peter Lyon, formerly Senior Policy Advisor, Environment, MAV advised that:

> … we think improving community sustainability consists of some basic things like evaluation and monitoring. We think there are a lot of programs going on out there. We've got a lot to show you, but we can't sit here and say which ones are effective particularly well. I think that's a drawback of local and state government programs. I think there needs to be much more monitoring of cost benefit in terms of change, volume of water, kilojoules of energy, what you are saving for your dollar. We do know that a lot of household-based programs are quite expensive for governments to run. You might have a whole program funded to get to 90 households, but is that getting to the broader community? … you might contrast that with, say, a state advertising program of many millions that gets to the whole community. I think what we argue is better evaluation and monitoring of outcomes is really vital, and developing good cost benefit indicators per household would be essential.[171]

In its submission to the Inquiry, Environment Victoria stated that the capacity of many organisations to measure the performance of their programs may be limited as a result of inadequate knowledge, skills or resources. Different organisations employ different methodologies to evaluate their programs, making comparisons difficult. Furthermore, many organisations have limited capacity to conduct qualitative evaluations (i.e. social research) of their programs, especially over the long term.[172]

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[169] Mr W Wescott, Chief Executive Officer, International Council for Local Environmental Initiatives, transcript of evidence, 5 July 2004, p. 33

[170] Municipal Association of Victoria, submission no. 28, p. 38

[171] Mr P Lyon, Senior Policy Advisor, Environment, Municipal Association of Victoria, transcript of evidence, 5 July 2004, p. 59

[172] Environment Victoria, submission no. 80, p. 6

The evaluation of sustainable household consumption programs is not only of concern in Victoria. The Committee was interested to learn that the OECD is conducting a study on the environmental effectiveness and economic efficiency of various policy mixes.[173] The aim of the project is to develop a better understanding of when and how best to combine several policy instruments to address a given environmental objective. Residential energy efficiency and municipal waste management will be examined as part of the project, the results of which are to be discussed in June 2005 at the OECD Working Party on National Environmental Policy.[174]

The Committee found that, with a few exceptions, there has been very little evaluation of the effectiveness of policies and programs to promote sustainable consumption in Victoria. The Committee believes that robust evaluation of sustainability initiatives, using consistent methodology to allow comparison between different approaches, is critical to their success. Furthermore the Committee received evidence that there are sound methodologies to evaluate such initiatives.

The Committee believes there is a clear role for the state government in evaluating the effectiveness of sustainability programs, where local Government and community groups lack the capacity and the resources to develop robust methodologies. Accordingly it is recommended that:

**Recommendation 4.3**

**The State and Local Government ensure that:**

**a) performance targets are integrated into all State and Local Government funded household energy, waste and water programs;**

**b) the outcomes of State and Local Government funded household energy, waste and water programs are regularly reported to the community; and**

**c) a formal mechanism is developed to facilitate the sharing of information on program outcomes between State and Local Government and non-governmental organisations as part of the Victorian Sustainability Framework.**

[173] Ms Y Serret, Administrator, Sustainable Household Consumption, National Policies Division, Organisation for Economic Cooperation and Development, meeting, Paris, 7 February 2005

[174] The study constitutes part of a broader Organisation for Economic Cooperation and Development synthesis report on sustainable household consumption that will be released in 2006. Source: Organisation for Economic Cooperation and Development, 2005, Household Behaviour and the Environment: Improving Policies for Sustainable Consumption, Project Proposal

Chapter

5

# Consumer behaviour and behavioural change

## Key findings

**5.1** There are many theories that attempt to explain household consumption and the processes involved in creating and sustaining behavioural change. However, no single theory provides the full explanation of why consumers behave in a certain way. Instead the theories highlight different approaches to encourage behavioural change.

**5.2** There is a chain of players involved in the production and supply of goods and services relating to household water and energy. At the point of purchase, when a consumer makes a decision, there have already been a number of players influencing the outcome.

**5.3** Witnesses advised that one of the more efficient methods of changing consumer behaviour is to target those intermediaries who have an intervening interest between the government and consumers such as tradespeople, salespeople, designers and planners.

**5.4** One of the most effective methods of promoting household sustainability is to remove choices from consumers through sound product design. According to the United Nations, between 60 and 80 per cent of the environmental impact of a product during its lifecycle is determined at the design stage.

**5.5** Household consumers are a diverse group and consumer decision making is a complex process influenced by a wide range of factors such as place of residence, ethnicity and gender. Therefore behavioural change programs need to target different segments of the community and be based on sound social research data.

**5.6** The cost of environmentally sustainable technology and infrastructure can be prohibitive to households and the payback periods unclear. Furthermore, many people do not regard the environment as a priority when they design their home.

**5.7** Many witnesses advised that resources such as energy and water are under-priced and that prices do not promote sustainable consumption.

**5.8** Existing infrastructure and technology can be major barriers to environmentally sustainable behaviour. For example, poor household design prevents consumers from using energy efficiently.

**5.9** There is a considerable amount of information relating to energy and water conservation and waste reduction available to consumers. However the information is often conflicting, unavailable at the point of product purchase and competes with marketing campaigns that promote convenience and disposability.

**5.10** Sustainable behaviour involves questioning attitudes and expectations. Government and industry have an important role to play in leading by example and shaping attitudes and expectations.

## Introduction

> Behaviour change is fast becoming the 'holy grail' of sustainable development policy. But understanding how, why and where behaviours change is an important pre-requisite for making progress here. Information campaigns have been widely used for achieving public interest goals. But they are known to be less effective than other forms of learning.[1]

This chapter focuses on the roles and responsibilities of consumers in relation to sustainable communities. While research shows us that most consumers care about the environment, this concern is not always reflected in their behaviour. Conceptual approaches to behavioural change are discussed to provide a context for potential initiatives aimed at reducing household consumption of water and energy and the production of waste. The diversity of consumers is examined as well as the barriers to sustainable household consumption.

## Conceptual models of household consumption and behavioural change

Behavioural change is complex and a plethora of theories attempt to explain household consumption and the processes involved in creating and sustaining behavioural change. For example the OECD notes that:

> Theories of consumer behaviour are offered in marketing studies (psychology of decision-making), microeconomics (individual preferences and maximisation of utility), philosophy (why people consume), anthropology (consumption as a cultural expression and social identity), sociology (life-stage, social status, cultural meaning of consumption; sociology of technology) and ethics (individual values, social and environmental responsibilities in consumption behaviour). Each of these fields explain important motives for consumption.[2]

[1] Jackson, T, 2005, Motivating Sustainable Consumption: a Review of Evidence on Consumer Behaviour and Behavioural Change, p. xi

[2] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Consumption? Trends and Policies in OECD Countries, p. 61

This chapter explores a selection of theories. Importantly, no single theory provides the full explanation of why consumers behave in a certain way. Instead the theories highlight different areas that can be used to target consumers and encourage behavioural change in relation to water, energy and waste. What might work with one group of consumers might not work with another. Behavioural change requires the development of sophisticated ways of connecting with consumers over time.

A number of economic theories of consumer behaviour assume a level of rationality among consumers, that is an individual will make a considered choice on the basis of cost and benefit and will choose the item that gives them the most benefit. Ideas of rationality have expanded over time to explain that consumers compartmentalise their decision making rather than examining the bigger picture.[3] This could explain why some people act contrary to their beliefs.

The Needs–Opportunity–Ability model of consumer behaviour looks at the underlying influences of behaviour at the macro level of society as a whole and the micro level of the household. At the micro level the motivation for a consumer to act in a certain way is the result of their needs and their opportunity and ability to fulfil those needs. Consumers do not buy goods and services simply for the sake of it, they buy goods and services for what they can do for them. As Figure 13 illustrates, needs vary and relate to quality of life and well-being, and they are the motivation behind consumption.[4]

'Need' can be an elusive concept. It is important in relation to sustainability to understand that consumption needs are almost always socially contingent – that is, satisfying them depends on the social context. Household needs are not just essentials like water and energy, but they are also linked with belongingness, peer group and esteem.[5]

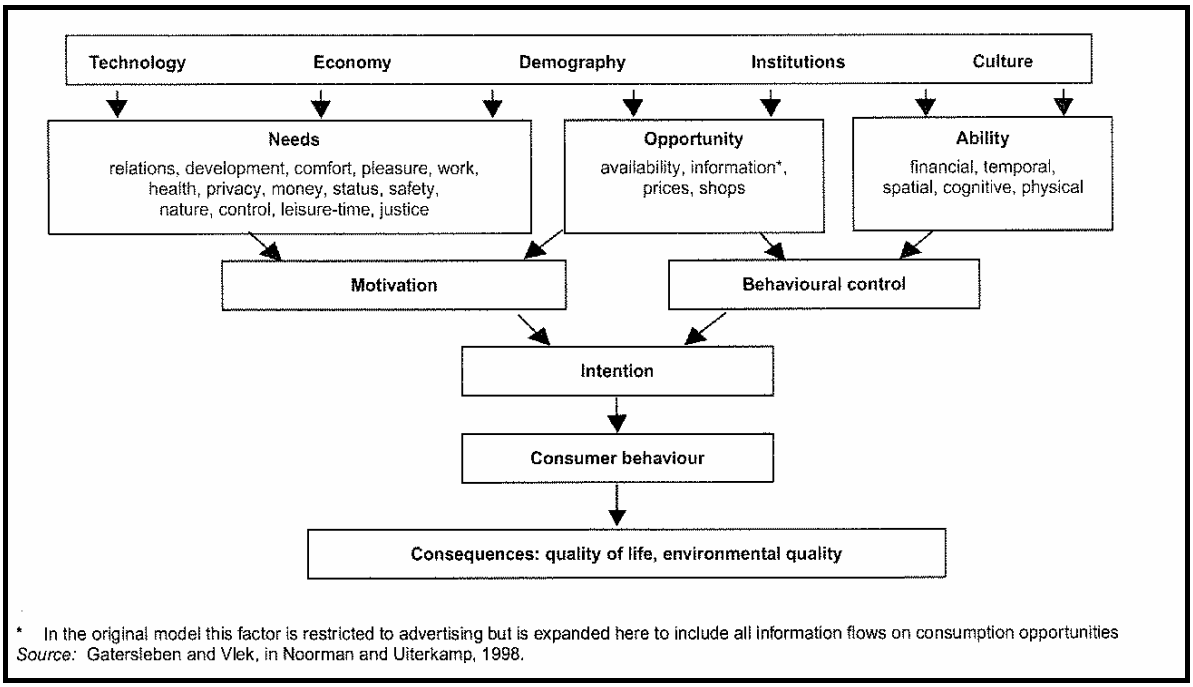
Opportunities and abilities determine how much control people have to meet those needs. Opportunities are determined not only by consumers but have an impact on their consumption patterns. For example are certain goods and services available, are consumers aware of products and are they easily accessible? Abilities refer to the capacity of the consumer to procure the goods and services and relate to financial factors, such as affordability, logistical abilities, whether the goods are compatible with the layout/design of the house, and regulatory factors (whether a permit or licence is required).

[3] Ibid, p. 64

[4] Ibid, p. 66

[5] Michaelis, L and Lorek, S, 2004, Consumption and the Environment in Europe: Trends and Futures, p. 63

## Figure 13: The Needs-Opportunity-Ability Model of Consumer Behaviour




Source: Figure 2, Towards Sustainable Household Consumption: trends and policies in OECD Countries, p. 67 © OECD, 2002

In addition to the micro level factors influencing consumption patterns, there are factors at the macro level. Consciously or subconsciously, these factors such as technology, the economy, demography, institutions and culture, influence the needs, opportunities and abilities of consumers. For a change in behaviour to occur, there needs to be motivation on the part of the consumer plus some level of control.

Another approach to behavioural change is persuasion theory which is based on the idea that consumers can be encouraged to change their behaviour through specifically targeted information messages. In its original and simplest form, the theory suggests that when consumers are exposed to a particular message, they hear and understand that information. This persuades them to change their attitudes and in turn results in behavioural change.[6]

There are a number of theories that build upon the basic premise of persuasion theory and in particular emphasise that the consumer is not a passive recipient of information. Attitude and behavioural change is likely to be more enduring if the consumer analyses the information and considers how it fits into their existing belief system. For those consumers who are difficult to engage, like 'latent greens' or 'inactives' (discussed later in this chapter), there should be less focus on the environmental message and

[6] Jackson, T, 2005, Motivating Sustainable Consumption: a Review of Evidence on Consumer Behaviour and Behavioural Change, p. 106

more focus on the potential rewards of behavioural change,[7] for instance financial benefits or increased levels of comfort.

Persuasive appeals must employ highly credible sources and be structured around a single, well-placed, and very positive message. For sustained behavioural change, consumers need to receive positive reinforcement.[8]

One issue with using persuasion to encourage changes in consumer behaviour is that it places a lot of reliance on people to act for 'the common good'. In relation to sustainable consumption, it assumes that people feel some level of commitment to the environment as a collective resource.

**Community based social marketing**

Community based social marketing (CBSM) is an approach based on research in the social sciences that demonstrates that behavioural change is most effectively achieved through initiatives delivered at the community level which focus on removing the barriers to an activity while at the same time enhancing the benefits of that activity.

The approach draws on evidence that education alone often has little or no effect on behaviour in relation to environmental sustainability and although it raises people's awareness of issues – actual behavioural change is limited. The model involves five steps: identifying the behaviour to be changed; identifying the barriers and benefits to an activity through direct contact with the community (focus groups and surveys); developing a strategy that utilises a number of behavioural change tools; piloting the strategy and evaluating the strategy once it has been implemented across a community.

The tools of behavioural change are central to the approach and are based on psychological theory and research. They include seeking commitment to making small changes and helping people view themselves as environmentally concerned; the use of prompts or reminders to carry out activities; the development and publicising of community norms which support sustainable behaviour and the use of incentives to reward sustainable behaviour.

The approach has been widely used in Canada and the United States for the last decade as well as in the health sector. However the technique is relatively new in Australia and there are few examples of its use in environmental behavioural change programs.

While many acknowledge the benefits of CBSM, criticisms have been made, including by the Gould League, an Australian environmental education organisation. While the approach focuses on changing personal behaviours, it does not address the underlying cultural influences. Some

[7] Ibid, p. 107
[8] ibid, p. 109

commentators regards CBSM as a transmissive process rather than a questioning process and as such the behavioural change will not necessarily be sustained.[9]

The Gould League told the Committee that changing the entire culture is necessary because having individuals with knowledge has not resulted in outcomes. The Gould League's approach to behavioural change is to focus not just on information and engagement but also interaction and leadership. They believe that behavioural change will be more likely to be sustained with feedback and positive reinforcement.[10]

## The roles and responsibilities of consumers

The terms of reference of the Inquiry require the Committee to focus on methods of encouraging individuals, households and communities to be environmentally sustainable. Chapter 3 illustrated the impact of household water and energy consumption, and waste generation on the environment. The Department of Sustainability and Environment (DSE) advised the Committee in its written submission that:

> Consumers/householders have a significant role to play in creating more sustainable communities. To some extent, Government and industry can create sustainable choices, ensure that external barriers are removed and that sustainable actions are accessible and achievable.
>
> *However, sustainable communities will ultimately depend on consumers choosing more sustainable lifestyles and adjusting their behaviour accordingly.* The remainder of this submission focuses its attention on the non-regulatory approaches and actions that householders can take within *existing dwellings in established communities* (the majority), as the purchasing decisions and behaviour change within these *households have the capacity to dramatically increase the sustainability of our communities* (added emphasis).[11]

The evidence the Committee received challenges the assumption that existing households have the capacity to readily and dramatically increase the sustainability of communities. For example, DSE advised the Committee that one of the most effective methods of household energy saving is through sound building fabric design.[12] Yet the average Victorian home has a poor energy efficiency rating of 2.2 stars.[13]

Furthermore householders account for a relatively minor fraction of water and energy use and waste production. The Committee believes therefore that the promotion of sustainable communities through households is a

[9] Mr J Grant, Chief Executive Officer, Gould League, transcript of evidence, 27 September 2004, p. 282

[10] Ibid, p. 281

[11] Department of Sustainability and Environment, submission no. 70, p. 30

[12] Ms S Stephen, Team Leader, Climate Change Strategies, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 722

[13] Moreland Energy Foundation, submission no. 56, unpaged

limited, albeit important management approach. Mr Kenneth Ruffing, Deputy Director of the Environment Directorate, Organisation for Economic Cooperation and Development (OECD) advised the Committee that targeting consumers and households in addressing consumption was a limited approach. He stated that household consumption is a popular area of policy from a political perspective as the onus is on households to take action. Mr Ruffing labelled this as a '10 per cent solution', for instance, only one sixth of the waste stream is residential.[14] Similarly, the United Nations Environment Program advised the Committee that 80 per cent of the world's water is consumed by the agricultural sector.[15]

Research conducted by the German Federal Environment Agency shows that the extent to which consumers can exercise choice is restricted:

> Concrete consumption patterns in day-to-day life do not fully reflect the preferences of individuals or private households. Besides 'lifestyles' (which are chosen by individuals), there are also 'ways of life' and 'conditions of life' (determined by family size, job status, income situation etc.). This means that although the remaining options open to consumers are often restricted, they do in fact exist … Even known and, in principle, desired alternatives are often difficult to implement, especially in view of the fact that conventional offers and sales infrastructures still clearly prevail. Furthermore, the options open within the scope of day-to-day lifestyles are restricted to an average perspective through strategic consumption decisions such as selecting where to live, how to live and the fittings provided (i.e. type of housing or heating system). Moreover, specific barriers can prevent individuals from realising and implementing options. These can be deficits in information, familiar routines or simple psychological compensation needs. [16]

This point was consistent with the evidence the Committee received in Victoria. The Committee was advised that consumers are limited by the choice of goods and services available, and in many cases they have little choice. This is particularly relevant considering some of the large infrastructure systems that are part of the production and supply of resources, in particular energy and water. Mr Ian Coles, the CEO of EcoRecycle, was sceptical about whether consumers have much opportunity to reduce their household waste through more selective purchasing. He told the Committee:

> I think that in the household it is very difficult to reduce waste. We are really captive to the pollution cycle … There is not much out there about the marketplace to discriminate the products or packaging. We are really left with very few options.[17]

Some commentators argue that industry responds to the demands of consumers for environmentally friendly products and services and that at

[14] Hazardous waste and chemical waste are of primary concern to the OECD rather than the management of municipal waste.

[15] United Nations Environment Program, Paris, meeting, 9 February 2005

[16] Loewe, C and Lichtl, M, undated, Overcoming the communication gap: public-private partnerships towards sustainable lifestyles, p. 12

[17] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence, 5 July 2004, p. 17

present that demand is minimal.[18] Consumer sovereignty is the concept that the demands and purchasing power of consumers dictate the types of goods and services that are produced in an economy. This places the responsibility of initiating change with consumers. However, the Committee heard evidence that in relation to household energy, water and waste it is not such a straightforward process of supply meeting demand.

There is a chain of players involved in the production and supply of goods and services related to household water and energy - manufacturers and importers, wholesalers and retailers, builders, sales staff, designers and tradespeople. At the point of purchase, when a consumer makes a decision, there have already been a number of players influencing the outcome.[19] With particular reference to energy, Mr Alan Pears from the Business Council for Sustainable Energy told the Committee that many of these players have no incentive or a disincentive to encourage energy efficiency, and that there are many players working against the delivery of the best outcome for the householder.[20] Mr Pears gave a number of examples including an appliance sales person who works on commission and has bonuses linked to certain products, a lighting advisor who needs to sell a lot of light fittings to stay in business and an electricity retailer who has a lot of fixed costs so selling extra energy means a better financial return.[21]

Dr Maureen Rogers from the Centre for Sustainable Regional Communities at LaTrobe University agreed that the ability of consumers to generate change was limited:

> I personally think that the notion of consumer sovereignty as being a driver for environmental change, meaning that it is all…[up to] the consumer to make the decisions that drives changes through business, is flawed in lots of ways … While that might work up to a certain level, the ability of the consumer to even do that is quite difficult.[22]

There is also an opportunity to change consumer behaviour by targeting those who have an intervening interest between the government and consumers,[23] for example tradespeople, salespeople, builders, architects, designers and planners. As mentioned earlier in this chapter, the people whom consumers have contact with can play an influential role in

[18] Ms M McCaskill, Chief Executive Officer, Beverage Industry Environment Council NSW, meeting, 26 October 2004, p. 488; Mr H Rasumussen, Energy Smart Design, transcript of evidence, 27 July 2004, pp. 152-154; Mr J Norton, Policy Services, Building Commission, transcript of evidence, 6 December 2004, p. 699

[19] Mr A Pears, Policy Advisor, Business Council for Sustainable Energy, tabled material, Environment and Natural Resources Committee hearing, 8 November 2004

[20] Mr A Pears, Policy Advisor, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 581

[21] Ibid, p. 581

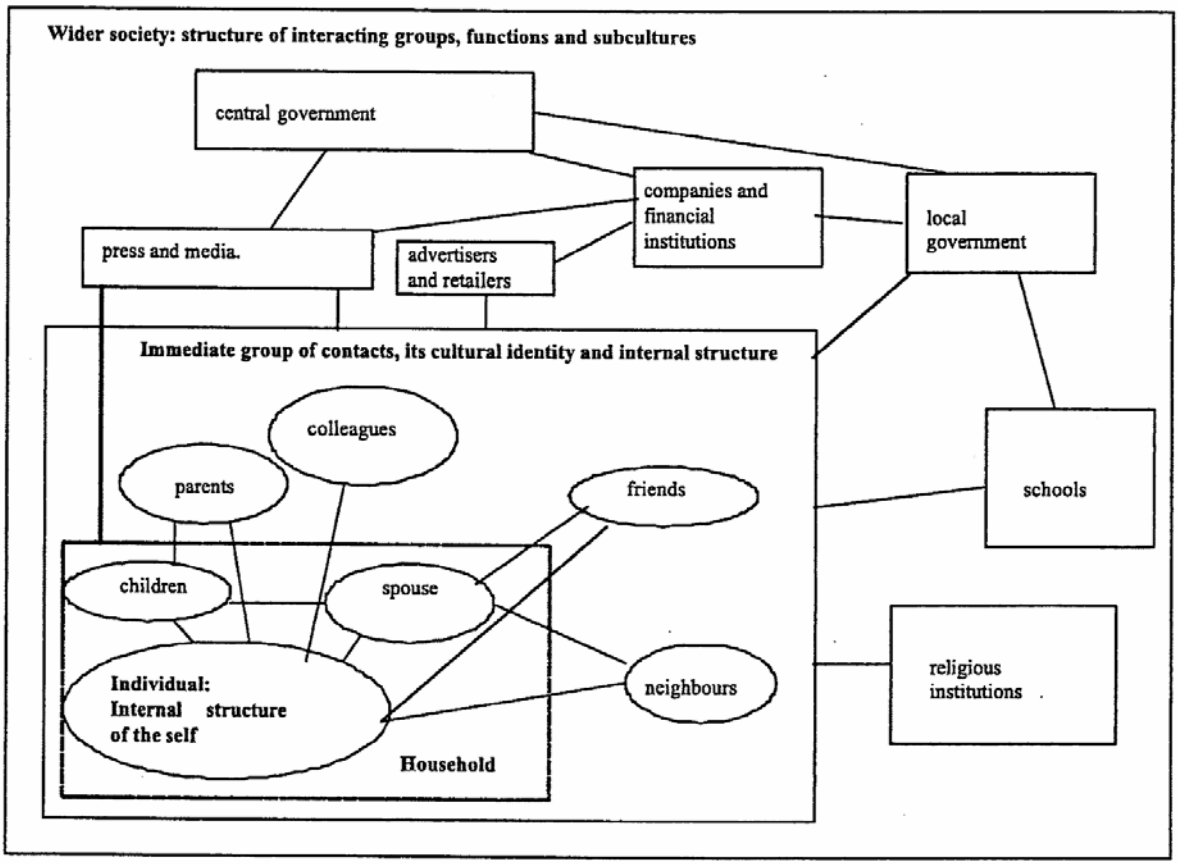
[22] Dr M Rogers, Centre for Sustainable Regional Communities, LaTrobe University, transcript of evidence, 27 July 2004, p. 161

[23] See Mr H Saddler, Managing Director, Energy Strategies, meeting, 27 October 2004, p. 519; Mr D Wilson, National Training Director, Master Builders Association, meeting, 27 October 2004; p. 529 and Mr J Shevlin, International and Strategies Branch, Australian Greenhouse Office, meeting, 27 October 2004, p. 544

determining whether households make sustainable decisions. With reference to the Cool Communities program, Mr James Shevlin from the Australian Greenhouse Office explained the potential of these intermediaries to change behaviour:

> I think the main message we ended up taking out of it [Cool Communities Program] was that the best way to get action to occur in a household was to go directly to the household, and not only point out what they could do but actually help them do it. That sort of very direct, hand-holding approach is clearly not something that we, or any government can afford to do for every single household. The issue for us is whether we can tap into other intermediaries that can do that and have an interest in doing that.[24]

## Figure 14: Structures and Networks Influencing Consumption Patterns




Source: Michaelis, L and Lorek, S, 2004, Consumption and the Environment in Europe: trends and figures, p. 64

The GreenPlumbers program is a good example of a federal government and industry partnership program that utilises intermediaries. The program trains plumbers so that they can provide their customers with up-to-date

[24] Mr J Shevlin, International and Strategies Branch, Australian Greenhouse Office, meeting, 27 October 2004, p. 547

information and advice on technology, the environmental impacts of plumbing services, appliances and household practices and water, energy and cost saving information.[25] The underlying premise of the program is that training one plumber who sees a number of customers a day is more effective than trying to educate consumers about plumbing and the environment, when they may use a plumber once a year.

As households have contact with many different intermediaries, there are advantages in considering them in strategies aimed at promoting behavioural change. A focus on intermediaries has many benefits as Mr Shevlin told the Committee:

> There are a number of areas where we can look at intermediaries, so rather than trying to get to 20 million people, we can get to several thousand people or tens of thousands of people which is obviously a lot easier … a large part … is about training the industry to actually deliver [environmentally sustainable] products and suggest things. [26]

However the interplay between consumers and intermediaries is also important:

> The consumer has to be aware and understand what the options are, the builder has to be aware and understand the options, the designer has to be aware and understand the options. It needs to be done in partnership. [27]

One of the most effective methods of promoting household sustainability is to remove choices from consumers through sound product design. This means that consumers are not relied on to make sound environmental decisions. The RMIT Centre for Design is involved in a number of collaborative projects with industry that focus on design methods and sustainable product design. Some recent examples include reviewing Nestle package design, design of a more energy efficient kettle with Kambrook, and working with Southcorp to re-design household appliances, such as a dishwasher.[28] The EPA gave an example of using design to ensure that wood heaters used in Victoria meet Australian standards for reduced smoke emissions.[29] This issue is discussed further in chapter 7.

Mr Philip Harrington, formerly of the International Energy Agency explained to the Committee:

> … Another initiative [to promote energy efficiency and renewable energy in the residential sector] is the use of things like partnerships and buyer's cooperatives. I think Sweden and many other countries have shown those to be very cost-effective ways of achieving what I sometimes call eco-redesign, which is essentially

[25] GreenPlumbers website www.greenplumbers.com.au accessed April 2005

[26] Mr J Shevlin, International and Strategies Branch, Australian Greenhouse Office, meeting, 27 October 2004, p. 544

[27] Mr D Wilson, National Director, Training, Master Builders Australia, meeting, 27 October 2004, p. 529

[28] RMIT Centre for Design website www.cfd.rmit.edu.au accessed April 2005

[29] Mr M Bourke, Chairman, Neighbourhood Environment Improvement Program, EPA, transcript of evidence, 5 July 2004, p. 22

> restructuring and redesigning the mainstream products that we see around us so that the default choice by consumers is a more efficient choice. Lighting is a good example. Our default choices tend not to be the most efficient, and not for any good reason but generally from a lack of information.[30]

All consumer goods, including 'green' ones have adverse effects on the environment.[31] Ecodesign, or design for the environment, is a principle that recognises the importance of product design in reducing this impact. Ecodesign is a preventative approach, attempting to avoid or reduce environmental impact, rather than dealing with the after effects.[32] It is concerned with the whole lifecycle of a product including how a product is manufactured; how it will be used; and where and how it will be disposed of once the consumer if finished with it. It aims to avoid or minimise significant environmental impacts and increase the efficient use of resources at all stages of a product's lifecycle.[33] This involves assessing the environmental implications of extracting raw material and processing it ready for use, manufacturing the product, packaging and distributing the end product, actual product use, and product disposal.

It has been reported that between 60 to 80 per cent of the impact a product will have on the environment during its lifecycle is determined at the design stage.[34] Most of the environmental impacts are locked in when a product is developed, as this is when it is determined what a product will be made of and how it will be used.[35] The only areas of significant discretionary influence are how a product is used, frequency of use and at what times it is used.

The Committee was briefed on some work conducted by the German Institute for Ecological Economy Research (IÖW) on product rental schemes and household consumption without ownership. The IÖW advised that these are 'new' concepts that are emerging in product use, although the Committee notes that such principles are not dissimilar from traditional thrift. There are product accompanying services, for example, methods of extending the life of products through maintenance, repair, upgrades or remanufacturing. There are also product replacing services whereby the use of a product is intensified through, rent-a-tool services or leasing where the ownership of the product remains with the supplier. There are also car sharing services, for example fleet management.

The IÖW developed a typology of people and sustainable product use. The institute found that over a third of Germans are ownership oriented, that is they belong to a traditional group of people who have inflexible consumption

[30] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2005, p. 622

[31] United Nations Environment Program, undated, Eco-Design: production without destruction (pamphlet)

[32] Fletcher, K, Dewberry, E and Goggin, P, 2001, Sustainable Consumption by Design, p. 214

[33] Environment Australia, 2001, Product Innovation: the Green Advantage, p. 3

[34] United Nations, 2002, Sustainable Consumption: a Global Status Report, p. 45, www.uneptie.org/pc/pc/pdfs/sus_cons.pdf , accessed March 2005

[35] EcoRecycle website www.ecorecycle.vic.gov.au/www/default.asp?casid=3917, accessed April 2005

habits and ownership tends to define their personal identity. They tend to be older (over 50 years of age) and have a low level of education. The open minded group have flexible consumption habits, are pragmatic and ownership of products does not tend to define their identity. They have a high level of education and represent 20 per cent of the Germans surveyed.

The establishment of sustainable communities involves focusing on more than just consumers. Good environmental outcomes, including more sustainable consumption patterns within households, will only be produced through co-operation among the various stakeholders. An integrated approach to household consumption, which looks at consumers, industry and government, helps to identify a wider set of intervention points for influencing choices.[36]

## Consumer diversity

Research shows us that most consumers are concerned about the environment and undertake conservation type behaviours.

**Environmental Issues: People's Views and Practices**

Every two to three years the Australian Bureau of Statistics (ABS) undertakes a survey of the environmental behaviours and practices of Australian households and individuals. The tenth survey in the series was published in 2004. Each survey focuses on a different issue and in 2004 the focus was on water use and conservation.

The survey found that the level of reported concern about the environment has shown a continual decline since 1992. In the 2004 survey, 57 per cent of respondents stated that were concerned about environmental problems, compared to 75 per cent in 1992. The Committee notes that this reflects international trends. A recent study attributed a decline in concern about environmental issues, not to apathy but to an increasing sense of helplessness and futility on the part of individual citizens who feel that their behaviour would not make any difference.[37]

In the twelve months prior to the 2004 ABS survey one in five of the respondents had donated some time or money to help protect the environment. However, 65 percent of people who stated that they were concerned about the environment did not donate time or money to protect the environment or formally register an environmental concern.

[36] Organisation for Economic Cooperation and Development, 2002, Policies to Promote Sustainable Consumption: an overview, pp. 11-12

[37] Jackson, T, 2005, Motivating Sustainable Consumption: a Review of Evidence on Consumer Behaviour and Behavioural Change, p. 13

Nine out of ten households reported that they purchase environmentally friendly products, the most common being recycled paper products and refillable containers. Of those households who did not purchase

environmentally friendly products, cost was the most common reason, particularly for single parent households, followed by a lack of interest.

While there are relatively high levels of people reporting that they take action to conserve water and buy environmentally friendly products, there is no indication of the regularity of their behaviour.

Household consumers cannot be considered a homogenous group. Individuals are not driven by identical motivations, and do not act in the same way. This makes consumers a diverse group, which has implications for any behavioural change initiatives directed at consumers.

Mr Geoff Young, from the NSW Department of Environment and Conservation has been involved with social research and community education for over 10 years. He told the Committee that there are a number of factors that influence the environmental awareness and behaviours of consumers. These factors include social demographics such as place of residence, ethnicity, gender, age, income, education and occupation. Policies and structures, both physical and social, also influence the level and type of environmental concerns of consumers.[38] Mr Young emphasised the importance of targeting behavioural change programs:

> … there are huge sociodemographic variables across the community. If you are going to effectively spend your money on making change, you need to be addressing the specific needs of the segments of the community but you do not need to be spending the same amount of money. There are lots of different ways to do segmentation analysis but you need to sophisticate your targeting … At its simplest you think of a sort of bell curve that you are shifting along over time … What you are really doing is designing programs that are based on one simple practical step and you are positioning all of your images and messages just one credible step of change ahead of people. Obviously you have to do your social research and find out what the norm is, and do your research into practical systems at the household, community and work levels, and design a behaviour change program which is targeting one practical shift. However, that is entirely simplistic. What I am trying to say is you need to sophisticate that simple normative view into a very targeted approach sector by sector.[39]

Mr Young also highlighted the need for behavioural change programs to be based on sound social research data, which is often not the case.[40] The Committee understands that the government is due to release a draft behavioural change strategy – *Learning to Live Sustainability: Victoria's*

[38] Mr G Young, Manager, Community Education Unit, Department of Environment and Conservation (NSW), meeting, 26 October 2004, p. 464

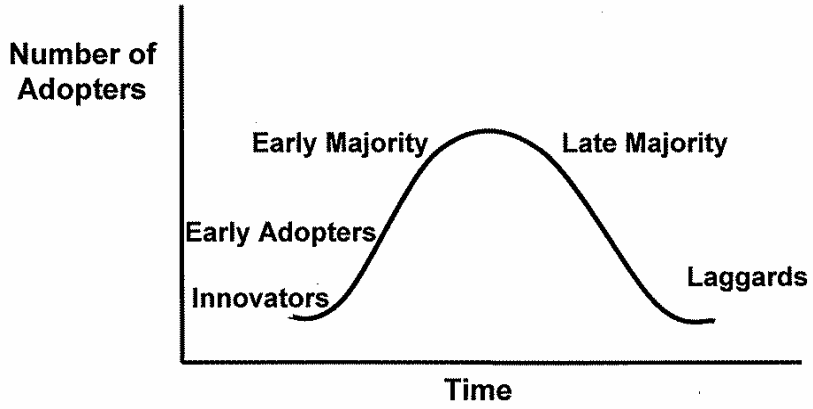
[39] Ibid, pp. 466-467

[40] Ibid, p. 464

*Education, Behaviour Change Strategy* - in the second half of 2005.[41] The Committee believes that the strategy should be underpinned by a comprehensive sound research program, as is the case in New South Wales and other jurisdictions such as Germany, rather than market research being conducted on an ad hoc, individual program basis. This issue is discussed further in chapter 6.

A number of witnesses referred to the bell curve of social change, set out in Figure 15.[42]

## Figure 15: Types of Innovators




1. **Innovators** - the people who first adopt a particular innovation in a particular locale
2. **Early Adopters** - the second group to adopt
3. **Early Majority** - the third set of adopters
4. **Late Majority** - the next group to adopt
5. **Laggards** - the last group in that locale (or social assemblage, or people in a particular organisation) to adopt that particular innovation

The Committee was advised that the German Federal Environment Agency (UBA) has conducted extensive research on environmental awareness and behaviour and developed a typology of consumption styles.[43] Mr Christian Loewe, Desk Officer, Product Assessment and Ecolabelling, UBA, noted that it is important to recognise groupings in order to develop specific information strategies for target groups and find new ways of communicating

[41] Minister for the Environment John Thwaites MP, April 2005, Making Victoria a Sustainable State: Ministerial Statement on Environmental Sustainability, p. 7

[42] Dr E Phillips, Manager, Neighbourhood Environment Improvement Program, Environment Protection Authority, transcript of evidence 5 July 2004, p. 27; Mr L Robinson, Enabling Change, meeting, 26 October 2004, pp. 496-497, and Mr G Young, Manager, Community Education Unit, Department of Environment and Conservation (NSW), meeting, 26 October 2004, p. 467

[43] Mr C Loewe, Desk Officer, Product Assessment and Ecolabelling, Federal Environment Agency (Germany), Berlin, meeting, 2 February 2005

and campaigning for sustainable development.[44] For example, the main barriers are:

- time and convenience;
- people in the community who feel overloaded lack confidence and options;
- ambivalent traditionalists value quality products, regional products, the repair of products, health and are open to environmental services; and
- the privileged value status, social leadership and responsibility.

The UBA has identified a number of emerging challenges that can have a significant impact on household consumption and consequently environmental communication, including:

- pluralisation and individualisation – as people are deprived of the opportunity to identify themselves with work, they depend on developing symbolic aspects of consumption (and leisure) behaviour in order to develop a 'style' of their own. Therefore individuals are no longer oriented towards uniformity and straightforwardness;
- this has resulted in inconsistent and ambivalent (hybrid) consumer behaviour. For example, the parallel attitudes of 'enjoying without regretting' on the one hand and a high degree of environmental awareness and responsibility on the other. Customers expect 'clean' and 'healthy' products, but are not automatically willing to change their own buying and consumption behaviour or to develop a straightforward 'ecological lifestyle'; and
- social mega trends such as globalisation, the spread of new technologies and new forms of work will result in people's ambivalence becoming more pronounced.[45]

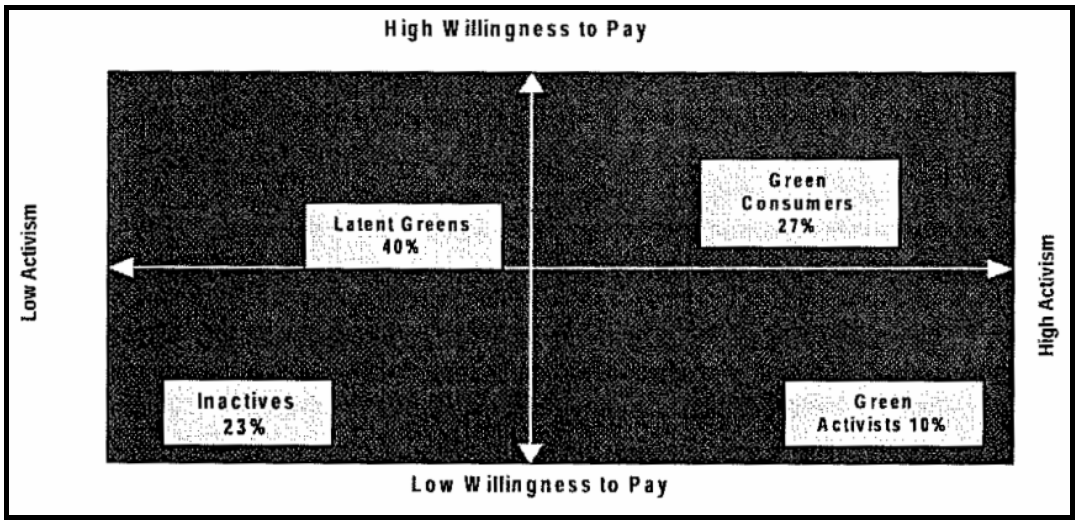
Research conducted by Environics, an international environmental polling organisation, found that consumers care about environmental problems and see themselves as a key part of the solution. The study conducted in fifteen OECD countries, including Australia, found that many consumers show a relatively high level of environmental activism but have a low willingness-to-pay to carry out that activism.[46] Figure 16 illustrates the four basic groups identified in the Environics research.

Environmental activism included avoiding a product or brand for environmental reasons, gathering environmental information, voting based

[44] Ibid
[45] Ibid
[46] Organisation for Economic Cooperation and Development, 2002, Report of the OECD Workshop on Information and Consumer Decision making for Sustainable Consumption, pp. 11-13.

on environmental policies, supporting environmental non governmental organisations, writing a letter or making a phone call to express environmental concerns and urging policy changes.

## Figure 16: Consumer Environmental Activism and Willingness to Pay




Source: Figure 2, Report of the OECD workshop on information and consumer decision making for sustainable consumption, p 12, © OECD 2002

The four groups were defined as follows:

- green consumer - high environmental activism and high willingness to pay;
- green activist - high environmental activism but lower willingness to pay;
- latent green - lower environmental activism and mid willingness to pay; and
- inactive - low environmental activism and low willingness to pay.

'Green consumers' and 'green activists' were identified as the easiest to engage in environmentally conscious decision making, while the 'latent greens' could be engaged but need a stronger enabling environment before they act. 'Inactives' are the most difficult to engage as the environment is of little concern to them.

This research by Environics found that there is potentially a strong level of interest by consumers in the environment and how they can act in a more sustainable way. The research also illustrates that different segments of the population will require more encouragement and assistance than others, and that there will always be a group of consumers for whom the environment will never be an important consideration. The policy and

educational implications of this research is quite clear – a uniform approach to consumer behaviour is inadequate.

**United Nations Environment Program/UNESCO Partnership on Youth and Sustainable Consumption**

The Committee was interested to learn of the UNEP/UNESCO program with young people (18 to 25 year olds) on sustainable consumption and lifestyles. An extensive survey of 10,000 young people from 24 countries made what the Committee believe are somewhat discouraging findings:[47]

- young people are aware of environmental problems but do not make the connection between their purchasing and travel and the resulting environmental impact;
- young people prefer unorganised forms of everyday action to organised mobilisation as a strategy to improve the world; and
- young people share many of the same values, however the social aspects of sustainable consumption, for example health and human rights, appear to be more important in Africa, Asia and Latin America compared to other areas of the world.

The Committee was advised that to be effective, the starting point for management needs to be 'daily life' rather than 'the environment'. UNEP is currently piloting an education kit on sustainable consumption.[48]

## Barriers to behavioural change

As mentioned in chapter 2, there is a fundamental disconnection between people's environmental attitudes or perceptions and behaviour. Surveys such as those conducted by the NSW Department of Environment and Conservation and the Australian Bureau of Statistics show that consumers are concerned about the environment and take some action to reduce environmental impact. However, household energy use and waste generation is increasing, and overall water use is increasing, therefore current behaviours are unsustainable over the long term.

The barriers to consumers behaving with an awareness of sustainability have been described as internal and external.[49] Individuals and households have little control over external barriers, which need to be resolved before households can engage in more sustainable behaviour. For example, to

[47] Ms I Marras, Programme Officer (Youth, Procurement), United Nations Environment Program, Paris, meeting, 9 February 2005 and UNEP/UNESCO, undated, Youth: Sustainable Consumption Patterns and Lifestyles, p. 44

[48] UNEP/UNESCO, 2002, YouthXChange training kit on responsible consumption: the guide

[49] Department of Sustainability and Environment, submission no. 70, p. 23

reduce reliance on the car, there needs to be accessible modes of alternative transport like reliable public transport and/or bike paths. Individuals have more control over internal barriers such as attitudes and knowledge. The following sections outline the key barriers to behavioural change that were identified during the Inquiry. Many of the barriers represent management opportunities, as detailed in chapter 5.

## Cost

Cost is a key factor inhibiting many households from practising sustainable consumption. The initial set up cost and the cost compared to non-environmentally friendly products acts as a financial deterrent. It can be difficult, particularly for low income households, to allocate what would be a significant part of the household budget to make physical changes to a building. The City of Port Phillip found through their Sustainable Living at Home and Sustainable Traders programs that the cost of new technology and the proportion of the budget that it takes up can be prohibitive.[50] Many witnesses identified cost as a barrier.[51]

Even for households that are not low income, cost is a factor. People are not always willing to pay a higher price to buy a 'green' product over others on the market. Ms Helen Lewis, Director, Centre for Design from RMIT commented that:

> And even though people like the idea of greener products they will not necessarily pay more. If everything else is equal, they may buy an environmentally approved product.[52]

She explained that during the early 1990s there were a number of companies in Australia that designed green appliances that were more expensive than non-green alternatives. The experience was that they did not sell very well as consumers were less willing to pay extra for a green product that was in every other way identical to a less expensive standard one.

One explanation of this is that the financial benefits of investing in these types of products and technologies are not always clear. The initial purchase price and installation fee can act as a deterrent even though the benefits experienced over the long term cover the up front cost. Many witnesses commented on a lack of information on the payback periods of environmentally friendly products. Information on payback periods inform the consumer on how long it takes for the extra money invested in green technology to be returned through savings in energy or water bills. For example owners building a new house investigating hot water systems can opt for a standard gas or electric hot water system. For approximately $2,000 more they can install a solar hot water system. On face value, the

[50] City of Port Phillip, submission no. 45, p. 5

[51] Refer to City of Yarra submission no. 12, Ms K Gosden, submission no. 34, CitiPower, submission no. 67

[52] Ms H Lewis, Director, Centre for Design RMIT, transcript of evidence 6 July 2004, p. 77

gas or electric system is much cheaper, but if the owners were to install a solar system, they would have lower gas or electricity bills, which over 4-10 years[53] (depending on the type of solar hot water system) would cover the extra $2,000 outlaid at the beginning and the savings on the energy bills would continue after this payback period. In addition, the solar system has less impact on the environment.

While the cost of sustainable products and technology is a barrier, it is also a question of personal priorities for the household. In discussing improvements to sustainable house design, Ms Lewis observed:

> I think there is a lot of interest [in sustainable building design]; but once again, as long as they don't need to pay much more - cost is a huge barrier for a lot of people. Although they will pay a lot more for the extra room and the huge garage, so it is not just about money, it is about priorities.[54]

In discussing financial barriers, Mr Pears, Business Council for Sustainable Energy said that there was a need to change the way we think about renewable energy, with less focus on payback periods. He told the Inquiry that in relation to renewable energy:

> The very common question … is "What is the payback period? How long before I get my money back?". Yet these same people will buy a $30,000 car and lose nearly $10,000 of its value in the first year without blinking. They will spend less money on a solar system than they will spend on renovating a bathroom, yet they will not expect a rate of return on that bathroom. [55]

He argues that rather than focusing on payback periods, renewable energy should be seen in the same way as the many other investments a household will make. However, payback periods were seen by many witnesses as a practical way of demonstrating the overall financial benefits of a particular product choice.

## Undervalued and underpriced resources

Some witnesses to the Inquiry felt that the price paid by consumers for water is not reflective of its true value.[56] Similar sentiments were made about energy and waste disposal. The low price of sending waste to landfill is a barrier preventing people from changing their waste generation behaviours. As landfill is cheap there is little incentive to look for alternative methods of waste disposal.

The reason resources are said to be undervalued is that the amount charged to consumers does not take into account the environmental costs and externalities associated with that resource. If prices incorporated

[53] Sustainable Energy Authority Victoria, Solar Hotwater Factsheet, p. 4, accessed online www.seav.vic.gov.au/ftp/renewable_energy/shw/shw_factsheet.pdf April 2005

[54] Ms H Lewis, Director, Centre for Design RMIT, transcript of evidence 6 July 2004, p. 80

[55] Mr A Pears, Policy Advisor, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 578

[56] Refer to Victorian Water Industry Association, submission no. 57, p. 6 and Moreland City Council, submission no. 64, p. 3

environmental externalities, which would increase the price paid by consumers, it would make excessive consumption of resources unattractive and alternative sustainable energy more attractive. For example, Mr Kane Thornton from the Alternative Technology Association stated:

> Once you have a true cost-reflective pricing, energy efficiency and renewable energy look a lot more competitive on a purely economic basis. At present there is some acknowledgement that while solar photovoltaic power provides a lot of environmental benefits, economically it does not make sense for people to spend money on it because they are getting electricity at such cheap rates.[57]

Many witnesses thought consumers might be more concerned about their water and energy use if they were being charged at a rate which was more reflective of its true cost. In many households energy and water use and waste disposal constitutes such a small proportion of total household expenditure, the potential savings from better resource use may not financially justify the time and effort invested in making the savings.[58]

## Disassociation from the environment

Generally consumers do not relate their behaviour to environmental impacts, as previous chapters of this report have explained. If the linkage between water, energy and waste consumption and environmental consequences is not made then there is little chance that the consumer will see a need for their behaviour to change.

Another element of disassociation that is a barrier to behavioural change, in particular sustained behavioural change, is the sense that people are acting alone. Some households go to great effort to recycle, save water and reduce their energy use only to see that their neighbours or government or industry are not taking any action. Various programs have shown that this discourages those who are taking action, particularly in high density dwellings.[59]

## Technology and infrastructure

Acting with an awareness of the impact on sustainability is not just about decision making. The systems, infrastructure and technology also need to make this behaviour change possible. There are infrastructure systems in place that are very difficult to change. Dr Zoe Sofoulis from the University of Western Sydney used the term 'Big Water' to describe the system for the supply, use and treatment of water. On one level these systems, which over time have become taken for granted, assume the responsibility for providing and disposing of water.[60] Many households do not actually understand the

[57] Mr K Thornton, Energy Policy Officer, Alternative Energy Association, transcript of evidence, 6 December 2004, p. 679

[58] Department of Environment and Sustainability, submission no. 70, p. 24

[59] City of Port Phillip, submission no. 45, p. 5

[60] Dr Z Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, p. 599

systems they use every day and how the systems impact on the environment.[61]

On another level, it is only when consumers try to change their behaviour that the inbuilt biases and conventions of technology become more obvious. Dr Sofoulis said that people are willing to make changes but the existing technology/infrastructure does not always accommodate that change.[62]

The infrastructure of dwellings and poor design was identified as a key issue relating to high levels of energy consumption.[63] Poor household design prevents consumers from using energy efficiently in relation to certain household activities like heating and cooling. It is difficult to address poor design problems once the house has already been built, and it can be a costly process to retrofit.

A bad experience with the improper application of technology casts doubt over the credibility of the technology. This in part relates to the information given by the product provider. It is questionable whether people selling the technology fully understood it, particularly in a large retail setting where the water or energy efficient product is part of a wider selection of products.[64]

Ms Rachel Ollivier from the Alternative Technology Association explained the obstacles facing a consumer wanting to adapt water saving and energy saving technologies:

> ……one of the pieces of feedback we get a lot is, 'I have to convince my tradesperson that I want solar hot water', or 'I ask these questions, and I get really inconsistent advice from the people trying to sell it to me. I have people talking me out of the technology I want'. Those are all significant barriers for someone who might be interested in technology. It is not just interest in the technology that enables people to put it in at the moment; they need to be persistent, to have done a lot of research, to be quite technically competent and to be prepared to spend a bit of extra money, all of which are significant barriers to uptake. [65]

## Information for consumers

Consumers need to be informed if they are going to make environmentally sound decisions. However, too much irrelevant and conflicting information can confuse decision making and result in disillusioned consumers. Many witnesses felt that there was a considerable amount of information relating to energy and water conservation and waste reduction available to consumers through various sources and that a barrier to sustainable behaviour was the absence of the readily digestible information being available when a key purchasing decision is made. Many witnesses to the

[61] City of Stonnington, submission no. 62, p. 3

[62] Dr Z Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, p. 598

[63] Moreland Energy Foundation, submission no. 56, p. 5

[64] Surf Coast Shire, submission no. 44, p. 3

[65] Ms R Ollivier, Chief Executive Officer, Alternative Technology Association, transcript of evidence, 6 December 2004, pp. 678-79

Inquiry also felt that information on sustainability factors should be available to the consumer at the point of product purchase.[66]

Too much information results in information overload where the sheer volume of facts and figures is overwhelming, particularly for consumers who do not have an interest in sustainability. Environmental messages are also competing with a whole range of other messages in the market place and vying for the attention of consumers.[67]

Information provided at various levels is more manageable for the consumer. At one level, the information needs to be simple enough to base a decision on, but on another level it needs to be backed by comprehensive information when the consumer requires it.[68] This allows consumers to choose how much or how little information they access and when they access it.

How information is presented to consumers can also create barriers. The number of different labelling systems used by manufacturers to inform consumers of a product's efficiency and 'greenness' is an area of confusion. It can be difficult for the consumer to determine whether the product has been made in the most sustainable way, or whether it will be resource efficient in future use.[69] This relates to how information is presented and also the credibility and consistency of information. Tailored and direct one-on-one information has been found to be effective in changing behaviour.[70]

## Attitudes and expectations

Sustainable behaviour involves questioning attitudes and expectations. A lot of day-to-day household activities that use water and energy are done out of habit. A problem with habitual behaviour is that often consumers do not question why they behave in a certain way and once certain behaviour becomes a habit it is hard to change. Habits are formed through repetition and reinforcement.[71] However, there are many theories that explain how consumers behave irrationally, that is, they do things out of habit, for emotional reasons and because of group influences. [72] For example, using appliances to do only half loads of washing or dishes. Examining and challenging accepted belief systems and underlying assumptions is one way to change habits.

Forming good habits can have a positive environmental outcome. When the onus is on the consumer to go out of their way to perform a particular

[66] Surf Coast Shire, submission no. 44, p. 2

[67] Organisation for Economic Cooperation and Development, 2002, Report on the OECD Workshop on Information and Consumer Decision making for Sustainable Consumption, p. 22

[68] Sustainable Energy Authority Victoria, submission no. 72, p 10

[69] Surf Coast Shire, submission no. 44, p. 3

[70] Department of Sustainability and Environment, submission no. 70, p. 23

[71] Jackson, T, 2005, Motivating Sustainable Consumption: a Review of Evidence on Consumer Behaviour and Behavioural Change, p. 115

[72] Ibid, pp. 35-41

behaviour, it requires a certain level of commitment not needed for more routine behaviours. By making things easy for people, and making sustainable choices part of everyday life it increases the likelihood more people will participate in that behaviour.[73]

Values and aspirations also influence behaviour. Western society places a high value on convenience and disposability, which are not always compatible with sustainable behaviour. Consumers are encouraged to aspire to big houses and large cars which are often environmentally unsustainable.[74]

Conformity also plays a considerable role. Research has found that the desire to belong to a group is one of the driving factors behind consumption.[75] Often participation in social groups can require particular standards in dress, transport and eating out. When the alternative to having these things is to be socially excluded, this type of consumption is seen less as a luxury and more as a necessity.[76] Conformity is developed and reinforced through collective narratives, the use of consumption or wealth as symbols of social position and esteem; the association of wealth or consumption with pleasure, deeply held values or with the 'good life'; and through habituation.[77]

Government and industry have an important role to play in leading by example and shaping attitudes and expectations, this will be discussed in further detail in chapter 4.

## Regulations/policy as a deterrent

Policy, regulations and guidelines can act as a barrier to more sustainable behaviour. Some current regulations make particular water saving practices difficult, for example the installation and use of private greywater systems. This means that consumers are being provided with contradictory messages. On one hand, they are being encouraged to save water, but on the other they are discouraged from doing so. Similarly consumers receive mixed messages when the government builds extensive freeways whilst encouraging commuters to use public transport.

As the following chapters outline, there are a number of ways that government can encourage households to adapt more sustainable consumption behaviours. Shifting consumption patterns toward more sustainable behaviours relies on a robust understanding not just of what motivates consumers, but also on how behavioural change occurs, and how

[73] Ms H Lewis, Director, Centre for Design, RMIT, transcript of evidence, 6 July 2004, p. 82
[74] Department of Sustainability and Environment, submission no. 70, p. 24
[75] Michaelis, L and Lorek, S, 2004, Consumption and the Environment in Europe: Trends and Futures, p. 65
[76] Ibid, p. 65
[77] Ibid, p. 65

consumers (if at all) can be influenced by public sector interventions.[78] As Professor Jackson states:

> Policy development in the context of behavioural change is notoriously difficult. One of the reasons for this is the enormous variety of factors that influence behaviour. Another is the 'value laden-ness' of behavioural and lifestyle issues. At the same time, there is a widespread recognition of the need to engage in this difficult terrain and to develop 'evidence based policies' to support behavioural change. Nowhere is this more relevant than in the domain of sustainable consumption.[79]

[78] Jackson, T, 2005, Motivating Sustainable Consumption: a Review of Evidence on Consumer Behaviour and Behavioural Change, p. 105

[79] Ibid, p. v

Chapter

6

# Environmental education and a strategic approach to environmental sustainability

## Key findings

**6.1** Social instruments such as awareness raising campaigns, environmental education and behavioural change programs rarely result in changed behaviour when implemented alone, but as a component of a range of policies aimed at encouraging sustainable consumption and behaviour, play a fundamental role.

**6.2** There is a gap in the delivery of environmental education in the upper secondary and tertiary levels of the formal education system in Victoria.

**6.3** Practical demonstrations of energy and water conservation practices and waste avoidance are a powerful means of communicating sustainability concepts and encouraging behavioural change. To assist in better targeting and planning the activities of demonstration sites and meeting the needs of the community, more effective monitoring of the outcomes of demonstration projects and sites is required.

**6.4** While many locally based programs are considered successful in terms of engaging the community, the number of households participating in these programs is usually small.

**6.5** There is a need to ensure that local sustainability programs reach a broad spectrum of the community, are effectively evaluated and have sufficient resources and a long enough timeframe to achieve their objectives.

**6.6** Ongoing funding or opportunities for local government to raise funds are important for the long term success of community environment programs managed through local government. The current State and local government Sustainability Accord process should explore the option of a local government environmental levy (as occurs in New South Wales).

**6.7** The majority of environmental education programs lack effective performance measures.

**6.8** There is a wide diversity of environmental education and behavioural change programs operating in Victoria. However the programs are fragmented and duplicated. Environmental education in Victoria lacks coordination and strategic direction. There is not a single organisation that provides statewide leadership on environmental education.

**6.9** Despite numerous recent reviews of environmental education in Victoria, a comprehensive audit of environmental education is needed to identify duplication, linkages, opportunities and deficiencies.

**6.10** Although recent community surveys have been undertaken in relation to community attitudes to waste management and water conservation, a comprehensive picture of community attitudes, knowledge and values of environmental sustainability is not available in Victoria. Such information is fundamental to the development of effective environmental education programs and should be collected at four year intervals to provide longitudinal data to inform the development of policies and programs and the results made available in the public domain.

## Introduction

The terms of reference require the Committee to inquire into opportunities to promote changes in the way communities and households use energy, water and other natural resources to reduce environmental impacts. Environmental education and behavioural change are an essential foundation on which policy instruments such as regulation and economic incentives are based.

This chapter explores the role of education and behavioural change in promoting environmentally sustainable behaviour within the Victorian community. Current Victorian environmental education programs are briefly outlined and gaps in the current frameworks and approach to environmental education are examined. The chapter includes discussions on opportunities to improve the strategic direction and delivery of environmental education and behavioural change in Victoria.

## The role of environmental education

In chapter 5 it was noted that the strength of social policy instruments such as environmental education is that while such instruments often do not result in changed behaviour, they reinforce and underpin other policy instruments to promote sustainable behaviour.

A recurring theme of the Inquiry was whether education and behavioural change programs lead to people adopting more sustainable practices. Many witnesses advised that it was difficult to separate the effects of education programs from other measures such as regulation. The

Committee was presented with evidence from the Waste Wise Schools[1] program, the Victorian water conservation awareness campaign and a NSW campaign to prevent the pollution of waterways[2] that indicated a causal link between the education and awareness raising activities and changed behaviour. Mr Geoff Young, Manager of the NSW Department of Environment and Conservation's Community Education Unit explained that there are three policy approaches that can be used – education, regulation and economic instruments. He emphasized the importance of education:

> Firstly, how does a government get to make regulatory change in a democratic situation? It has to have the support of the community. How does it get the support of the community? The community has to know about the problem and have a significant appreciation of it. It is not just the newspapers that are going to give it to you in specific instances. For example, if you want to reduce water in the home or in the workplace you need a whole range of specific training. You can introduce regulation, but on its own it will not work unless people are skilled and able to make those changes. You will not get that regulatory setting supported unless the community understands it, agrees to it and knows how to comply.[3]

A report by the New Zealand Parliamentary Commissioner for the Environment on learning and education for sustainability discusses the language for communicating the role of education in environmental sustainability.[4] The report observes that the term 'education for sustainability' implies a more forward looking approach than 'environmental education', aiming to do things differently in the first place rather than fixing the symptoms of underlying problems. A recent evaluation by the Victorian Association for Environmental Education (VAEE) of environmental education in Victoria also pointed to disagreement among practitioners.[5] This disagreement or confusion about definitions also highlights a key dilemma about the role of social instruments in changing the way people use resources – there is a difference between informing the community and engaging the community.

The term 'environmental education and behavioural change' (sometimes shortened to 'environmental education') will be used in this chapter. These activities include marketing, social marketing, advertising, public relations campaigns, incentive schemes, formal education in schools and community based programs aimed at empowering communities to adopt practical measures in their daily lives to reduce their environmental impact.

[1] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 6 December 2004, p. 664

[2] Mr G Young, Manager, Community Education Unit, NSW Department of Environment and Conservation, meeting, 26 October 2004, p. 466

[3] Ibid, p. 468 and personal communication Mr G Young, Community Education Unit, NSW Department of Environment and Conservation, May 2005

[4] New Zealand Parliamentary Commissioner for the Environment, 2004, See Change: Learning and Education for Sustainability, p. 38

[5] Victorian Association for Environmental Education, 2004, Evaluation of Environmental Education in Victoria, p. 14

The New Zealand environmental commissioner's report emphasises that 'environmental education' or 'education for sustainability' should include the following elements:[6]

- it should be based on shared values. Education for sustainability seeks to extend boundaries of concern beyond an individual's sense of self;

- it should encourage people to think critically, ask questions, and challenge underlying assumptions so that they can understand and address the causes of unsustainable practices;

- it should take a long-term perspective because the choices people and institutions make today, and the actions they take, have implications for the future. Governments and businesses often have very short-term timeframes;

- it should give people the opportunity to participate in changes that support sustainability, that is, people should not just be educated about sustainability, they need to be empowered to take actions that contribute to sustainable outcomes;

- it should recognise that learning takes place in many different contexts, beyond the formal education system; that people learn through their families, peers, workplaces, the media and many different social networks and that many other influences in society shape the way people think, feel and act;

- it should be interdisciplinary because sustainability issues are very broad in scope. Education for sustainability requires integrated thinking and it requires people and institutions to share knowledge; and

- it is important not to place all responsibility on individuals. Societal changes are driven by people (usually working together) but people live and work with wider systems and social structures. These systems can enable people to act in certain ways, but they can also constrain them.

The Committee notes that importantly, this framework recognises that education for sustainability needs to be integrated into all aspects of community life, rather than be a simple information transfer process.

[6] New Zealand Parliamentary Commissioner for the Environment, 2004, See Change: Learning and Education for Sustainability, pp. 43 - 48

## Environmental education in Victoria

During the course of the Inquiry the Committee met with local and state government agencies and community groups to gain an overview of education for environmental sustainability in Victoria, in particular, education that focuses on the sustainable management of energy, waste and water. The Committee found a wide variety of programs operating at all levels. While an exhaustive listing of environmental education programs in Victoria is beyond the scope of this chapter, it is useful to provide a brief overview of some of the key programs and to identify the characteristics of different approaches to environmental education and behavioural change.

## Victoria's environmental education strategies - past and current

The first Victorian Environmental Education Strategy was released in 1992. Developed by the former Victorian Environmental Education Council, the strategy provided a statewide framework to, in part:[7]

- establish comprehensive programs for environmental learning for all Victorians;
- stimulate large scale community involvement in environmental care and education;
- stimulate environmental education curriculum development and professional development in the education sector;
- develop environmental education strategies in all of the education sectors;
- include environmental education in environmental initiatives; and
- establish a comprehensive research and evaluation program to guide the development of environmental education.

In a review of environmental education in Victoria, the VAEE concluded that the approach towards environmental education outlined in the Victorian strategy was 'forward thinking and innovative for its time' and relevant to the present day.[8] However, the strategy is not well known amongst environmental education practitioners and on-going development of the strategy has not occurred. While there are some highly successful individual programs, lack of coordination has been a characteristic of environmental education in Victoria over the past decade.

[7] Victorian Association for Environmental Education, 2004, Evaluation of Environmental Education in Victoria, p. 25

[8] Ibid, p. 29

DSE is developing a behavioural change strategy.[9] The strategy is being developed in the context of findings of recent evaluations of environmental eduction undertaken in Victoria.[10] According to the state government, the strategy will set out a 10-year program that coincides with the United Nations Decade of Education for Sustainable Development (2005-2014).[11] According to DSE, the UN Decade of Education for Sustainable Development provides a focus for a combined long-tem approach to education and sustainable development because it provides a way of linking activities at all scales – local, state, national and global.[12] UNESCO is the lead agency for the initiative and is in the process of developing an implementation strategy. The vision for the initiative is defined as follows:

> The vision of education for sustainable development is a world where everyone has the opportunity to benefit from quality education and learn the values, behaviour and lifestyles required for a sustainable future and for positive societal transformation. [13]

An extensive range of priority areas have been identified as part of the initiative from human rights, governance and the market economy to the environment and HIV/AIDS. Of most relevance to this Inquiry is the work being conducted on sustainable consumption, water, climate change and sustainable urbanisation. Details of the requirements and commitments of UN Member States under the initiative are unclear. The expected outcomes of the initiative are also unclear.

Key elements of the DSE strategy will include:[14]

- a broad scope, addressing all sectors of the community;
- the strategy will focus on all the main contexts of people's lives including home, work, formal education and public places;
- the strategy will address the different way people learn; and
- the strategy will be multi-disciplinary and draw on a wide range of experience in learning based behaviour change.

The Committee understands that an outline for *Learning to Live Sustainably* is currently being considered by the Minister for Environment and that the

[9] Minister for the Environment, John Thwaites MP, 2005, Making Victoria a Sustainable State, Ministerial Statement on Environmental Sustainability, p. 7

[10] Malcolm, S, 2005, A Victorian Perspective on the Decade of Education for Sustainability at www.vaee.vic.edu.au/events/dsestevemalcompresentjan05.PDF, accessed May 2005

[11] Minister for Environment, 2005, Making Victoria a Sustainable State, Ministerial Statement on Environmental Sustainability, p. 7

[12] Malcolm, S, 2005, A Victorian Perspective on the Decade of Education for Sustainability at www.vaee.vic.edu.au/events/dsestevemalcompresentjan05.PDF, p.11, accessed May 2005

[13] http://portal.unesco.org/education/en/ev.php-URL_ID=23295&URL_DO_TOPIC&URL_SECTION=201.html, accessed May 2005

[14] Malcolm, S, 2005, A Victorian Perspective on the Decade of Education for Sustainability at www.vaee.vic.edu.au/events/dsestevemalcompresentjan05.PDF, p. 9

timeframe for completion of the strategy is the end of 2005.[15] The Committee supports the development of the Victorian education and behavioural change strategy for environmental sustainability. The Committee also recommends that:

**Recommendation 6.1**

**The Victorian education and behavioural change strategy should contain performance measures that can be used to regularly monitor progress towards outcomes.**

## Formal education

The Department of Education and Training (DET) advised that it is developing an Environmental Sustainability Strategy for Victorian Schools.[16] DET's submission to the Inquiry states that the strategy will provide 'a comprehensive framework for strategic and coordinated programs over the next 5 years'.[17]

Two initiatives in environmental sustainability education within the school system are worth noting, Sustainable Schools and Waste Wise Schools. These programs have been developed in partnership with DET, the Gould League and CERES. The programs are school-based, but supported by organisations such as CERES, in an advisory role. The programs are based on identifying and addressing environmental sustainability issues facing the school, such as waste generation, water conservation and energy efficiency. The Victorian Association for Environmental Education (VAEE) advised the Committee that, the level of activity in learning about sustainability falls markedly at senior secondary school and tertiary levels.[18] At this stage, students learn within specific disciplines. The VAEE advised that, with the move into disciplinary knowledge, students lose the opportunity to study sustainability within the context of their chosen field of interest. At the tertiary level, only a small number of students undertake specific environmental courses.

The VAEE contends that the upper secondary and tertiary sector is a vital area where change in practices needs to be initiated, given that these students will represent the work force of the near future.[19] The VAEE also suggests that significant changes are required within the tertiary sector to incorporate the values of sustainability into a broad range of courses. Requirements for sustainability in tertiary curricula would then influence the

[15] Personal communication, Mr S. Malcolm, Project Manager, Education and Behaviour Strategies, Department of Sustainability and Environment, May 2005

[16] Personal communication, Ms G Hart, General Manager, Corporate Services Division, Department of Education and Training, April 2005. DET advised that the strategy was not available at the time of preparation of this report

[17] Department of Education and Training, submission no. 79, p. 3

[18] Victorian Association for Environmental Education, submission no. 14, p. 2

[19] Ibid, p. 2

secondary curricula.[20] Associate Professor Ian Thomas, RMIT University advised that it was important to ensure that people leaving schools and tertiary education have a strong and enduring sustainability education.[21]

In his submission Professor Thomas advised that, world wide, universities have signed up to several agreements that pledge the incorporation of sustainability education across the curriculum. For example, the Talloires Declaration is well recognised and has been signed by over 290 institutions in 47 countries. In Australia eight universities are signatories to this declaration, yet according to research carried out by Professor Thomas, there is little indication that their curricula has been changed to include sustainability education.[22] Professor Thomas states that ensuring sustainability education is delivered to all tertiary students will require both the active support of university leaders and staff development to equip teachers to introduce sustainability principles into their teaching.[23]

The Committee notes that the *Western Australian Environmental Education Strategy* and Action Plan includes among its key objectives for formal education:[24]

- that environmental education for sustainability is provided to all students in the school system (from kindergarten up to year 12);
- environmental education is included in all pre-service teacher education courses;
- that students in all undergraduate and post-graduate courses develop an understanding of environmental sustainability; and
- all participants in vocational training develop an understanding of particular environmental responsibilities within their field.

The Committee was advised by the DET that a number of initiatives are currently being considered by the department to integrate environmental sustainability into training programs within the vocational training sector (TAFE system).[25] However it is concerned that the evidence presented by the VAEE and Professor Thomas suggests that sustainability education has not been adequately addressed at upper secondary and tertiary levels. The Committee supports the view that the upper secondary and tertiary levels of

[20] Ibid, p. 3

[21] Associate Professor I Thomas, School of Social Science and Planning, RMIT University, submission no. 9, p. 3

[22] Thomas, I, 2004, Tertiary or Terminal: A Snapshot of Sustainability Education In Australia's Universities, paper presented at Effective Sustainability Education Conference, University of New South Wales, February 2004, p. 1. Surveys of Australian universities show little indication that their curricula have been changed to include sustainability education

[23] Associate Professor I Thomas, School of Social Science and Planning, RMIT University, submission no. 9, p. 5

[24] Government of Western Australia, Department of Environment, 2004, Environmental Education Strategy and Action Plan, p. 14

[25] Department of Education and Training submission no. 79, pp. 4-5

education are critical areas for the incorporation of environmental sustainability principles into mainstream courses.

## Community based programs

Peak and smaller non-governmental organisations deliver a range of environmental education and behavioural change programs. Environment Victoria (EV) delivers the Commonwealth Government's Cool Communities program in Victoria, which focuses on reducing household greenhouse gas emissions. EV also runs its own residential sustainability programs, Green Home Action, which helps householders to reduce their ecological footprint by saving energy, water and reducing waste and Smog Busters which encourages the community to evaluate their travel habits and plan more sustainable ways to commute.[26]

The ACF is developing a program called Ecowave, which will include awareness raising, marketing and working with individual householders to assist them to reduce their levels of consumption.[27] CERES is a community environment project located in Brunswick. CERES focuses on a very broad range of sustainability issues including global environmental concerns, energy conservation and renewable energy, waste minimisation and recycling and water conservation. It serves both as a demonstration site and delivers an extensive education program for schools, with 50,000-60,000 students visiting the centre annually.[28]

## Demonstration projects

The Committee received evidence that practical demonstrations of energy and water conservation and waste avoidance is a powerful means of communicating sustainability concepts to government officers, developers, and householders and encouraging behavioural change. As discussed in chapter 5, two key barriers to the adoption of sustainable practices identified during the Inquiry were that people do not think they can make a difference to reducing environmental impact, and while people may be concerned about the environment, they do not connect their everyday actions with environmental impacts. Environment Victoria explained the value of demonstration projects such as the Origin Energy house at CERES, a typical suburban house in Brunswick with a range of energy and water saving features:

[26] Victorian Association for Environmental Education, 2004, Evaluation of Environmental Education in Victoria, p. 40

[27] Ms S Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November, 2004, p. 646

[28] Mr E Bottomley, Sustainability Project Team Leader, Centre for Education and Research in Environmental Strategies, transcript of evidence, 13 September 2004, pp. 247-250

> … they immediately see that a lot of the best options are really low-cost and quite easy to do. So you're immediately bridging that gap between general awareness and possibilities that are presented to people to actually take action.[29]

Ms Liza Dale-Hallet of the Melbourne Museum told the Committee that demonstration sites make issues (such as water conservation), personal and familiar. For example, Ms Dale-Hallet explained that the Museum's Smart Water Home program aims to show people how they can reduce their water use in the home through practical demonstrations and through presenting the experiences of householders who have made changes in their water use.[30]

The Committee received evidence that there are a number of sustainability demonstration sites and projects across Victoria. They range from 'eco houses' demonstrating water and energy efficient technology and appliances to the large site at CERES in Melbourne's north and the Melbourne Museum interactive displays. In addition there are a number of tours available where people can visit 'lived in' sustainable homes. However, there are relatively few such demonstration sites across Victoria and they are on a small scale. In particular, regional and rural communities lack access to demonstration facilities such as CERES. A number of witnesses advised of proposals to develop CERES-style sites and other demonstration projects in regional Victoria.[31]

Mr Eric Bottomley, Sustainability Project Team Leader, Centre for Education and Research in Environmental Strategies, advised the Committee that CERES provides advice to a number of sustainability demonstration and education centres within the Melbourne metropolitan area and undertook a consultancy to advise on the development of Sydney's Macarthur Community Environmental Research Education Service park.[32]

The Committee supports the view that practical demonstration sites and projects are a key component of environmental education and believes that there is a need for improved access to sustainability demonstration facilities across the state, particularly in regional areas. Development of further sites in Victoria requires a coordinated approach to ensure adequate funding and access for all sectors of the community. The Committee also believes that the information and exhibits provided at sustainability facilities must be consistent and of a high standard and therefore supports a system of

[29] Mr D Voronoff, Director, Sustainable Living, Environment Victoria, transcript of evidence, 5 July 2004, p. 43

[30] Ms L Dale-Hallett, Senior Curator, Sustainable Futures, Museum Victoria, transcript of evidence, 6 December 2004, p. 686

[31] For example refer to Mr P Kennedy, Central Victorian Greenhouse Alliance, transcript of evidence, 27 July 2004, p. 169; Mr E Bottomley, Sustainability Project Team Leader, Centre for Education and Research in Environmental Strategies, transcript of evidence, 13 September 2004, p. 248 and Mr C McKiernan, Environment Coordinator, Surf Coast Shire, transcript of evidence, 29 September 2004, p. 368

[32] Mr E Bottomley, Sustainability Project Team Leader, Centre for Education and Research in Environmental Strategies (CERES), transcript of evidence, 13 September 2004, pp. 248-249

accreditation of sustainability demonstration sites. Accordingly, the Committee recommends that:

**Recommendation 6.2**

**The Victorian Government in cooperation with Local Government establish education and practical demonstration sites across Victoria to promote sustainable household consumption. The outcomes of the demonstration sites should be monitored.**

## Local government programs

Local Government has played a key role in environmental education, with extensive involvement in recent years. Sustainable practices, such as energy efficient council operations, are becoming core business practices in a significant number of councils (although the issue of core funding for environmental officers is an identified barrier for many rural councils).[33] Key peak bodies such as Environs Australia, the International Council for Local Environmental Initiatives (ICLEI) and the MAV have promoted energy efficiency, water conservation and materials efficiency within local government.

The VAEE points out that local government often initiates community programs and events and the nature of these varies enormously from awareness raising to programs leading to major behavioural change. Examples of these programs include Sustainability Street, Sustainable Living at Home (SLAH - City of Port Phillip) and the Anglesea Neighbourhood Environment Improvement Plan (NEIP), a community based project facilitated by Surf Coast Shire in partnership with the EPA and other agencies.

While these programs differ somewhat in the way they are developed and funded they share a number of important characteristics. They are based on:

- auditing household consumption and setting targets for reductions in energy and water use and waste generation;
- providing households and communities with the information and support they need to make changes in their consumption patterns; and
- providing an avenue for community social interaction and community building.

For example, the Sustainable Living at Home project asks participants to calculate their environmental footprint at the beginning of the program.

[33] Municipal Association of Victoria, submission no. 28, p. 9

Households are then assisted to develop individual action plans to meet resource reduction targets.[34]

Local government advised the Committee that it is essential for state and local government to work cooperatively in order to achieve effective sustainability outcomes for communities and households. In the view of local government, state government and its agencies are not only better resourced but have the overarching responsibility to undertake community education and information programs, such as the current statewide campaigns on water conservation. At the same time local government can deliver programs tailored to their communities. Surf Coast Shire summarised the position of many local government authorities on their role in promoting sustainability and their relationships with state and federal levels of government:

> The environmental sustainability of households and local communities] … is a statewide issue, a national issue, a global issue, and we need not only federal government support through programs like Cool Communities, but we also need state government support to make whatever we think is the best approach consistent and integrated across the state. We are happy to deliver these programs, but we really need assistance through resources and finances to make these things happen.[35]

The Committee found that, while many local and state government funded programs were considered successful in terms of changing the behaviour of participants and engaging the community, the number of households or individuals participating in these programs was small relative to the size of a municipality or township. In the City of Port Phillip, there are 183 households currently participating in the fifth round of the SLAH program.[36] Environs Australia Projects advised that there are 22 Sustainability Street projects in different locations, and most involve a small core group.[37] The Anglesea NEIP has directly involved about 10 per cent of the town's population in related events.[38]

However, the Committee believes that while the quality of information and delivery of many local programs is not in question, there is a need to ensure these programs reach a broad spectrum of the community, are effectively evaluated and have sufficient resources to achieve their objectives. The MAV advised that community environmental sustainability programs are often reliant on external funding, which is short term in many cases:

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[34] City of Port Phillip, submission no. 45, p. 3Ibid, p. 3

[35] Mr C McKiernan, Environment Coordinator, Surf Coast Shire, transcript of evidence, 29 September, p. 370

[36] Mr R Palmer, Manager, Infrastructure and Environment, City of Port Phillip, transcript of evidence, 9 August 2004, p. 192

[37] Mr S Ray, Executive Director, Environs Australia Projects, transcript of evidence, 9 August 2004, p. 185

[38] Mr G Brown, Facilitator, Anglesea Neighbourhood Environment Plan, transcript of evidence, 29 September 2004, p. 360

> Excellent programs can be established but can fail to make long-term impacts upon communities because they tend to lack follow through. Communities usually need extended reinforcement of behaviour change techniques before they become the norm. Therefore, projects need longer term planning and funding arrangements.[39]

The City of Port Phillip advised that funding its Sustainable Living at Home (SLAH) program was an on-going challenge, with the Council seeking funding from a number of different sources.[40] The Anglesea Neighbourhood Environment Improvement Plan is a program regarded by the EPA as an important model for community sustainability in Victoria.[41] The Committee was advised by Surf Coast Shire and the Anglesea NEIP community leadership group that one of the keys to the success of the program has been a paid community facilitator to drive the program.[42] The shire stated that it would be unrealistic to expect a community representative to voluntarily organise events and workshops and administer the program.[43] However, the Committee was advised by the EPA that it had not originally considered funding the program long term:

> When the EPA went into this we hoped it would mean funding for a year or two and then we could walk away, in the sense of go and fund the next one, then the next one, and so on. We hoped we would be seed funding. [44]

The EPA advised that its objective would be to develop the NEIP as a volunteer organisation.[45]

The MAV, in its submission to the Inquiry, stated that ongoing funding, or opportunities for local government to raise its own funds are important for the long term success of community environment programs managed through local government. The MAV pointed out that NSW councils have the power to raise an environment levy to fund local projects, after setting community priorities through a community engagement process.[46] The MAV advised the Committee that this option could be raised through the Local Sustainability Accord process.[47] (see chapter 4). A number of Victorian councils advised the Committee that they have established revolving sustainability funds, with savings made from reductions in energy costs, for example, Mornington Peninsula Shire

The Committee is concerned that many local government and community sustainability education programs are limited by the uncertainty of whether

[39] Municipal Association of Victoria, submission no. 28, pp. 36-37

[40] Mr R Palmer, Manager, Infrastructure and Environment, City of Port Phillip, transcript of evidence, 9 August 2004, p. 192

[41] Dr E Phillips, Manager, Neighbourhood Environment Improvement Program, EPA, transcript of evidence, 29 September 2004, p. 391

[42] Mr N Wight, Anglesea NEIP Community Leadership Group, transcript of evidence, 29 September 2004, p. 361

[43] Surf Coast Shire, submission no. 44, p. 3

[44] Mr T Robinson, Regional Manager, Environment Protection Authority, transcript of evidence, 29 September 2004, p. 393

[45] Ibid, p. 393

[46] Municipal Association of Victoria, submission no. 28, p. 37

[47] Ibid, p. 37

on-going funding will be available. The Committee was advised by many experts that changing community behaviour towards more sustainable practices is a long term process, requiring ongoing support and resources. The Committee also believes that a number of opportunities for local government to raise funds for sustainability education require further examination. Accordingly, the Committee recommends that:

**Recommendation 6.3**

**The Department of Sustainability and Environment, the Municipal Association of Victoria and the Victorian Local Government Association, examine the provision of environmental sustainability programs (including education and behavioural change programs) through revenue raised from levies, similar to the landfill levy.**

## Victorian government programs

The Department of Sustainability and Environment, the EPA, EcoRecycle, the SEAV and the Department of Infrastructure (DoI) have a responsibility for environmental education and deliver a variety of education and behavioural change programs to the community. Some of these programs are delivered in partnership with local government or community groups. A recent review of environmental sustainability education and behavioural change programs delivered by the Victorian government identified 88 DSE portfolio programs that relate in various ways to education and behavioural change.[48] The following is a brief overview of some key state government programs.

Waste Wise is EcoRecycle's core education and community engagement program. It has two components, the 'Waste Wise approach' and the Waste Wise programs. The key features of the Waste Wise approach are that it aims to involve people and organisations from across a range of sectors, it is focussed on encouraging and assisting waste minimisation rather than simply communicating information and it uses a range of methods to reinforce the overall approach.[49] The other characteristic of Waste Wise is its broad range of targeted programs for different sectors including business, community, local government, public events and schools.[50]

The Department of Infrastructure is developing a marketing approach to changing travel behaviour known as TravelSmart. This program uses dialogue or individualised marketing which involves targeted personal approaches to people, provision of personalised information and incentives. The program is delivered with projects targeted at up to 50,000 households

[48] KPMG, 2004, Stocktake of Education and Behaviour Change Programs, a Report to Department of Sustainability and Environment, Overview, p. 2

[49] R.M. Com Pty Ltd, 2005, Waste Wise Review Program prepared for EcoRecycle, p. 5

[50] Ibid, p. 5

in 2005.[51] A similar approach has been trialled by DSE to encourage water conservation.[52]

DSE has developed a campaign to reduce water consumption in Victoria. The Our Water Our Future campaign is based on extensive advertising, provision of information through water saver kits and on a web site and is linked to initiatives such as rebates for water saving products.[53]

The EPA administers Neighbourhood Environment Improvement Plans (NEIPs) that are designed to: [54]

- tackle the issues important to a local community;
- be developed in partnership by all parts of the community;
- focus on local level solutions; and
- encourage a long-term commitment to environmental behaviour change.

**The Anglesea Neighbourhood Environment Improvement Plan**

The Committee was advised by numerous witnesses that it is critical to consider social relationships in the design of behavioural change programs. Mr Geoff Brown, Facilitator of the Anglesea Neighbourhood Environment Improvement Plan (NEIP) stated that:

> The business of saving the environment needs to be less about facts and more about relationships … we see it as absolutely paramount in this community, and any community, if we want to create change … [55]

Dr Emily Philips, Manager, Neighbourhood Environment Improvement Program, EPA advised that research has shown that behavioural change programs should be designed at the local level and driven by community members. However, most such programs are designed at a macro government level. The Anglesea NEIP process is based on developing relationships within a community and identifying the barriers to behavioural change within that community. The key elements of the program were described by Surf Coast Shire, as follows:[56]

- a network of project partners including individuals, organisations, government agencies and energy businesses. The project

[51] Mr P Harbutt, Manager, Integrated Transport Projects, Department of Infrastructure, transcript of evidence, 22 November 2004, p. 612

[52] Socialdata Australia Pty Ltd, 2004, Water Saver Pilot Project: a Pilot Study of Voluntary Behaviour Change to Reduce Household Water Consumption, draft final report

[53] Mr R Posner, Deputy Director, Communications and Stakeholder Relations, Department of Sustainability and Environment, transcript of evidence, 27 September 2004, p. 262

[54] Environment Protection Authority, submission no. 73, p. 4

[55] Mr L Robinson cited by Mr G Brown, Facilitator, Anglesea Neighbourhood Environment Improvement Plan, transcript of evidence, 29 September 2004, p. 359

[56] Surf Coast Shire submission no. 44, p. 3

partners provide information, time and/or financial support to the local community;

- development of action plans for participants in the NEIP;
- a project facilitator supports participants to implement their action plans;
- incentive packages reward the achievement of actions. Incentives include contributions from project partners such as discounts on materials, rebates, technical advice or labour from tradespeople;
- commitments from community participants to monitor and report on whether their actions are working;
- training of community representative as household sustainability auditors, enhancing the skills within the community; and
- celebrating achievements in community events, providing an opportunity for behavioural change to be discussed and become the norm among peer groups.

The NEIP process offers a unique model in that it brings together different government agencies and programs at a local level and involves communities in decisions about how those programs are run. However, the Anglesea NEIP process has a number of important shortcomings. One of the major partners in the NEIP process, the Alcoa Anglesea Power Station provided some insights into some of these difficulties. Alcoa advised that the NEIP program did not engage a broad cross section of the local community:

> … it has been a program that has been preaching very much to the converted. The engagement has been very much among the people who were already involved in a lot of similar activities… sometimes it has been very difficult to see any particular lead or direction …[57]

Alcoa also advised that the NEIP lacked focus and that it has attempted to address too many issues.[58] Mr Foran of Alcoa Anglesea told the Committee:

> Part of it is they are trying to do a little bit too much. They start off with the theme of urban sustainability and they end up getting into areas that are probably related to biodiversity conservation and things like that, and because people have specific interests and passions.[59]

Alcoa also advised that in attempting to address a broad range of sustainability issues as part of the NEIP, the process alienated some

[57] Mr P Cooke, Manager, Alcoa Anglesea Power Station, transcript of evidence, 29 September 2004, p. 403

[58] Mr B Foran, Community Relations Officer, Alcoa Anglesea Power Station, transcript of evidence 29 September 2004, p. 403

[59] Ibid, p. 403

sections of the local community who were already involved in other conservation activities.[60]

Not surprisingly, short-term funding cycles were identified by Surf Coast Shire as a major limitation to the program's ability to plan strategically.[61]

The community decides on the environmental issues to be addressed and works with the EPA to determine the actions, responsibilities, timeframes and the resources needed to address these issues.[62] However, the Committee was also advised that the EPA controls the agenda to a certain degree.[63] While the EPA stressed the importance of the statutory nature of the NEIP, the community leadership group suggested this was a relatively minor aspect of the process.[64]

The Anglesea NEIP represents an important development in the implementation of community sustainability programs. However, although it addresses some of the key requirements for engaging the communities in sustainable practices identified in this Inquiry, it is still a pilot program and its long-term future remains uncertain. The Committee is also unclear of the costs associated with the program.

Importantly however, it recognises that people are most influenced by credible, trusted peers within their own social networks. This characteristic is also a key element of the Landcare network.[65] A number of witnesses suggested the Landcare model, which is focussed on the rural landscape and conservation, could translate to community sustainability.[66]

## Recent reviews of environmental education in Victoria

The evidence the Committee received suggests that environmental education in Victoria is fragmented. The Victorian Association for Environmental Education (VAEE) concluded:

> ... there is no common view about the state of environmental education in Victoria. Some believe many things have been achieved, while many others feel that change is patchy. There is also a great deal of confusion and no consensus over the

[60] Mr P Cooke, Manager, Alcoa Anglesea Power Station, transcript of evidence 29 September 2004, p. 403

[61] Mr C McKiernan, Environment Coordinator, Surf Coast Shire, transcript of evidence 29 September 2004, p. 373

[62] Dr E Phillips, Manager, Neighbourhood Environment Improvement Plan, transcript of evidence, 29 September 2004, p. 388

[63] Dr H Blutstein, Consultant, Integrating Sustainability, transcript of evidence, 23 August 2004, p. 219

[64] Ms T Gunning and Mrs K McGregor, Anglesea Neighbourhood Environment Improvement Plan Community Leadership Group, transcript of evidence, 29 September 2004, p. 364

[65] Barwon Water, submission no. 77, Appendix 2, p. 4

[66] For example, refer to Mr G Brown, Facilitator, Anglesea Neighbourhood Environment Improvement Plan, transcript of evidence, 29 September 2004, p. 365 and Barwon Water, submission no. 77, Appendix 2, p. 2

> language to describe this area. These findings are symptomatic of an uncoordinated and fragmented situation.[67]

The VAEE also identified some of the reasons for this lack of coordination. Many organisations that undertake environmental education programs are unaware of what other organisations are doing. Ms Teresa Day, VAEE Education and Development Officer told the Committee that this stems from:

> the way the industry is funded – and this occurs not just in Australia but worldwide – people are quite protective and they are quite nervous [of losing funding to competing organisations]. They will come up with a good idea ... but they do not want to go externally to do it. Rather than adding value by sharing things ... they get very protective [of their funding and their project].[68]

Ms Meagan Parker, VAEE President, advised the Committee that the environmental education field has seen rapid growth in recent years, and there has been a lack of coordination for at least ten years and this partly explains the lack of integration and fragmentation.[69]

In order to assist in developing future directions for environmental education and behavioural change programs,[70] DSE commissioned two separate evaluations which address different aspects of environmental sustainability education in Victoria.[71] In addition, Environment Victoria has undertaken a review of community sustainability in Victoria, which included an examination of the practicalities, difficulties and achievements of community sustainability programs.[72] Furthermore, the Committee was advised that the Office of the Commissioner for Environmental Sustainability will progressively, over a several-year timeframe conduct an audit of community-based programs delivered by the Department of Sustainability and Environment (not including programs within the formal education system).[73] A brief overview of the findings of three recent reviews of environmental education in Victoria and the work of the Office of the Commissioner for Environmental Sustainability is set out below.

## Victorian Association for Environmental Education evaluation

DSE commissioned VAEE to assess the current status of environmental education in Victoria in light of Victoria's early environmental education

[67] Victorian Association for Environmental Education, 2004, Evaluation of Environmental Education in Victoria, p. 4

[68] Ms T Day, Education and Development Officer, Victorian Association for Environmental Education, transcript of evidence, 27 September, 2004, p. 275-276

[69] Ms M Parker, President, Victorian Association for Environmental Education, transcript of evidence, 27 September 2004, p. 275

[70] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 6 December 2004, p. 662

[71] These reviews are: An Evaluation of Environmental Education in Victoria conducted for DSE by the Victorian Association for Environmental Education and a Stocktake of Education and Behaviour Change Programs conducted by KPMG

[72] Environment Victoria, submission no. 80, p. 6

[73] Ms K Heffer, Senior Program Officer, Officer of the Commissioners for Environmental Sustainability, transcript of evidence, 8 November 2004, p. 563

strategy, released in 1992.[74] The review evaluates this early strategy in relation to developments in NSW and nationally and assesses the current validity and relevance of the 1992 strategy. The review also assesses the extent to which the actions and sustainability outcomes of the strategy have been implemented and makes recommendations about further policy directions. The review provides a valuable overview of environmental sustainability education in Victoria.

The VAEE concluded that the aims, rationale, principles and actions of the 1992 Victorian strategy are very similar to the recent national and NSW strategies and remain relevant today.[75] The VAEE evaluation found that many practitioners in the environmental education sector viewed 'grass roots' development of programs as one of the strengths of environmental education in Victoria. However, often these programs are not coordinated resulting in less effective and less efficient programs and a patchy coverage across the state. The evaluation found there is no single body that strategically coordinates, monitors or directly facilitates state-wide environmental education development and therefore recommended the establishment of a statutory body to provide advice to government and provide high-level coordination of environmental education across the sectors.[76]

Another of the VAEE's key findings is the need to establish a clear and reliable picture of what is happening across the state in relation to environmental sustainability education. While the VAEE study provided a broad overview of environmental education, it did not examine programs in detail nor identify duplication, linkages and deficiencies. The VAEE report recommends an audit to map the current environmental education activities in Victoria in order to improve, identify duplication, linkages and deficiencies.[77]

The report also identified:[78]

- the need for an updated policy and environmental education strategy, including a comprehensive implementation process;
- concern that the formal education policies in Victoria do not currently support environmental education;
- the need for further professional development in environmental education and behavioural change;

[74] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 6 December 2004, p. 662
[75] Ibid, p. 662
[76] Victorian Association for Environmental Education, 2004, Evaluation of Environmental Education in Victoria, p. 13
[77] Ibid, p. 16
[78] Ibid, p. 4

- the importance of ongoing funding of programs including the length of commitment of funding bodies; and

- the need to promote research into best practice and to evaluate the value of programs.

## KPMG evaluation

In 2004 DSE commissioned a review of environmental education programs currently coordinated by government agencies.[79] The purpose of the review was to establish the types of education and behavioural change programs used across the DSE portfolio identify their purpose, methodology and costs to help identify examples of best practice and contribute to the development of an integrated overall approach to environmental sustainability.[80]

There are 88 DSE government coordinated programs that relate to education and behavioural change.[81] The report identified that there was a lack of effective measurement of program success in many of these programs. While most programs had some form of monitoring and evaluation, they were not able to directly link the programs with behavioural and physical outputs.

The report identified a need to improve performance measurement and to improve the sharing of expertise and knowledge between programs. It suggested establishing program requirements and practical support for performance measurement, establishing a formal network of education and behavioural change practitioners across the sustainability and environment portfolio and establishing a centre of expertise within DSE to facilitate effective performance measurement and knowledge transfer.[82]

## Environment Victoria review

In 2004 Environment Victoria (EV) undertook an extensive review of environmental education in Victoria, focussing on community based programs. While the review covered a variety of theoretical aspects of community sustainability, it also examined the experience of managers and participants.[83] The EV review also identified a number of operational gaps in environmental sustainability programs. The review concluded that, in agreement with the KPMG report's findings about DSE programs, performance measurement of community environmental sustainability programs is problematic. It found that different organisations have varying commitments to the measurement of resource related outcomes. As noted in chapter 4, many organisations have a limited capacity to undertake either

[79] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 6 December 2004, p. 662

[80] KPMG, 2004, Stocktake of Education and Behaviour Change Programs, a report to the Department of Sustainability and Environment, Overview, p. 1

[81] Ibid, p. 2

[82] Ibid, p. 3

[83] Environment Victoria, submission no. 80, p. 6

resource related or qualitative measurements due to inadequate knowledge, skills and resources. Further, measurement of resource outcomes may not be a priority, where community development or 'neighbourliness' is the primary aim of the project, also different organisations employ differing measurement methodologies.[84] As noted earlier in the chapter, the review also identified a need for overall coordination of the diverse range of community environment programs currently delivered in Victoria.

In summary, EV recommended that government should develop a unifying framework with a common brand to promote community sustainability and minimise confusion between numerous programs. Further, the EV report recommends that there should be a single agency that refers members of the community to programs relevant to their circumstances. EV also pointed out that community environment programs provide an opportunity for sound social research to help inform future program development, but as noted above, community groups lack the resources and skills required.[85]

## Office of the Commissioner for Environmental Sustainability audits

The Commissioner for Environmental Sustainability, Dr Ian McPhail advised the Committee that one of the key functions of the Commissioner's Office is to audit Victorian environmental education programs[86] and advise the Minister on their effectiveness in encouraging the community to adopt ecologically sustainable principles and practices.[87] The Committee was advised that the role of the Commissioner's Office in auditing environmental education is permanent and therefore audits would be continuous and on-going.[88]

The Committee was also advised that the definition of environmental education is very broad under the legislation. The initial audit will focus on marketing, advertising, awareness-raising, formal education, extension advisory services and incentive programs delivered by state government outside the formal education system.[89] The Committee was advised that the Office of the Commissioner was currently developing a framework for auditing environmental programs and that audits would be carried out in a phased program, starting with a number of pilot audits in 2005 with an on-going program of audits being undertaken after 2005.[90] However, the Committee was advised that a time frame had not been established for

[84] Ibid, p. 6
[85] Ibid, p. 7
[86] Dr I McPhail, Commissioner for Environmental Sustainability, transcript of evidence, 8 November 2004, p. 562
[87] Ms K Heffer, Senior Program Officer, Office of the Commissioner for Environmental Sustainability, transcript of evidence, 8 November 2004, p. 562
[88] Dr I McPhail, Commissioner for Environmental Sustainability, transcript of evidence, 8 November 2004, p. 566
[89] Ms K Heffer, Senior Program Officer, Office of the Commissioner for Environmental Sustainability, transcript of evidence, 8 November 2004, p. 563
[90] Ibid, p. 564

completion of environmental education audits and the Office of the Commissioner did not advise how many audits would be undertaken each year once an audit framework was developed. Further, the Committee was advised that, while it is recognised that a number of schools based programs such as Sustainable Schools are focussed both within the formal education system and in the broader community, the Commissioner's initial audit will only focus on programs delivered outside schools.[91]

Overall, the Committee was advised that the scope of the Commissioner's initial environmental education audits will be limited. Dr McPhail told the Committee:

> …. we are not going to do the audit of environmental education in Victoria. We will start with the Department of Sustainability and Environment, as the minister outlined in his second-reading speech. By the end of next year we will take a couple of programs from the environment portfolio and test run them as audits. Then we will expand into the entire range of community education programs that DSE or its environment portfolio is carrying out. We cannot give you a timetable for 2005 and on, but by the middle of next year we will give you a timetable as to what the program of audits will be from then on.[92]

The Committee is concerned that, while a number of reviews of various aspects of environmental education have been undertaken and identified gaps in the delivery of environmental education in the State, there has not been a comprehensive assessment of existing environmental education and behavioural change programs. In order to inform the development of a strategic approach to environmental education, the Committee believes that the state government in conjunction with the Office of the Commissioner for the Environment should conduct a comprehensive assessment. The Committee believes that the audit program proposed by the Office of the Commissioner for Environmental Sustainability is not comprehensive. For example, there is a clear need to examine the affect school based programs have on the sustainability practices of the wider community, yet the school programs will not be included in initial audits. The Committee also believes that a timeframe should be set for the completion of the Commissioner's audits of environmental education. This could ensure that all programs have been reviewed within a defined timeframe and benchmarks set for future performance monitoring. Accordingly, the Committee recommends that:

**Recommendation 6.4**

**As a priority the State Government in conjunction with the Office of the Commissioner for the Environment conduct a comprehensive assessment of environmental education and behavioural change programs in Victoria across all sectors by 2007. The assessment should evaluate:**

[91] Ibid, p. 564-565

[92] Dr I McPhail, Commissioner for Environmental Sustainability, transcript of evidence, 8 November 2004, pp. 566-567

**a) the coordination and integration of programs;**

**b) the content of programs;**

**c) resourcing of programs; and**

**d) the performance measures and outcomes of programs.**

## Key issues for environmental education and behavioural change programs in Victoria

# Institutional arrangements

The Committee found that there is no single organisation that provides statewide leadership on environmental education. The Committee supports the approach taken by the NSW government in establishing an Environmental Education Council.

### NSW Environmental Education Action Plan

Ten years after the development of the Victorian Strategy the NSW Government developed a comprehensive plan for environmental education. The plan, *Learning for Sustainability: NSW Environmental Education Plan 2002–2005*, has been developed to provide environmental education to all sectors of the community. The plan aims to achieve 'effective and integrated environmental education which builds the capacity of the people of NSW to be informed and active participants in moving society towards sustainability'.[93] The plan was developed by the NSW Council on Environmental Education (CEE), in collaboration with a wide range of stakeholders.

The NSW Council on Environmental Education was established under the *Protection of the Environment Administration Act* 1991 to advise the state government on strategic directions for environmental education.[94] The CEE is made up of representatives of the various state government natural resource management agencies and education and community agencies as well as representatives from the industry, local government and community sectors and from professional associations of environmental educators.[95]

To inform the plan's development the CEE conducted a comprehensive assessment of environmental needs for NSW people.[96] The CEE also

[93] NSW Government, 2002, Learning for Sustainability: NSW Environmental Education Plan 2002-2005, p. 1

[94] www.epa.nsw.gov.au/cee/index.htm, accessed May 2004

[95] Ibid

[96] Victorian Association for Environmental Education, 2004, Literature Search: System-wide Strategies that Support Environmental Sustainability Education, p. 11

conducted a comprehensive assessment of environmental education in NSW and compiled an inventory of programs. This included identifying priorities for sustainability as well as key environmental education needs. The findings of these assessments became the key priorities for the plan. Those relevant to this Inquiry include:[97]

- making information and programs accessible through web based links for government and non-governmental education programs, resources and contracts;
- improving delivery of environmental education in schools through the Sustainable Schools Program - all government schools are required to develop environmental management plans;
- developing a cleaner production program for industry including education initiatives; and
- sustained community education campaigns.[98]

The key feature of the plan is that it is informed by needs identified by the community. The plan presents a set of deliverable outcomes, based on the identified needs and priorities for environmental education in NSW. These include:[99]

- improved integration of environmental education with other tools and strategies used by organisations to promote environmental sustainability;
- enhanced cross-sectorial coordination of environmental education programs;
- enhanced partnerships between environmental education providers;
- improved access to environmental education programs;
- training and professional development for environmental education providers;
- increased research and evaluation; and

[97] NSW Government, 2002, Learning for Sustainability: NSW Environmental Education Plan 2002-2005, p. 1

[98] The NSW government operates the Our Environment: It's a Living Thing, community education campaign. It costs $17.5 million over 3.5 years and is aimed to encourage sustainable choices in daily decision making

[99] NSW Government, 2002, Learning for Sustainability: NSW Environmental Education Plan 2002-2005, pp. 1-2

- increased active participation by the community.

The plan presents a detailed implementation process to deliver each of these outcomes. This approach includes a strategy to achieve the outcome, a series of specific actions and responsibilities for stakeholders and a series of performance indicators, requiring annual reporting to the CEE by state government agencies. The Council must report annually to the Government outlining progress in achieving the plans outcomes.[100] Importantly the plan contains mandatory requirements for state agencies to report against 39 performance indicators across seven key outcomes. Reporting for local government and other organisations is voluntary.

Mr Geoff Young, Manager of the NSW Department of Environment and Conservation's Community Education Unit stated that the plan combines both input from a wide diversity of environmental education programs from all sectors with the coordination of a central body to bring together those diverse programs. Mr Young stated that:

> ... you have to have some strong central body which can speak on behalf of that incredibly diverse constituency and represent their views and can facilitate a dialogue amongst those and between government and non-government about what needs to be done and how it needs to be done.[101]

The role of the CEE is an essential feature of environmental education in NSW ensuring statewide leadership and coordination.

The VAEE notes that the strategic process in place in NSW is clearly missing in Victoria.[102] It also notes that a key role of Sustainability Victoria will be the implementation of the sustainability framework and the coordination of the education strategy.[103] However, the Committee also believes that the Victorian Sustainability Advisory Committee should consult with representatives of community, industry, professional associations of environmental educators and government to ensure the strategy addresses the needs of all sectors of the community and provides a focus for coordinating the implementation and monitoring of the strategy. The Victorian Sustainability Advisory Committee is a high level ministerial advisory body that meets quarterly and reports directly to the Environment Minister. It is comprised of the Treasurer and representatives from industry and local government. Accordingly, the Committee recommends that:

[100] Ibid, pp.18-43 and p.46

[101] Mr G Young, Manager, Community Education Unit, NSW Department of Environment and Conservation, meeting, 26 October 2004, pp. 471-472

[102] Victorian Association for Environmental Education, 2004, Evaluation of Environmental Education in Victoria and Environment Victoria, p. 24

[103] Personal communication, Mr S Malcolm, Project Manager, Education and Behaviour Strategies, Department of Sustainability and Environment, May 2005

**Recommendation 6.5**

**The Victorian Sustainability Advisory Committee be asked to consult with representatives of state environment and natural resource management agencies, the Department of Education and Training, industry, local government and community sectors and professional associations of environmental educators in the development and implementation of Victoria's education and behavioural change strategy for environmental sustainability. Specifically to:**

a) **provide advice to government on environmental education and behavioural change;**

b) **provide advice to government on the monitoring and evaluation of the strategy and individual environmental education programs across Victoria; and**

c) **facilitate the professional development of environmental education and behavioural change practitioners.**

## Performance measurement of environmental education programs

The Committee is concerned that, given the diversity of environmental sustainability education programs operating within Victoria, most lack effective measurement of program performance and outcomes. The Committee recognises that robust methodologies have been developed for some environmental behavioural change programs such as Waste Wise and the Victorian water conservation awareness campaign, but that many local government and community based organisations lack the resources and skills to adequately measure performance. Therefore the Committee recommends that:

**Recommendation 6.6**

**State Government, through Victoria's education and behavioural change strategy for environmental sustainability:**

a) **develop a consistent methodology for performance measurement of environmental education and behavioural change programs. This should consist of a range of social research tools appropriate for different scales of program (i.e. from local community to statewide);**

b) **require environmental education and behavioural change programs to incorporate robust performance measurement using recognised social and market research methodologies and measurement of change in resource use such as reduced water or energy consumption; and**

**c) provide adequate resources and training in the evaluation techniques to enable providers of environmental education to conduct effective performance measurement.**

## Social research to inform policy

The Committee received evidence that environmental education and behavioural change programs need to be designed very precisely, be based on good social research data yet this is an area that is generally not thoroughly researched.[104] The NSW Environmental Education Plan contains seven key outcomes (and 39 performance indicators across these outcomes). However, the key objective or outcome is 'increased active and informed participation by NSW people in creating a sustainable future'. According to the NSW Council for Environmental Education this indicator is based on the NSW government's statewide survey, *Who Cares about the Environment?* This series of surveys has tracked changes in the environmental knowledge and attitudes of the people of NSW since 1994. The survey results inform the planning, implementation and evaluation of government sustainability initiatives, including the Environmental Education Plan. Because the survey provides longitudinal data, broad changes in community values, knowledge and attitudes can be followed and linked to various social changes and policy initiatives. The surveys also provide information for community based and private sector organisations to help them coordinate programs across all sectors.[105]

The Committee notes that, while recent community surveys have been undertaken in relation to community attitudes to waste[106] and water conservation,[107] a comprehensive broad scale picture of community attitudes, knowledge and values about environmental sustainability does not exist in Victoria. The Committee believes that such information is fundamental to the development of effective environmental education programs. Gaining an understanding of the knowledge of and attitudes towards environmental issues of different segments of the community would allow more effective targeting of environmental education programs.[108] The Committee also believes that while the NSW survey results may provide a broad overview that is generally relevant to the Australian community, a survey of Victorian communities would provide far more accurate data to guide the development of Victorian environmental education programs. The NSW Department of Environment and Conservation's extensive experience in social research should be drawn on to assist in the development of a Victorian survey. Accordingly, the Committee recommends:

[104] Mr G Young, Manager, Community Education Unit, NSW Department of Environment and Conservation, meeting, 26 October 2004, p. 464

[105] NSW Department of Environment and Conservation, 2004, Who Cares About the Environment in 2003?, p. 5

[106] EcoRecycle, 2001, Community Attitudes Survey

[107] Mr R Posner, Deputy Director, Communications and Stakeholder Relations, Department of Sustainability and Environment, transcript of evidence, 27 September 2004, p. 263

[108] Mr G Young, Manager, Community Education Unit, NSW Department of Environment and Conservation, meeting, 26 October 2004, p. 467

**Recommendation 6.7**

**Sustainability Victoria, in partnership with other state agencies, local government and the non-government sector, develop and conduct a survey of the Victorian community to measure people's attitudes to, knowledge of, and skills and behaviour regarding environmental sustainability. Surveys should be conducted at regular intervals to provide longitudinal data to inform the development of policies and programs and the results made available in the public domain.**

## Victoria's environmental sustainability framework

In April 2005, the Victorian Government released its Environmental Sustainability Framework, *Our Environment Our Future*. According to the framework documentation:

> The Framework does not replace the many specific strategies that exist to address particular environmental issues, such as water or climate change. Instead, the Framework provides the broad strategic context for these strategies and informs future policy initiatives.[109]

The framework 'does not impose a set of actions but sets directions, guiding principles and measurable objectives' for individuals and communities in their daily decisions.[110]

The framework sets three directions for Victoria to move towards sustainability: maintaining and restoring natural assets, using resources more efficiently and reducing everyday environmental impacts. Under these three broad directions are a series of 13 objectives that give rise to interim targets. These targets are set out in existing policy documents such as the White Paper, *Securing Our Water Future Together* (for example increase waste water re-use in Melbourne to 20 per cent by 2020). The framework states that new interim measures and targets may be set as understanding of the environment improves.[111]

The Government had made a commitment by taking a lead on sustainability by integrating the directions of the framework into its day-to-day operations, planning and environmental management systems (EMS) from July 2006.[112]

Of particular interest to this Inquiry, the framework does not explicitly address education and behavioural change but includes a major strategic direction to reduce 'our every day environmental impacts'. The framework acknowledges the need for better information to assist consumers make better environmental decisions and 'the need to make it easy for people' to

[109] Victorian Government, Department of Sustainability and Environment, 2005, Our Environment Our Future: Victoria's Environmental Sustainability Framework, p. 30
[110] Ibid, p. 30
[111] Ibid, p. 21
[112] Ibid, p. 31

act sustainably and includes an objective for communities 'to have an ethic of saving water, energy and materials'.[113]

There is no detail given as to how these objectives will be achieved, but a separate document, *Making Victoria a Sustainable State, a Ministerial Statement on Environmental Sustainability* announces that a behavioural change strategy, *Learning to Live Sustainably*, is currently under development.[114]

In addition the framework sets out a community consultation process that will guide its implementation. The government has called for submissions on the implementation of the Victorian Sustainability Framework by August 2005.

The Committee notes that the framework contains commitments from government to monitor its effectiveness. This will occur at three levels. DSE will undertake a comprehensive review of the framework and its outcomes in 2010. In addition the Commissioner for Environmental Sustainability will annually review the adoption of the framework's directions by government departments and agencies and DSE will review the state's progress on the objectives and interim targets of the framework every 2 years.[115]

It is of interest to briefly contrast the Victorian Sustainability Framework with the Western Australian State Sustainability Strategy. This comprehensive strategy was the first state level sustainability strategy to be released in Australia.[116] The Strategy differs markedly from the Victorian approach. Whereas the Victorian framework provides a structure for integrating existing policies and provides for new policies to be developed, the Western Australian approach has integrated all aspects of sustainability from the outset. The WA sustainability strategy also contains details on implementation, presenting an action plan containing specific actions that can be applied across all sectors of government and the community. Importantly, however, the WA approach provides an example of a detailed and integrated implementation plan, developed following two years of community consultation.

[113] Ibid, pp. 28-29

[114] Minister for Environment, 2005, Making Victoria a Sustainable State, Ministerial Statement on Environmental Sustainability, p. 7

[115] Victorian Government, Department of Sustainability and Environment, 2005, Our Environment Our Future: Victoria's Environmental Sustainability Framework, p. 31

[116] Government of Western Australia, 2003, Hope for the Future: the Western Australian State Sustainability Strategy, p. 3

Chapter

7

# Promoting household waste prevention and resource recovery

## Key findings

**7.1** Efforts to manage waste in Australia have focussed largely on managing waste disposal rather than waste prevention.

**7.2** While there have been significant advances in the development of policies to encourage a life cycle approach to production and consumption in Europe over the last decade, the delivery of outcomes has been limited in Australia.

**7.3** The Victorian *Towards Zero Waste* strategy does not contain differentiated recycling targets. The Committee believes that the targets in the draft *Towards Zero Waste* strategy need to cover specific waste fractions.

**7.4** Extended producer responsibility schemes overseas have been successful in preventing waste generation at the source by promoting more environmentally sound product design and facilitating efficient material recovery and re-use. The revision of the National Packaging Covenant offers an opportunity to set in place a comprehensive extended producer responsibility policy framework. It is critical that the National Packaging Covenant include mandatory waste reduction targets for the packaging industry.

**7.5** Victoria leads Australia in the development of best practice kerbside recycling. Approximately half of Victorian councils have best practice recycling systems. These systems can divert 31 to 35 per cent of household waste from landfill. The development of markets for recycled products is critical to achieving a higher rate of diversion of waste from landfill along with better sorting technologies.

**7.6** Measures to manage packaging waste were first introduced into the European Union in the 1980s. Detailed and substantive targets apply to the prevention of packaging waste, the re-use of packaging and the recovery and recycling of packaging waste.

**7.7** The bulk of municipal waste sent to landfill is composed of food (37 per cent) and garden organic waste (17 per cent). There is little economic

incentive to divert organic waste from landfill. The low cost of landfill, compared to the cost of treating organic waste, and immature markets for organic waste remain a significant barrier to further recovery.

**7.8** Landfill costs are set to progressively increase. As these costs increase, alternative methods of treating municipal waste will become increasingly financially viable. However it may take up to 10 years before the cost of alternative waste treatment will be competitive with landfill in Victoria.

**7.9** Current waste management technologies (predominantly landfill) are unlikely to deliver the resource recovery outcomes required by the draft *Towards Zero Waste* strategy.

**7.10** Under the European Union landfill directive, Member States are obliged to reduce biodegradable municipal waste going to landfill to 75 per cent in July 2006 and to 35 per cent in 2016 from 1995 levels. Some countries have already achieved these targets through a combination of incineration with energy recovery, central composting and recycling.

**7.11** A restructure of the institutional framework for waste management has been proposed for metropolitan Melbourne. Large scale alternative waste technology facilities to improve resource recovery from the organic waste stream may be introduced.

**7.12** Alternative waste technology is an emerging industry in Australia, currently processing only 3 per cent of garbage or mixed putrescible waste (the fraction of the waste stream that would otherwise be landfilled).

**7.13** Australian consumers currently have limited choice about the environmental impacts of the products they purchase and are provided with little information on the environmental impact of retail products.

**7.14** Few Australian consumers currently recognise environmental product labels, however over 80 per cent of consumers want more environmental information on products and packaging. There is a need for a national product and packaging labelling scheme indicating whether packaging and products are recyclable and the recycled content of products and packaging.

**7.15** The level of knowledge within the community about the types of materials that can be recycled is poor. This is particularly the case for plastics. Despite high participation rates in kerbside recycling, misconceptions and cynicism about the outcomes of kerbside recycling remain common.

**7.16** There is little community awareness of the difference between recycling and waste avoidance. There is a need to redevelop Victoria's waste education program to reflect the principles of waste avoidance and a life cycle analysis.

## Introduction

The first and second terms of reference require the Committee to identify the barriers to increasing the rate of participation by individuals and households in conserving resources and to examine how state and local governments can encourage an increase in the rate of recycling.

This chapter explores strategies for improving the management of residential waste and reducing the amount of waste sent to landfill. The current frameworks for management of residential waste are outlined as well as trends in household waste generation. The key barriers and opportunities for improving waste management at the household level are then examined. Policy instruments to encourage waste prevention and resource conservation are discussed. Strategies including the increased recycling of organic waste and the promotion of composting, product labelling, alternative waste technology and community education are considered.

**Waste Terminology**

According to EcoRecycle solid waste can be grouped into three types:

- Garbage (residual waste or general waste): waste materials including animal and vegetable matter and other refuse that is disposed of in landfill;
- Recyclables: waste materials such as paper and cardboard, glass, metal and some plastic containers which can be recycled and processed to make other products; and
- Green waste: waste materials such as plants, leaves, grass clippings, tree cuttings and prunings which can be processed into mulch, compost or soil conditioners.

Some of these materials are readily decomposed by natural processes (such as bacteria) and are called putrescible wastes. Those materials that

do not easily break down are called solid inert or non-putrescible wastes.[1] The term organic waste is also used to describe waste able to be broken down by natural processes such as grass clippings, tree prunings and food waste.[2]

Solid waste can also be grouped into three main types based on source:

[1] South Eastern Regional Waste Management Group, 2004, Regional Waste Management Plan 2004/2009, p. 8

[2] Ibid, p. 8

- municipal kerbside waste: kerbside domestic waste including garbage, recyclables, green and hard waste;

- other municipal waste: including waste from council services such as street sweeping, parks and gardens services, litter, construction waste from owner/ occupier renovations, residential "self haul" waste; other non industrial waste collected by local government, such as waste from commercial premises; [3] and

- solid industrial waste: industrial waste, commercial waste, building waste from commercial operations.

Recovered and recycled material refers to:

- recovered material: material that would have been otherwise disposed of as waste or used for energy recovery, but has instead been collected and recovered (reclaimed) as a material input, in lieu of a new primary material, for a recycling or manufacturing process;[4] and

- recycled material: material that has been reprocessed from recovered (reclaimed) material by means of a manufacturing process and made into a final product or into a component for incorporation into a product.[5]

According to the OECD, recycling is one type of waste recovery:

- waste recovery: any waste management operation that diverts a waste material from the waste stream and which results in a certain product with a potential economic or ecological benefit. Recovery mainly refers to the following operations:

  - material recovery, i.e. recycling;

  - energy recovery, i.e. re-use as a fuel;

  - biological recovery, e.g. composting;

  - re-use.

Waste from households is categorised as waste collected by local government kerbside services, i.e. garbage, recyclables, green organics and hard waste.

[3] Source: www.ecorecycle.vic.gov.au/www/print.asp?casID=3454, accessed May 2005
[4] Source: http://waste.eionet.eu.int/definitions/recovery
[5] Source: http://waste.eionet.eu.int/definitions/recycling

Comparison of waste generation with international jurisdictions is problematic because the means of deriving the figures for municipal waste vary between countries. For example, the OECD has published figures for municipal and household waste generated per capita however it is not stated how municipal and household waste are defined (e.g. whether the figure is total waste generated including recyclables). The OECD data for 2004, shows that Australia generates 690 kilograms of municipal waste per capita per year and the United States generates 730 kilograms per capita.

## Management of domestic waste in Victoria and Europe

The policy frameworks for waste management in Victoria are broadly outlined in Chapter 5. The following section provides details of how waste management is implemented in Victoria and Europe.

# EcoRecycle

EcoRecycle is the state's primary solid waste management agency. Established in 1996 under the *Environment Protection Act* 1970, EcoRecycle focuses on statewide strategies for the reduction of municipal and solid industrial waste, reducing and recovering resources from hazardous solid waste and promoting more sustainable use of resources.[6] EcoRecycle undertakes statewide planning for industrial solid waste and facilitates best practice waste management through grants and programs.

In April 2005, the Victorian Government announced that it will merge EcoRecycle and the Sustainable Energy Authority Victoria (SEAV) to form a new organisation, Sustainability Victoria. Sustainability Victoria will commence operating on 1 October 2005. The Government states that the strategic and business plans for EcoRecycle and the SEAV will continue into the 2005-06 financial year and that Sustainability Victoria will progressively implement new strategic directions in the context of recognising existing and ongoing program commitments.[7] This chapter will continue to refer to EcoRecycle as the lead agency for ongoing waste management programs, however, recommendations for future action will refer to the new agency.

EcoRecycle is funded by a landfill levy collected on behalf of the Environment Protection Authority by licensed landfills throughout the State. In addition to funding EcoRecycle, the levy contributes to funding the EPA and Regional Waste Management Groups. The basis for the distribution of the landfill levy rests in the Environment Protection (Distribution of Landfill Levy) Regulations 2002. As of December the levy was $5 per tonne of municipal waste and $7 per tonne of industrial waste. [8] Levies will increase

[6] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 14

[7] Source: www.ecorecycle.vic.gov.au/www.newsletter_article.asp?id=1225, accessed April 2005

[8] Parliament of Victoria, 2004, Public Accounts and Estimates Committee, Report on the Review of the Auditor General's Performance Audit Report no. 65 - Reducing Landfill: Waste Management by Municipal Councils, p. 68

progressively each year and will rise to $7-$9 per tonne for municipal waste and $13-$15 per tonne for industrial waste by 2007-08.[9] Seventy per cent of the levy income goes to EcoRecycle, 20 per cent to the EPA and 10 per cent to the Regional Waste Management Groups. In addition the regional groups have access to a substantial proportion of the revenue allocated to EcoRecycle through project funding for waste education initiatives.[10]

## Landfills

There are 151 operating landfills in Victoria and of these, 52 are licensed. Landfills serving a population of 5,000 people or more are subject to EPA licensing provisions. Landfill facilities that serve a population of 500 or more people require a EPA works approval, before construction. the EPA states that landfills are the least preferred waste management option[11] due to a range of environmental impacts including impacts on surface and groundwater through leachate from putrescible waste, impacts on air quality and greenhouse emissions and potential impacts from birds and vermin.[12] However the EPA also points out that landfills will continue to be required in the future to manage those wastes that cannot currently be recycled or re-used.[13] All landfill operations in Victoria must comply with the *Environment Protection Act* 1970. In December 2004 the Waste Management Policy (Siting, Design and Management of Landfills) came into effect. This policy provides a mechanism for continuous improvement and the adoption of best practice for the siting, design and management of landfills.

Almost all unlicensed landfills are located in small provincial local government areas or rural townships.[14] The EPA runs a program in conjunction with local government to identify unlicensed landfills across Victoria and is progressively closing unlicensed landfills.[15] However, EcoRecycle reports that this remains a challenge in non-metropolitan areas and the true number of unlicensed landfills may be higher than the reported figures.[16] While the EPA continues to close unlicensed landfills, the rate of closure is relatively slow with only 9 landfills closed in 2002–03.[17]

The Committee is concerned at the high number of unlicensed landfills currently operating in Victoria and that there are unidentified landfills operating in Victoria. The Committee supports the EPA program of identifying and closing unlicensed landfills and recommends that:

[9] Source: www.ecorecycle.vic.gov.au/www/default.asp?casid=2900, accessed April 2005
[10] Towards Zero Waste Working Party, 2005, Report of Findings, p. 39
[11] Source: www.epa.vic.gov.au/Waste/Landfill.asp, accessed April 2005
[12] EPA Victoria, 2001, Siting, Design, Operation and Rehabilitation of Landfills, p. i
[13] Source: www.epa.vic.gov.au/Waste/Landfill.asp, accessed April 2005
[14] EcoRecycle, 2004, Local Government Data Collection 2002-2003, p. 39
[15] Ibid, p. 38
[16] Ibid, p. 38
[17] Ibid, p. 39

**Recommendation 7.1**

**The Environment Protection Authority:**

a) **conduct a comprehensive assessment of licensed and unlicensed landfills in Victoria to determine the extent of unlicensed premises and compliance with the *Environmental Protection Act* 1970; and**

b) **finalise its closure of unlicensed landfills program by 2008.**

## Local government

There are 207 local government owned waste transfer stations operating in Victoria. Waste transfer stations, as the name suggests, are facilities used to transfer waste from collection vehicles to a bulk haul vehicle in order to achieve long-distance transportation efficiency.[18] The majority of these are in rural townships and small provincial municipalities, reflecting the need in rural areas for drop off facilities to consolidate recyclables and waste.[19]

Local government is responsible for the delivery of domestic waste management services including kerbside collection, waste education (through RWMGs), litter abatement and management plus the management of transfer stations and landfills.[20]

The majority of Victorian landfilled waste, some 75 per cent, is generated in metropolitan Melbourne. Provincial cities generate 16 per cent of waste and the remaining 9 per cent is generated in rural areas.[21] While EcoRecycle, has a statewide focus, the key strategic area is metropolitan Melbourne where the population centre and economic activity are focussed.[22]

In Europe, local and regional authorities are being encouraged by groups such as the Brussels Institute for Management of the Environment and the Association of Cities and Regions for Recycling (ACRR) to encourage waste prevention. Mr Jean-Pierre Hannequart, the CEO of the Brussels Institute for Management of the Environment advised the Committee that local and regional authorities should promote the repair and re-use of goods and ecoproducts, encourage sustainable procurement, promote services instead of product consumption and inform people of the consequences of their lifestyles by encouraging the debate on defining human needs.[23] He

[18] Source: www.epa.nsw.gov.au/waste/envguidlns/compostingglossary.htm, accessed May 2005

[19] EcoRecycle, 2004, Local Government Data Collection 2002-2003, p. 39

[20] Environment Protection Authority and Municipal Association of Victoria, 2001, Local Government Role in Waste Management, p. 1

[21] EcoRecycle, 2003, Towards Zero Waste, Appendix A, Supporting Analysis to the Strategy and Plan, p. 3

[22] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence, 5 July 2004, p. 14

[23] Mr J Hannequart, Director General, Brussels Institute for Management of the Environment, meeting, Brussels, 11 February 2005

provided a number of examples of local and regional authorities that are encouraging waste prevention as follows:

- the City of Munich banned the use of disposable paper plates, plastic cups and cutlery at large-scale public events in 1991. Instead consumers pay a deposit for reusable items. This has significantly reduced the waste created at festivals such as Oktoberfest. The city also cooperates with a company for smaller scale events and rents out reusable tableware and mobile dishwashers;

- in Vienna the community is encouraged to repair goods, re-use goods (second-hand goods) and rent instead of buying. The Vienna Waste Management Department promotes 23 small repair shops and has opened a Repair and Service Centre. The local authority also hosts an internet exchange program for second-hand goods and operates a flea market; and

- in 1999 the City of Nuremberg promoted dematerialisation at Christmas time. The city published a leaflet aiming to promote low-waste and low-pollution products. In the leaflet, the city encouraged creativity in choosing gifts and wrapping them. It advised on how to choose the Christmas tree and decorations, gave tips on reducing food wastage and promoted the consumption of local products.[24]

In 2002-03 Victorian local government spent $178.5 million on kerbside collection services for garbage, recyclables, green waste and hard waste.[25] Kerbside recycling services are principally funded through local government rates or municipal waste charges.[26] Furthermore:

- almost all households in Victoria (95 per cent) have access to kerbside recycling services;[27]

- half of local government agencies provide a green waste service, with about 75 per cent of households having access to these services; and[28]

- the average costs per household for the provision of kerbside waste services were $51 for garbage collection, $29 for recyclables collection, $12 for green waste collection and $4 for hard waste.[29]

[24] Refer also to Brussels Institute for Management of the Environment and ACRR, 2004, Voluntary actions supported by local authorities to encourage waste prevention in Europe

[25] EcoRecycle, 2004, Local Government Data Collection 2002-2003, p. 7

[26] [26] Environment Protection Authority and Municipal Association of Victoria, 2001, Local Government Role in Waste Management, p. 3

[27] EcoRecycle, 2004, Local Government Data Collection 2002-2003, p. 8

[28] Ibid, p. 9

[29] Ibid, p. ii

The average cost per household of providing kerbside recycling services is higher in small provincial cities and rural townships ($34-$37). Containing the cost of kerbside recycling services in some areas (mainly non-metropolitan) is a challenge.[30]

The system of kerbside recycling available to households varies in Victoria. There are currently 15 different combinations of container systems and service frequencies used by Victorian councils. EcoRecycle data shows that the type of service available has an impact on the yields of recyclables and the costs of the service.[31] For example a 240 litre co-mingled recyclables collection system delivered the greatest annual yield of recyclables per household (232 kilograms) whereas the older style system of bundled paper and separate recyclables crate delivered 186 kilograms per household.[32]

The Best Practice Kerbside Recycling Program is funded under the National Packaging Covenant. The aim of the program is to assist councils to improve kerbside recycling services. The program's goal is to increase the rate of recycling at a lower cost. Best practice systems are either a 120 litre co-mingled recycling bin collected weekly; a 240 litre split bin system collected fortnightly or a 240 litre co-mingled system collected fortnightly.[33] Green waste collection is also included in these systems. The Committee was advised that Victoria leads Australia in the development of best practice kerbside recycling services.[34] Approximately half of Victorian receive best practice systems.[35] These systems have a diversion (from landfill) rate of 31 to 35 per cent, compared to 25 to 29 per cent for other systems. However, best practice systems cost about $10 more per household than other systems.

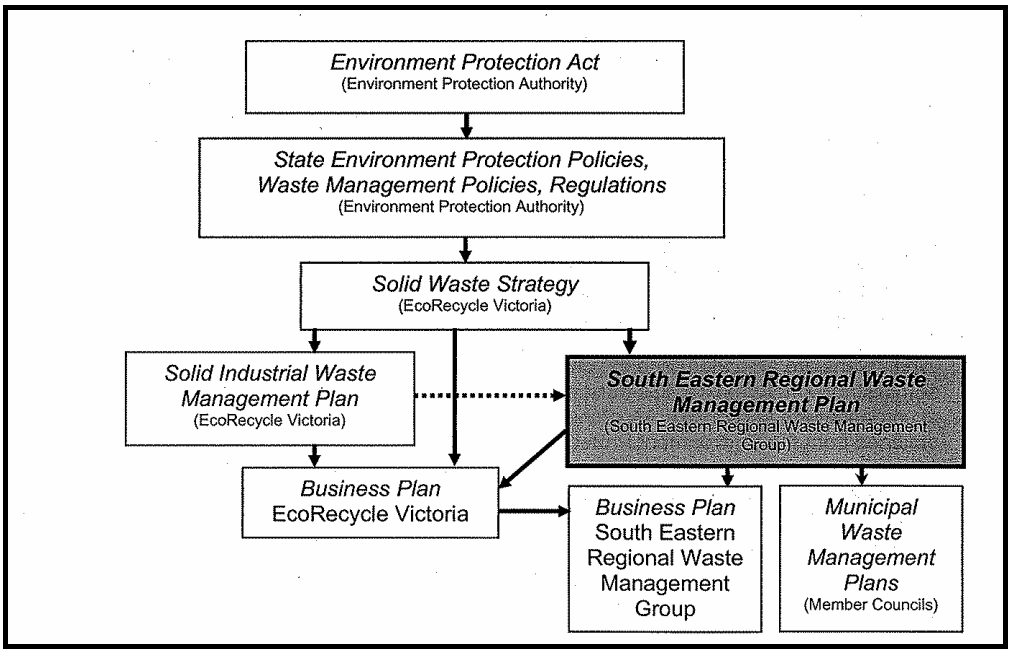
## Regional Waste Management Groups

As outlined in chapter 4 there are 16 Regional Waste Management Groups in Victoria (RWMGs). RWMGs are public authorities responsible to the Minister for Environment[36] and typically cover a cluster of about 4-10 local government areas. Regional Waste Management Groups are responsible for regional planning municipal waste including infrastructure. While the state agency, EcoRecycle, is responsible for commercial and industrial waste planning. The focus of RWMGs is on planning rather than the operation of waste management facilities such as landfills. The RWMGs also share the responsibility for implementing programs in alignment with EcoRecycle's business plans and giving effect to state-wide strategies.[37]

[30] Ibid, p. 15
[31] Ibid, p 17
[32] Ibid, p. 17
[33] Source: www.ecorecycle.vic.gov.au/www/print.asp?casID=2594, accessed March 2005
[34] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 14
[35] Ibid, p. 16
[36] Towards Zero Waste Working Party, 2005, Report of Findings, p. 41
[37] South East Regional Waste Management Group, 2004, Regional Waste Management Plan 2004-09, p. 12

Each RWMG is required, under the *Environment Protection Act* 1970 to produce a regional waste management plan to coordinate and facilitate the waste management activities of its member councils.[38] Regional waste management plans are implemented through annual business planning. Regional plans are part of an integrated framework of policies and strategies including state environment protection policies, the state Solid Waste Strategy, the Solid Industrial Waste Management Plan and individual council waste management plans. Figure 17 shows the relationship of regional waste management plans within the framework of Victorian environmental policy and state waste management planning.

## Figure 17: Framework of Victorian Environmental Policy and State Waste Management Planning




Source: South Eastern Regional Waste Management Group, 2004, Draft Regional Waste Management Plan 2004/2009, p. 13

RWMGs are responsible for coordinating the waste management activities of their member councils and ensuring conformity of standards for waste management across the region. RWMGs also have a role in training staff involved in municipal waste management and undertaking research into waste management. A recent Towards Zero Waste Working Party report recommends merging five metropolitan RWMGs into a single metropolitan waste management group.

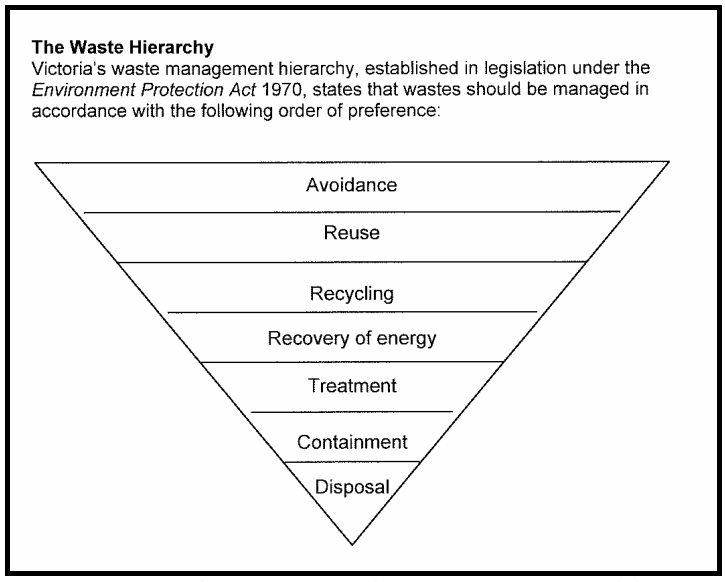
Waste education has been a major focus of the activities of both EcoRecycle and the Regional Waste Management Groups. EcoRecycle has developed extensive education and behavioural change resources to

[38] Ibid, p. 12

assist the community to apply the waste hierarchy, with a priority on avoidance and then re-use (Figure 18).[39]

Mr Ian Coles, CEO of EcoRecycle advised that approximately 25 per cent of the agency's budget is expended on the Waste Wise program, providing behavioural change programs to schools, communities, local government and businesses.[40] Waste Wise seeks to achieve long term behavioural change in consumption patterns, disposal and recycling behaviour, through a broad state-wide extension program.

### Figure 18: The Waste Hierarchy




Source: EcoRecycle, 2003, Towards Zero Waste: a materials efficiency strategy for Victoria, (draft) p. 2

## The *Towards Zero Waste* draft

In 2003 EcoRecycle released Towards Zero Waste: A Material Efficiency Strategy, Draft for Consultation. The strategy contains policy initiatives for the next 10 years aimed at minimising the amount of waste generated and maximising opportunities for re-using materials. The strategy is based on the waste hierarchy approach to resource management. The strategy has set a target to reduce the generation of waste by 15 per cent by 2013.[41]

The key priorities of the strategy that impact on household waste management include: [42]

[39] Source: www.ecorecycle.vic.gov.au/www/default.asp?casid=3143, accessed April 2005

[40] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 15

[41] EcoRecycle, 2003, Towards Zero Waste: A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 4; note this target represents a 15% reduction in the waste that would have been generated by 2013 if the economy grew at 3.5% per annum and no new waste management programs were introduced

[42] Ibid, pp. 14-23

- reducing solid waste;
- community engagement;
- implementing product stewardship;
- recovering solid waste;
- residual waste management; and
- reducing litter.

Municipal waste represents a relatively minor component of the materials recycled in Victoria (14 per cent), with the majority (approximately 75 per cent) coming from commercial and industrial sources and construction and demolition.[43] The reprocessing industry is well established in Victoria, with over 30 specific secondary-use materials recovered from the waste stream for conversion into new products.[44] The primary reprocessing industries in Victoria are smelters of aluminium and steel, crushing plants for concrete and other building materials, paper and cardboard pulp mills, composting, glass, rubber products and plastic conversion.

EcoRecycle has stated that the development and maintenance of effective markets for recycled materials is critical for sustainability and that recovery and recycling systems need to reflect demand rather than supply - without markets, additional collection and diversion of recyclable materials will achieve little.[45] However, the Committee found that markets for organic waste are immature.[46]

EcoRecycle has promoted the development of markets for recycled or recovered materials through a program of market development grants.[47] For example, the EcoRecycle web site provides case studies of 18 products (manufactured with recycled materials such as plastics, green waste and rubber) developed with support of the market development grants program.[48]

The development of markets for recycled materials is a priority in the draft *Towards Zero Waste* strategy[49] and EcoRecycle's Business Plan (2004-05

[43] EcoRecycle, 2004, Annual Survey of Victorian Recycling Industries 2002-2003, p. ii

[44] Ibid, p. 1

[45] Public Accounts and Estimates Committee, Report on the Review of the Auditor General's Performance Audit Report no. 65- Reducing landfill: waste management by municipal councils, p.67

[46] Mr J Nolan, President, Victorian Branch, Waste Management Association of Australia, transcript of evidence, 23 August 2004, p. 206; Public Accounts and Estimates Committee, Report on the review of the Auditor General's performance audit report no. 65 - Reducing landfill: Waste Management by Municipal Councils, p.65

[47] EcoRecycle, 2003, Towards Zero Waste: A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 19

[48] Source: www.ecorecycle.vic.gov.au/www/print.asp?casID=2957, accessed May 2005

[49] EcoRecycle, 2003, Towards Zero Waste: A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 19

– 2006-07) states that it will continue to investigate and trial the potential to expand the range of materials used in recycled products.[50] Objectives outlined in EcoRecycle's three year business plan (2004 – 2007) include the establishment of a sustainable organics industry in the Melbourne metropolitan area and a market analysis and development program for organics, office paper and some plastics.[51]

## European Union

In contrast there are multiple directives that provide the framework for the management of household waste in the European Union, as set out in Figure 19.[52]

The directives and policies of most relevance to the Inquiry address landfill, packaging waste and integrated product policy.

The Committee was advised that a target of 350 kilograms/person/year of household waste by 2000 was set as part of the fifth European Union Environmental Action Plan, but the target is now regarded as overambitious with waste currently being generated at 600 kilograms/person/year.[53] As in Australia, the volume of household waste is steadily increasing in EU-15 countries as illustrated in Figure 20, with landfill the most utilised method of disposal (Figure 21). However there are substantial differences between EU jurisdictions with the bulk of municipal waste being landfilled in Greece, Ireland, the United Kingdom and Italy and most waste in Denmark, Sweden, Luxembourg and the Netherlands being incinerated.[54]

[50] EcoRecycle, 2004, Towards Zero Waste, EcoRecycle Business Plan 2004–05 to 2006-2007, p. 18

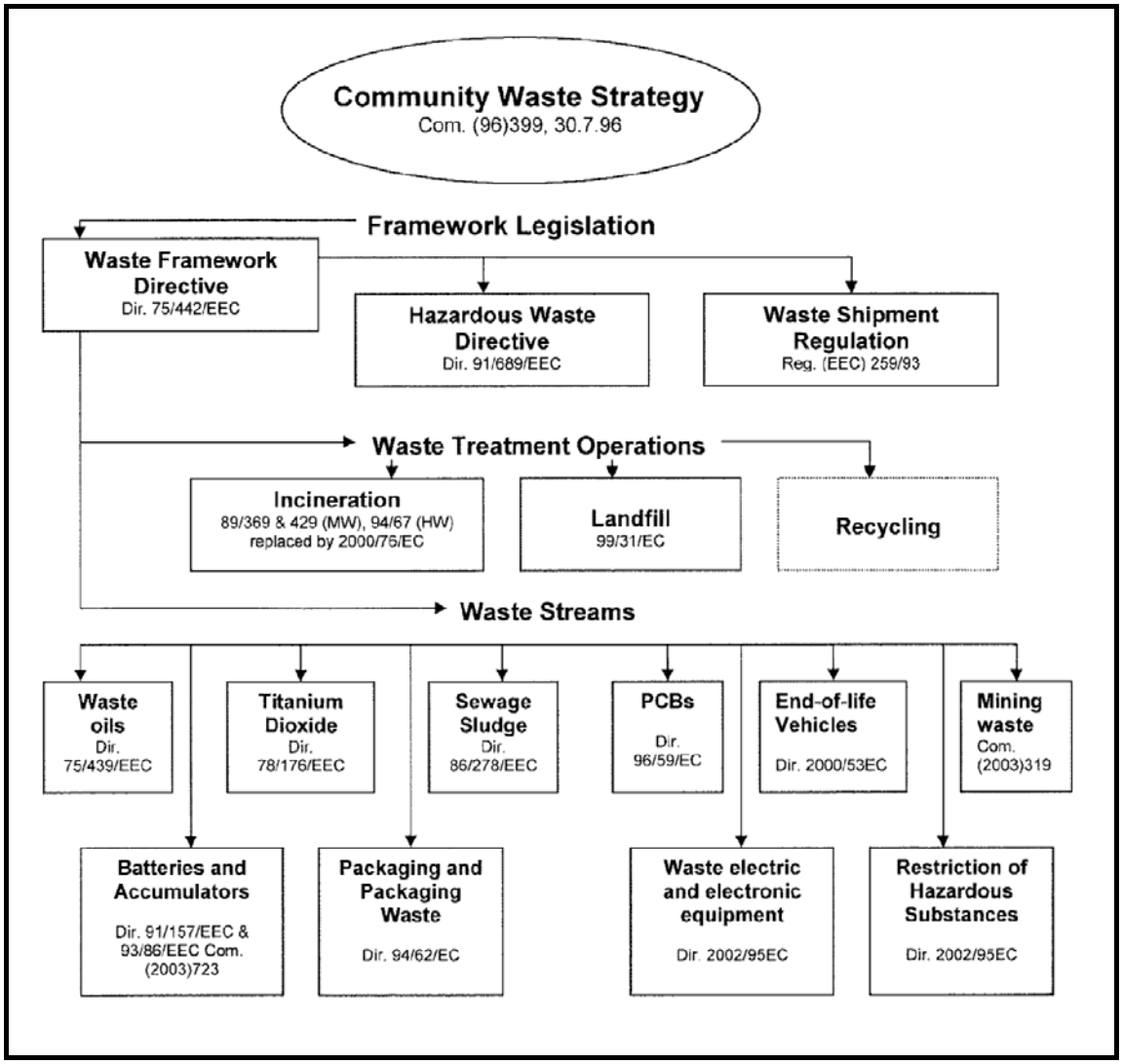
[51] Ibid, p. 19

[52] Mr P Speight, Administrator, Waste Prevention and Recycling Strategy, Environment Directorate-General, European Commission, meeting, Brussels, 10 February 2005

[53] Ibid

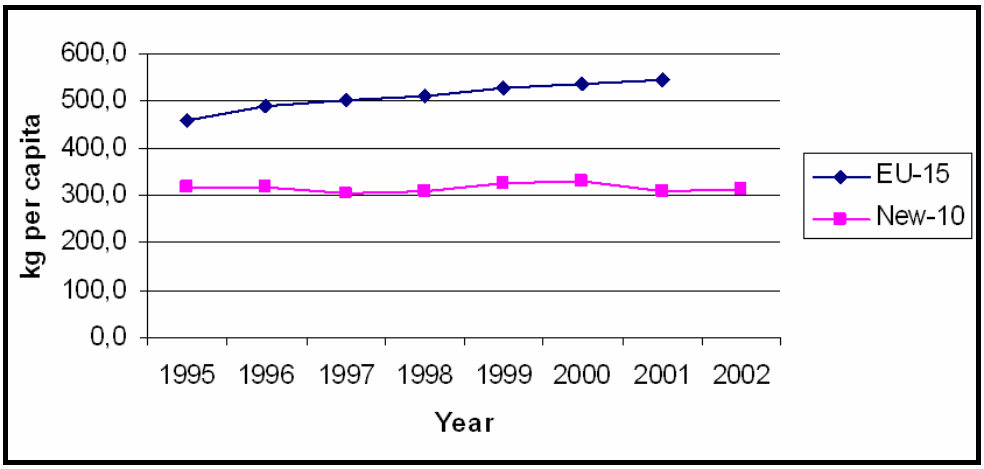
[54] Mr B Zambrzycki, Project Manager – Waste, European Environment Agency, meeting, Copenhagen, 1 February 2005

## Figure 19: European Union Waste Directives



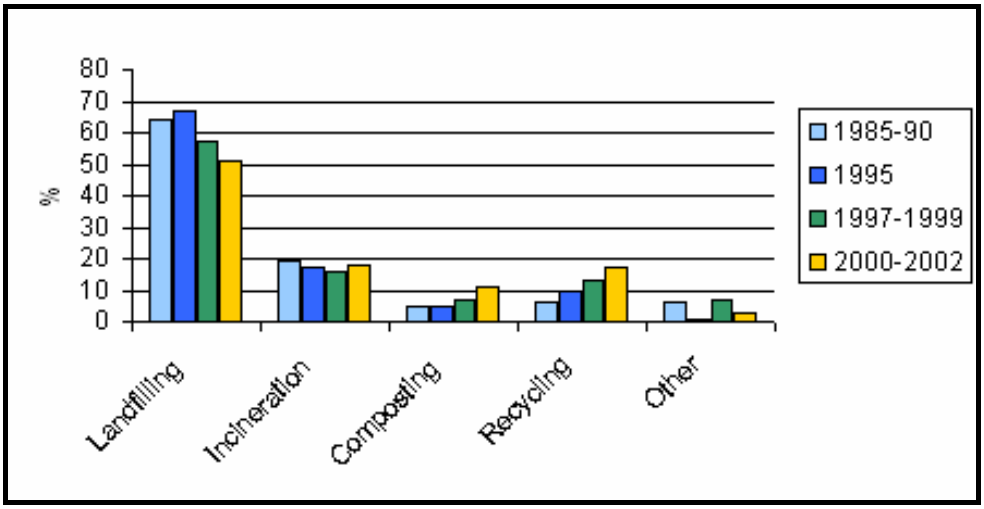

Source: Mr P Speight, Administrator, Waste Prevention and Recycling Strategy, Environment Directorate-General, European Commission, meeting, Brussels, 10 February 2005

## Figure 20: Municipal Waste Generation (collection) in EU-15 and New-10 Countries




Source: European Commission (EuroStat), 2003, Waste Generated and treated in Europe – Data 1990-2001

## Figure 21: Treatment of Municipal Waste in EU-15, 1985-2002




Source: European Commission (EuroStat), 2003, Waste Generated and treated in Europe – Data 1990-2001

## Trends in household waste generation and recovery

In Victoria, on average each household produces 886 kilograms of waste per year including garbage (540 kilograms), recyclables (211 kilograms), green waste (96 kilograms) and hard waste (39 kilograms).[55] As discussed in chapter 3, Australia is one of the highest producers of waste per capita in the OECD, ranking second only to the United States. The majority of waste

[55] Source: www.ecorecycle.vic.gov.au/www/print.asp?casID=3443, accessed May 2005

generated in Victoria comes from commerce and industry and the construction and demolition sector.[56]

The most recently available data for recycling in Victoria shows that the rate of diversion from landfill for domestic waste was 34 per cent in 2002-03.[57] Recovery rates for the commercial and industrial and construction and demolition sectors are higher than for the residential sector.[58]

From EcoRecycle's local government data, it is clear that a significant proportion of municipal waste sent to landfill could be recycled. Organic waste makes up 55 per cent of the total municipal waste stream.[59] In addition large quantities of potentially recyclable material such as paper, metals, plastic and glass still remain in the waste going to landfill, representing about 33 per cent of municipal waste to landfill.[60]

Over the last decade total waste generation in Victoria has grown in line with economic activity and population.[61] Figure 22 shows the rate of economic growth and solid waste generation in Victoria over the last decade. Over the past five years, however, the link between economic growth and waste generation has been weakened, with waste generation trending slightly downward.[62]

At the same time the recovery rate of materials is increasing. The overall recovery rate for all waste in Victoria (including municipal and industrial waste) has increased from 26 per cent in 1993 to 51 per cent in 2002-03.[63] This rapid growth in recycling has resulted in a stabilisation of the amount of waste going to landfill (see chapter 3, Figure 10). The major advances in solid waste recovery that have been made by the increased recycling activity since 1993 have been countered by the continued increase in overall waste generation[64] as the production and consumption of goods and services increases.[65] EcoRecycle points out that such a trend is not environmentally sustainable.[66] The *Australian State of The Environment Report* 2001 found that 'Australia's level of per capita material flows is very high by world standards and continues to grow rapidly'.

[56] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 14

[57] EcoRecycle, 2004, Local Government Data Collection 2002-2003, Waste Management Services – August 2004, p. 2

[58] Towards Zero Waste Working Party, 2005, Report of Findings, p. 2

[59] Mr J Nolan, President, Victorian Branch, Waste Management Association of Australia, transcript of evidence, 23 August 2004, p. 208

[60] EcoRecycle, 2003, Towards Zero Waste Appendix A: Supporting Analysis to the Plan, p. 5.

[61] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 14

[62] Source: www.ecorecycle.vic.gov.au/www/default.asp?casid=3442, accessed April 2005

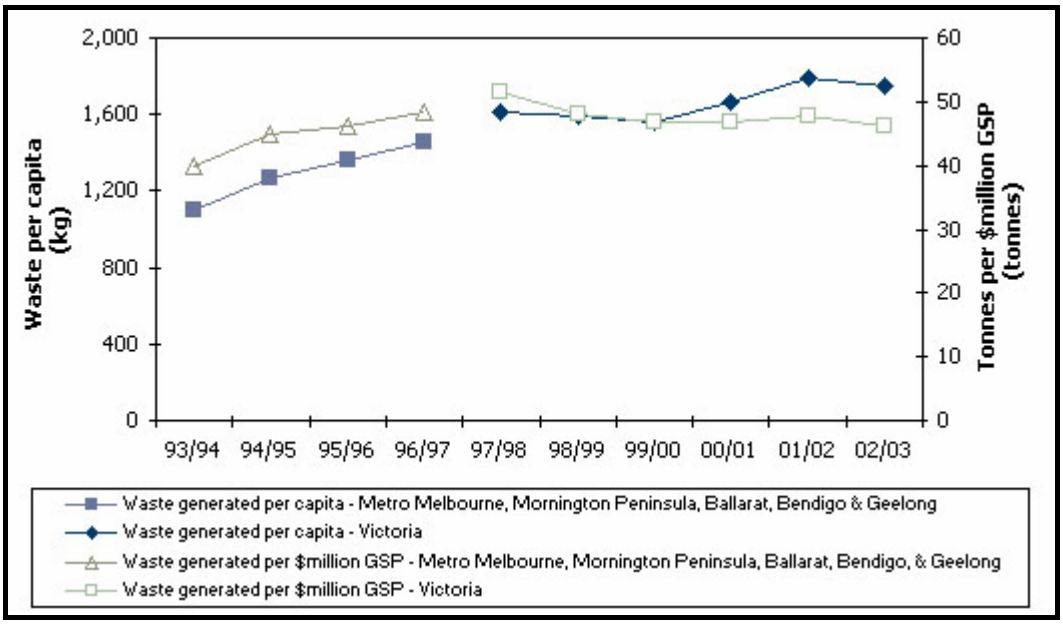
[63] Source: www.ecorecycle.vic.gov.au/www/default.asp?casid=3456, accessed April 2005

[64] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 14

[65] EcoRecycle Waste Generation Data at www.ecorecycle.vic.gov.au/www.default.asp?casid=3455, accessed April 2005

[66] Ibid

## Figure 22: Total Waste Generation Relative to Economic and Population Trends, Victoria 1993-94 to 2003-04




Source: EcoRecycle Waste Generation Data
www.ecorecycle.vic.gov.au/www/default.asp?casid=3442 accessed May 2005

Recycling rates of waste generated outside the home such as food and beverage containers is limited in Australia.[67] It has been estimated that 48 per cent of beverage containers are disposed of away from home, the majority of which are not recycled.[68] The Beverage Industry Environment Council (BIEC) states that recycling of aluminium and plastic containers outside the home is limited in Australia. The non-residential recovery of glass is more effective but contamination and lack of colour separation impacts on the market values of glass recovered from the non-residential sector. In its joint action plan for the National Packaging Covenant, the BIEC highlights a lack of interest in recycling and litter abatement among commercial operators of venues and a poor understanding of recycling systems in the hospitality industry. The BIEC is developing programs to improve recovery rates in this sector.[69]

The Committee received evidence from a number of witnesses that, until recently, efforts to manage waste in Australia have focussed largely on managing the problem once waste has already been generated by increasing the efficiency of existing collection systems and developing new treatment technologies rather than focussing on waste avoidance. Mr Ian Coles, CEO of EcoRecycle Victoria told the Committee:

[67] Institute for Sustainable Futures, 2005, Beyond Recycling: An Integrated Waste Management Framework for local Government, Part B: Recycling in context the current situation, University of Technology Sydney, p. 9

[68] Ibid, p. 11

[69] Beverage Industry Environment Council, 2003, Joint Action Plan for the National Packaging Covenant, p. 10

> The focus that we have had on the household is to improve the recycling systems so that we are getting the paper, the containers, out of the waste stream into the recycling stream where they can be converted, re-used and recycled, and I think we have done a very good job there. The big and most difficult challenge is how we can get householders producing less waste in the first place. There is no simple solution[70]

The Australian Conservation Foundation advised that when individuals consume, they are unaware of the broader impact of that consumption.[71] As noted in chapter 3, there is a trend towards increased packaging waste in the household waste stream, linked to both an increased need for packaging to protect goods and changing lifestyles.

At the household level waste minimisation involves behavioural change. According to EcoRecycle, household waste reduction can be achieved through changing consumption and behaviour patterns. The following behaviours are highlighted by EcoRecycle and other organisations promoting sustainable consumption:[72]

- purchasing products in bulk and storing food in reusable containers to reduce packaging waste;
- avoiding highly packaged items and purchasing recycled and recyclable items;
- reusing and repairing household items rather than disposing and avoiding disposable products;
- reducing consumption of unnecessary consumer items;
- sourcing good quality second hand items or items that are long lasting;
- becoming a “best practice recycler” by recycling as much as possible through kerbside recycling, becoming aware of what items can be recycled, avoiding contamination of recyclable items and purchasing recycled products;
- home composting; and
- reducing garden waste through the selection of plants requiring less pruning and produce less green waste, for example by avoiding deciduous plants.

[70] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 17

[71] Ms S Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 647

[72] Source: www.ecorecycle.vic.gov.au/www/default.asp?casid=3143, accessed April 2005; Australian Conservation Foundation, Protecting the Environment Starts with You, p. 3; Ha, T, 2003, Greeniology, How to Live Well, Be Green and Make a Difference, Allen and Unwin

Two recent surveys provide an insight into the level of community acceptance of waste avoidance. EcoRecycle 2001 survey of community attitudes found that 92 per cent of respondents to the survey consider that it is important to cut down the amount of waste that goes to rubbish.[73] However, the survey also indicates that very few households are reducing their material consumption. The proportion of households that claim to be consciously reducing the amount of materials coming into the home declined from 22 per cent in 1998 to 5 per cent in 2001.[74] In 2001, 16 per cent of households were buying goods with less packaging.

A more recent national survey (November 2004) undertaken by the Australia Institute reflects the Victorian findings. The survey sought to assess the extent of behaviour that can be defined as wasteful consumption[75] together with its prevalence among households and individuals and their attitudes to waste. The study concluded that there is a disjunction between how people feel and think about wasteful consumption and how they actually behave.[76] While a majority of those surveyed believed that they do not buy things they do not use, the data also indicated that on average Australian households waste $1,226 per annum on items purchased but unused.[77] Food accounts for the most wasteful consumption, with an estimated $5.3 billion of food thrown away by Australian households in 2004.[78]

The contradiction between community attitudes to waste avoidance and the actual consumption behaviours and waste generation exhibited by households was highlighted to the Committee. The Committee found there are several key barriers to reducing household waste generation and increasing the recovery of recyclable materials from the waste stream. These barriers and opportunities to reduce household waste are discussed in the remainder of this chapter.

## Barriers to and opportunities for improving recovery rates and waste prevention

As discussed above, a key theme throughout the Inquiry was a need to shift the focus of waste management from managing waste once it has been generated, to prevention. The barriers to making this fundamental shift and the opportunities to overcome these barriers will be discussed in detail below. However, witnesses and submissions to the Inquiry also identified that increasing the capacity of waste management systems to recover resources and to add value to recovered products remains a critical component of sustainable waste management in Victoria.

[73] EcoRecycle, 2001, Community Attitudes Survey, March 2001, p. 5

[74] Ibid, p. 5

[75] Wasteful consumption was defined as the amount of money spent on goods and services that are never or rarely used

[76] Hamilton, C, Denniss, R and Baker, D, 2005, Wasteful Consumption in Australia, the Australia Institute Discussion Paper No. 77, p. ix

[77] Ibid, p. vii

[78] Ibid, p. vii

Increasing the recovery rate of recyclable materials is a key element of the draft *Towards Zero Waste* strategy and the Committee notes that the strategy contains ambitious targets for waste recovery by 2013. The strategy has also set 10-year targets to recover 65 per cent of municipal waste (the current rate is 34 per cent); 80 per cent of commercial and industrial waste (the current rate is 59 per cent) and 80 per cent of construction and demolition waste (the current rate is 57 per cent). Overall, the state's target is a recovery rate in all solid waste generated of 75 per cent by 2013.[79]

The interim target for the recovery of household or municipal waste is 45 per cent (the current rate is 34 per cent) by 2008. Mr John Nolan, President of the Victorian Branch of the Waste Management Association of Australia advised the Committee that the organic waste component of the municipal waste stream represents a major barrier to achieving these targets. In addition recovery rates from the municipal solid waste stream for plastics, metals, paper and glass products are relatively low.[80]

The Committee received evidence that a combination of factors prevented further improvements to recovery rates in the residential sector. These barriers include:

- lack of information and lack of understanding within the community of what can be recycled and what happens to recycling once it leaves the kerbside;[81]
- lack of a uniform recycling service throughout the state;
- the low cost of landfill and lack of financial incentives to reduce waste disposal;
- lack of markets for some recyclable materials, particularly green waste and food waste;
- lack of infrastructure to process some recyclable materials; and
- poor recovery rates of recyclables disposed of 'away from home'.[82]

## Waste avoidance and resource conservation

The Committee received evidence that there is an emerging awareness among local and state government agencies that a life cycle approach to

[79] EcoRecycle, 2003, Towards Zero Waste: A Material Efficiency Strategy for Victoria, Draft for Consultation, p. 4

[80] Ibid, p. 5

[81] Ms R Angus, Regional Educational Officer, Highlands Regional Waste Management Group, transcript of evidence, 28 September 2004, p. 309

[82] Ms S Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 649

waste management and recycling is required to address unsustainable production and consumption patterns.

**Glossary**

extended producer responsibility - an environmental policy approach where a producer's responsibility for a product is extended to the post consumer stage of a product's life

product stewardship – a principle that directs all participants involved in the lifecycle of a product to take shared responsibility for the environmental impacts that result from the production, use and end-of-life management of the product[83]

ecodesign – the process of designing products and product-systems in order to minimise environmental impacts over the total lifecycle[84]

lifecycle approach/analysis – determine the environmental impacts of products, processes or services, through production, usage and disposal[85]

Mr Nolan explained that life cycle analysis (LCA) enables the costs and benefits of waste and resource management options to be determined over the whole life of a product. An LCA collates the net environmental impact and benefits of producing and disposing of a product and its packaging along the full production and consumption cycle. For example, in the case of producing glass containers, an LCA estimates the environmental cost of using virgin materials (i.e. sand) for glass production and consumption compared with the use of recycled glass. The analysis considers the loss of amenity from sand mining, the energy and water consumption involved in production, emissions associated with production and the impacts of transport of materials and the impact of disposal to landfill.[86]

Australia lags behind Europe where the life cycle approach has been commonplace for at least a decade. The high recycling rates and low waste generation rates in some European countries have been attributed to the use of regulated recycling and packaging measures and economic instruments (such as the 1994 European Commission Directive on Packaging and Packaging Waste).[87] The European Commission released a green paper on integrated product policy (IPP) in 2001. The EC defines IPP as:

[83] Source: www.productstewardship.us/whatisproductstewardship.html accessed May 2005

[84] Source: www.cfd.rmit.edu.au/content/view/full/229 accessed May 2005

[85] Source: www.gdrc.org/uem/lca/lca-define.html accessed May 2005

[86] Mr J Nolan, President, Victorian Branch, Waste Management Association of Australia, transcript of evidence, 23 August 2005, p. 205

[87] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 15; Institute for Sustainable Futures, 2005, Beyond Recycling: An Integrated Waste Management Framework for Local Government, Part A: Developing an integrated waste management strategy and empowering the community, University of Technology Sydney, p. 2

> … an approach which seeks to reduce the life cycle environmental impacts of products from the mining of raw materials to production, distribution, use and waste management. The driving idea is that integration of environmental impacts at each stage of the life cycle of the product is essential and should be reflected in [the] decisions of stakeholders.
>
> IPP focuses on those decision points which strongly influence the life cycle environmental impacts of products and which offer potential for improvement, notably [the] eco-design of products, informed consumer choice, the polluter pays principle in product prices. It also promotes instruments and tools which target the whole life cycle of products.[88]

The paper was designed to stimulate debate on the issue and further action the EU might take to promote IPP. A general strategy on the main policy instruments that can be used to promote IPP and proposed actions are set out in Annex III of the paper. The instruments include economic instruments such as pricing; increased producer responsibility; ecolabelling public procurement, improved information on the life cycle of products and the development of ecodesign guidelines.

The Committee was advised that despite the importance of the green paper, action on its implementation has stalled and the outcomes of the process remain unclear.[89] The EU has conducted extensive consultations on IPP but is now looking at highly specific examples of products IPP can be applied to, such as wooden garden furniture and mobile phones.[90] The EU has made a commitment to identify the first set of products with greatest potential for environmental improvement and plans to take action to tackle these products in 2007.[91]

Directives have also been developed to address waste from specific product classes such as electric and electronic equipment and motor vehicles. The European Union describes the directive on electric and electronic equipment as follows:

> Directives 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment and 2002/96/EC on waste electrical and electronic equipment are designed to tackle the fast increasing waste stream of electrical and electronic equipment and complements European Union measures on landfill and incineration of waste. Increased recycling of electrical and electronic equipment will limit the total quantity of waste going to final disposal. Producers will be responsible for taking back and recycling electrical and electronic equipment. This will provide incentives to design electrical and electronic equipment in an environmentally more efficient way, which takes waste management aspects fully into account. Consumers will be able to return their equipment free of charge. In order to prevent the generation of hazardous waste, Directive 2002/95/EC requires the substitution of various heavy metals (lead, mercury, cadmium, and hexavalent

[88] Commission of the European Communities, 2001, Green Paper on Integrated Product Policy, p. 5

[89] Mr J Hannequart, Director General, Brussels Institute for Management of the Environment, Brussels, meeting, 11 February 2005

[90] Ibid

[91] European Commission, 2004, Sustainable Production and Consumption in the European Union, p. 12

> chromium) and brominated flame retardants … in new electrical and electronic equipment put on the market from 1 July 2006.[92]

Eight to nine million tonnes of waste is generated from end-of-life vehicles in the EU every year. The directive on end-of-life vehicles promotes the prevention of waste through the design and production of vehicles as first priority followed by re-use, recycling and other forms of recovery. Producers are responsible from meeting all or a significant part of the costs of implementing the directive. By January 2006, for all end-of-life vehicles, Member States must ensure that re-use and recovery is a minimum of 85 per cent by average weight per vehicle per year (the re-use and recycling target is 80 per cent). The target increases to 95 per cent re-use and recovery by 2015.

The Committee was advised that the EU is taking an increasingly conservative approach to waste management with the new leadership focussed on economic growth and decoupling. A white paper is currently being developed on the future direction of waste management in the EU. Member States are required to develop national waste plans by June 2005 that set out their own targets and actions. The Brussels Institute for Management of the Environment stated that there is debate about whether national prevention targets, arrangements for information exchange and waste prevention plans should be voluntary or mandatory.[93] There is also ongoing discussion about the relationship between the different EU instruments on waste and whether guidelines on waste prevention are needed for individual sectors (i.e. petrochemical sector). The EU appears to be in favour of a sectoral approach.

The Committee received evidence that achieving the targets set out in the draft *Towards Zero Waste* strategy will be challenging and will require new technologies and infrastructure to increase recovery from the waste stream.[94] *Towards Zero Waste* states that the focus of waste management in Victoria will shift towards engaging the community and business in waste avoidance. The emphasis will be on the establishment of voluntary agreements to encourage product stewardship. *Towards Zero Waste* states:

> There is a global trend towards requiring businesses to take greater responsibility for their products throughout their whole life cycle, from design through to production, consumption and ultimate disposal. This is product stewardship, a concept established in Victorian law, and already being implemented nationally for products such as mobile phones, lubricant oils and consumer packaging.[95]

While *Towards Zero Waste* recognises the importance of product stewardship and ecodesign and lists priority materials for product

[92] Source: http://europa.eu.int/comm/environment/waste/weee_index.htm, accessed May 2005

[93] Mr J Hannequart, Director General, Brussels Institute for Management of the Environment, meeting, Brussels, 11 February 2005

[94] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 15

[95] EcoRecycle, 2003,Towards Zero Waste: A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 16

stewardship, its major focus remains on recovery and recycling of materials once they have entered the waste stream. While *Towards Zero Waste* identifies priority materials it does not set specific targets for product stewardship.

Ms Helen Lewis, Director, RMIT Centre for Design, pointed out to the Committee that in relation to reducing packaging waste:

> A lot of the work we do on packaging is how do we change consumers, or should we change consumers; should it be something that industry does so that all packaging is sustainable … if people are provided with the options and it becomes the normal thing they will do it. That is a combination of education and manufacturers making products available.[96]

EcoRecycle has made a three year commitment to the Design for Environment Program that focuses on industrial packaging and encourage the inclusion of environmental criteria in product design. This program has also resulted in the development of *Design for Environment and Product Innovation Guidelines* to assist product developers to minimise a product's environmental impact.[97] The EPA is involved with a number of projects that encourage greener production but at this stage the actual redesign of products and how they can be used has been limited.

The challenge with such initiatives is to get the private sector to participate and the take up rate has been slow.[98] Many of the projects are small scale, which means that a focus on product design largely remains a niche approach.

Ecodesign is not well established in the tertiary education sector. Some universities in Victoria such as Swinburne have started to teach ecodesign, however RMIT is the only university in Victoria involved in ecodesign research and consulting.

Without the products, processes and infrastructure to support recovery of materials the ability to shift consumer behaviour remains limited. Extended producer responsibility schemes can be categorised into one of four groupings:

- take back;
- specific economic instruments such as deposit/refund schemes;
- broader economic instruments such as advanced disposal fees; and

[96] Ms H Lewis, Director, Centre for Design, RMIT, transcript of evidence, 6 July 2004, p. 82
[97] Source: www.ecorecycle.vic.gov.au/www/default.asp?casid=3917, accessed May 2005
[98] Personal communication, Ms H Lewis, Director, Centre for Design, RMIT, 3 May 2005

- performance standards such as recycled content requirements.[99]

As discussed in chapter 4, the National Packaging Covenant (NPC) is Australia's leading instrument to develop product stewardship or extended producer responsibility. The covenant is a voluntary agreement, established in 1999, between the packaging industry and the federal and some state governments to reduce packaging waste. The NPC has been extensively reviewed throughout 2004 and it has been widely concluded that in its five years of operation, the NPC has not been demonstrably effective in reducing packaging waste.[100]

The covenant has been revised in response to these findings and a general agreement by all stakeholders that the model needed to be significantly strengthened if it is to continue.[101] The National Packaging Covenant Council has released a draft proposal.[102] This draft proposal reflects the Covenant Council's recommendations for actions and changes to strengthen the covenant taking into account the findings of the recent reviews of the covenant and input from the nationwide consultation process.[103]

The failure of Mark 1 of the National Packaging Covenant (1999–2005) perhaps illustrates the fact that the emphasis in waste management in Australia has been on recycling and recovery rather than waste avoidance. For example, despite the establishment of a recycling program for mobile phones in 2000, only 2 per cent of mobile phones are currently being recycled.[104]

The National Packaging Covenant does not refer to extended producer responsibility, but focuses on product stewardship. The NPC document states that the scope of the covenant has been broadened to include a requirement for 'specific actions and quantifiable targets in relation to key performance indicators' in the action plans of organisations that sign the NPC. [105] According to the NPC document signatories will 'take action as appropriate' including: designing packaging to optimise waste minimisation and secondary market creation; production of packaging to minimise the amount of material essential to guarantee product quality and safety; product distribution; disposal and recycling or re-use; research aimed at

[99] West, D and Hogarth, M, 2005, Extended Producer Opportunity, Making EPR and Zero Waste Work for Business and Society, p. 2

[100] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 19; Institute for Sustainable Futures, 2005, Beyond Recycling an Integrated Waste Management Framework for local Government, Part A: Developing an Integrated Waste Management Strategy and Empowering the Community, University of Technology Sydney, p. 3

[101] Source: www.deh.gov.au/industry/waste/covenant/index.html

[102] National Packaging Covenant Council, 2005, The National Packaging Covenant: A commitment to the sustainable manufacture, use and recovery of packaging, 1 May to 2005 to 30 June 2010, p. 2

[103] Source: www.deh.gov.au/industry/waste/covenant/index.html

[104] Thwaites, J (Minster for the Environment), 2005, 'Victoria Calls for Mobile Phone Recycling Deal', media release, 14 April

[105] National Packaging Covenant Council, 2005, The National Packaging Covenant 1 May 2005 to 30 June 2010, p. 11

identifying new uses and markets for materials and reducing the amount of packaging required and providing accurate consumer labelling.[106]

While the NPC addresses these issues and includes generic key performance indicators, it does not contain any clear targets for the reduction of individual materials or goals for individual industries. This has been the major criticism of the NPC from its inception. It is instructive to note that the Victorian Minister for Environment, Hon. John Thwaites, recently stated that, 'industry must adopt clear and measurable targets to drive further reductions in the amount of packaging going to landfill… if these targets aren't met we would have to consider measures such as a container deposit legislation or other measures to drive further recycling'.[107]

Industry advised the Committee that it would prefer the voluntary rather than regulatory approach to continue.[108] Mr John Nolan told the Committee:

> We are coming from a long way behind in that we have really only started to implement effective product stewardship programs, probably in the last two to three years.[109]

In relation to the National Packaging Covenant and producer responsibility for manufactured goods, Mr Ian Coles of EcoRecycle advised:

> The focus … in the five years has been more on getting people signed up and involved rather than … delivery of outcomes. I think that is where we have to ensure that we have got the right sort of balance of cooperation and regulation, if you like, to ensure that the commitments are actually delivered.[110]

The waste hierarchy was legislated for in 1970 in Victoria however it has not been implemented. The focus in Victoria today still remains on waste recycling and landfill rather than waste prevention. Given the substantive developments overseas in waste management, the Committee recommends that:

**Recommendation 7.2**

**Sustainability Victoria and the Environment Protection Authority, in cooperation with industry, develop an integrated product policy by 2007 to reverse the upward trend in waste production.**

[106] Ibid, pp. 14-15

[107] Thwaites, J (Minster for the Environment), 2005, 'Victoria Seeks Strong Waste Targets', media release, April 14

[108] Mr J Nolan, President, Victorian Branch, Waste Management Association of Australia, transcript of evidence 23 August 2004, p. 210 and Ms M McCaskill, Chief Executive Officer, Beverage Industry Environment Council, meeting, 26 October 2004, p. 489

[109] Mr J Nolan, President, Victorian Branch, Waste Management Association of Australia, transcript of evidence, 23 August 2004, pp. 210-211

[110] Mr I Coles, Chief Executive Officer, EcoRecycle, transcript of evidence 5 July 2004, p. 19

**Recommendation 7.3**

**The Victorian Government promote a national approach to integrated product policy through the Environment Protection and Heritage Council.**

## Packaging and packaging waste

Measures to manage packaging waste were first introduced by the European Union in the 1980s. Since then, several amendments have been made to address internal market problems that arose as a result of cheap secondary materials from countries with recycling schemes appearing on the markets of other Member States, where no such schemes were in place.[111] The current directive aims to harmonise national measures in order to prevent or reduce the impact of packaging and packaging waste on the environment and to ensure the functioning of the internal market.[112] It contains provisions on the prevention of packaging waste, the re-use of packaging and on the recovery and recycling of packaging waste. The directive covers all packaging placed on the market in the EU and all packaging waste, whether it is used or released at industrial, commercial, office, shop, service, household or any other level, regardless of the material used.[113] The targets for 2004-2008 are as follows:

- by December 2008, 60% as a minimum by weight of packaging waste will be *recovered* or incinerated at waste incineration plants with energy recovery (article 6(1)(b));
- by December 2008 between 55% and 80% by weight of packaging waste will be *recycled* (article 6(1)(d));
- by December 2008 the following minimum *recycling* targets for materials contained in packaging waste will be attained:
  - (i) 60% by weight for glass;
  - (ii) 60% by weight for paper and board;
  - (iii) 50% by weight for metals;
  - (iv) 22.5% by weight for plastics, counting exclusively material that is recycled back into plastics; and
  - (v) 15% by weight for wood.

The Victorian *Towards Zero Waste* strategy does not contain differentiated recycling targets. The Committee believes that the targets in the draft *Towards Zero Waste* strategy need to cover specific waste fractions.

[111] Source: http://europa.eu.int/comm/environment/waste/packaging_index.htm, accessed May 2005
[112] Ibid
[113] Source: http://europa.eu.int/scadplus/leg/en/lvb/121207.htm, accessed 2 May 2005

Currently the European Union is recognised as having world's best practice waste management systems. Accordingly, the Committee recommends that:

**Recommendation 7.4**

**The *Towards Zero Waste* strategy contain specific targets, based on European Union targets, on the various fractions of the waste stream including glass, paper and cardboard, metals, plastics, wood, food and other biodegradable material.**

Fostplus is a private body accredited by the Belgian Regions that is responsible for promoting, coordinating and financing the selective collection, sorting and recycling of household packaging waste. The Committee was advised by Fostplus, that Belgium has the highest rate of packaging waste recovery (89 per cent in 2003) and recycling (86 re cent in 2003) in Europe.[114] The recovery system costs around 6 euros per person per year after material sales.

The Committee was interested in the difference between the Belgian and German packaging management frameworks which encountered significant difficulties. Mr Meiresonne, CEO of Fostplus advised that Belgium has been more selective about the waste fractions (types of waste) it collects.[115] The Belgian system focuses on paper/cardboard, glass and light weight plastic fractions rather than collecting all plastics. The costs of the German system are several times more than those in Belgium because of large overhead costs in Germany, the geographical coverage is too wide extending to isolated regions and some poor contracts have been signed with operators. The German Federal Environment Agency advised the Committee that it is currently investigating a system whereby household waste is collected unsorted and then separated at a waste treatment plant.[116] Currently 40 per cent of waste collected for recycling cannot be recycled which constitutes a significant proportion of contamination. The Committee was unable to determine the contamination rate of recycling collections in Victoria from the available data. The German government has a policy of phasing out all municipal waste to landfill by 2020.

As noted earlier in this chapter, Australia is addressing the need to prevent waste generation at the source through the National Packaging Covenant (NPC). The covenant has been revised following an extensive review process which concluded that it had not been effective. The Committee understands that the various state governments are currently considering their responses to the revised covenant.[117]

[114] Mr H Meiresonne, CEO, Fostplus, meeting, Brussels, 10 February 2005

[115] Ibid

[116] Mr H Keßler, Head, Hazardous Waste Management, German Federal Environment Agency, Berlin, meeting, 2 February 2005

[117] Personal communication, Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, 28 April 2005

Key criticisms of mark 1 of the NPC included:[118]

- lack of clear measurable waste reduction targets for industry;
- lack of performance indicators making it difficult for industry signatories to demonstrate compliance with the covenant; and
- lack of adequate mechanisms or strategies to increase recovery of waste disposed of 'away from home'.

The Australian Local Government Association has outlined its concerns with the former NPC and the revised covenant:[119]

- the packaging industry is not required to take responsibility for the waste it produces;
- the covenant does not commit industry to paying a fair price for recyclables, requiring only payment of market prices; and
- the covenant is totally reliant on kerbside collection as the means of recycling and fails to explore other means of recovery such as industry run collections, and container deposit legislation.

The revised National Packaging Covenant includes performance goals and key performance indicators for individual signatories (packaging industry, local and state government) that will be used to analyse and report on the effectiveness of the covenant. However, the covenant still lacks specific targets such as an overarching goal for recovery of packaging materials. Furthermore there are no specific targets for:

- the reduction of recyclable packaging material consigned to landfill;
- increasing recycling rates for individual materials (such as plastics or aluminium);
- increasing recycled content for packaging; or
- the reduction of packaging litter.[120]

The Committee is concerned that the NPC has no specific targets for waste reduction. The Committee believes that to progress extended producer responsibility in Australia the National Packaging Covenant should be strengthened. The covenant should set compulsory waste reduction targets

[118] Institute for Sustainable Futures, 2004, Review of the National Packaging Covenant, University of Technology, Sydney, pp. iv-v

[119] Bell, P, 2005, More work needed before local government can back a new packaging covenant, Australian Local Government Association

[120] National Packaging Covenant Council, 2005, The National Packaging Covenant, 1 May 2005 – 30 June 2010, pp. 26-33

for individual industries and the phase out of non-recyclable materials such as plastics labelled with codes 4-7.[121]

Furthermore, the Committee believes that a sound extended producer responsibility scheme for packaging waste would provide a model for other consumer products such as electrical goods.

Accordingly it recommends that:

**Recommendation 7.5**

**The Victorian Government, through the Environment Protection and Heritage Council, take a lead role in developing targets for the National Packaging Covenant including:**

**a) a national target for the reduction of packaging waste within a defined timeline;**

**b) targets for individual waste fractions which include a reduction in packaging waste to landfill, an increase in the recycled content of products, an increase in the quantity of materials recovered and a reduction in the amount of material used in packaging; and**

**c) targets for phasing out non-recyclable materials.**

## Economic incentives to organic waste

Throughout the Inquiry the Committee received evidence that the lack of mature markets for many recycled products is a major impediment to increasing the rate of recycling and waste avoidance. In particular, diverting organic waste from landfill remains problematic. Mr John Nolan told the Committee:

> If we are going to reach the EcoRecycle Victoria vision of [recovering] at least 65 per cent or 70 per cent of the domestic waste stream, we are going to either have to pull the food waste out as well to meet that target, or alternatively treat the residual component to reduce the volume and create energy.[122]

The draft *Towards Zero Waste* strategy recognises that strong markets for recycled products are essential to drive diversion of waste from landfill and has identified priority materials for the development of markets. In terms of household waste, these priorities are green waste, food waste and paper

[121] To help identify different plastics, manufacturers stamp a Plastics Identification Code on their products. This code is a number inside a triangle with chasing arrows. These codes serve only to identify the product, not to indicate that the product can be recycled. The six most common plastics have the codes 1 to 6. Code 7 includes all other plastics. Source: www.gould.edu.au/wastewise/waste_stop/pdf/act_06.pdf, accessed May 2005

[122] Mr J Nolan, President, Victorian Branch, Waste Management Association of Australia, transcript of evidence, 23 August 2004, p. 208

and cardboard.[123] However the Committee was advised that because the markets for many recycled goods, such as compost produced from recycled waste, are not well developed, there is little economic incentive to divert this waste from landfill.

The Calder Regional Waste Management Group advised that the end product of recycling green waste and food waste is a soil additive or compost that cannot currently compete in the market with commercially available fertilisers.[124] Many witnesses advised the Committee that the low cost of landfill when compared to the cost of treating waste through alternative technology, remains a significant barrier to the further recovery of recyclable material.[125] Mr Nolan advised that currently waste disposal in landfill costs between $25 and $40 per tonne, while the cost of treating municipal waste through AWT and diverting it from landfill is $60 to $110 per tonne.[126]

In 2004, a report on recent developments in municipal waste management by the Victorian Parliamentary Public Accounts and Estimates Committee (PAEC) addressed the issue of market development for green and organic waste.[127] The report found that markets for green and organic waste were immature and that development of strong markets for this waste fraction would be instrumental in reducing the amount of green and organic waste going to landfill.[128]

The PAEC noted that EcoRecycle has a Garden Organics Marketing Program which aims to increase customer confidence, minimise risks involved in using recycled garden organics products and stimulate market growth. However the PAEC's report also noted that the recycled organics industry was at a crisis point; that commercial users remain wary of products from recycled garden waste; that current technology does not guarantee a stable, high quality product and that stockpiled low quality products are proving difficult to market.[129]

The PAEC recommended that EcoRecycle focus on developing markets for recycled organic products and increase its funding for the development of facilities and markets for green waste and improvements in the quality of green and organic products.[130] In its response to these recommendations the government noted that EcoRecycle will develop a strategic plan for the

[123] EcoRecycle, 2003, Towards Zero Waste, A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 20

[124] Mr P Chudek, Executive Officer, Calder Regional Waste Management Group, transcript of evidence, 27 July 2004, p. 143

[125] For example refer to Mr P Clingin, Executive Officer, Highlands Regional Waste Management Group, transcript of evidence, 28 September 2004, p. 313

[126] Mr J Nolan, Director Nolan ITU, transcript of evidence, 8 November 2004, p. 571

[127] Public Accounts and Estimates Committee, 2004, Review of the Auditor-General's Performance Audit Report No. 65 - Reducing landfill, p. 77

[128] Ibid, p.77

[129] Ibid, pp. 80-81

[130] Ibid. pp. 78-82

organics industry by the end of 2005 and that a new funding program ($9 million over 3 years) has been established to foster the development of new best practice organics/residual waste recycling program.[131]

Recent research in NSW indicates that there is considerable potential to develop markets for recycled organic products but most existing or emerging markets for these products are at a very early stage.[132] The largest existing market for recycled organics in Sydney is urban amenity, that is, products used for urban landscaping and the maintenance of parks, gardens and reserves. However, recent market analysis indicates that future growth in this area is limited.[133] A report by the Recycled Organics Unit (ROU), a partnership between Resource NSW and the University of NSW has identified that there is potential to greatly increase the demand for recycled organics in intensive agriculture, land rehabilitation and environmental remediation, biofuel production and extensive agriculture. However the ROU also points out that without market intervention, market penetration for recycled organic products will be slow. In the case of recycled green waste, it has been estimated that it could take up to 18 years before existing markets could use all the green waste material produced in the greater Sydney Region.[134]

The ROU notes that: 'the achievement of government objectives in relation to resource recovery requires a recycled organics industry supplying a wider range of markets on a viable basis with a meaningful time frame. This can be achieved via direct government participation in market development.'[135] The ROU further states that in attempting to accelerate market development, governments should take a strategic approach such that:[136]

- government programs prioritise markets that offer minimal risk of failure, offer maximum volume of demand creation per dollar investment, and offer high environmentally sustainable development value;

- opportunities are made equally available to all individual enterprises on a whole-of-industry basis;

- market opportunities are created such that their viability can be sustained. This requires market intervention to be grounded in technical research, including a focus on performance based product standards; and

[131] Government Response to Public Accounts and Estimates Committee, Review of the Auditor-General's Performance Audit Report no. 65- Reducing Landfill, pp. 5-6

[132] Recycled Organics Unit, 2002, Guide to Selecting, Developing and Marketing Value – added Recycled Organics Products, Resource NSW and University of NSW, p. 25

[133] Department of Environment and Conservation NSW, 2004, Analysis of Markets for Recycled Organic Products, p. v

[134] Recycled Organics Unit, 2002, Guide to Selecting, Developing and Marketing Value – added Recycled Organics Products, Resource NSW and University of NSW, p. 26

[135] Ibid, p. 26

[136] Ibid, p. 26

- industry is engaged to lead the process to ensure relevant outcomes, and to ensure that both risk and the responsibility for the outcomes is shared.

Government assistance in industry development may also be necessary as viable and sustained market development is dependent on the capabilities of the industry. Industry development assistance may include:

- improving the capabilities of industry in terms of manufacturing to specified standards. This may be achievable through technical assistance, education and training;

- product development programs focusing on maximising recycled organics content, therefore maximising the diversion of compostable organic materials from landfill;

- the provision of clear and appropriate licensing and planning guidelines to encourage appropriate industry expansion;

- the availability of technical support and diagnostic services to assist in quality testing of products, and to improve manufacturing processes; and

- consideration of clear policy leadership and incentives as a driver to accelerate the development of the industry, and the prioritisation of organics recycling as a resource recovery priority.[137]

The Waste Management Association of Australia (WMAA) and other non-governmental organisations have sought to develop a viable and sustainable recycled organics industry across Australia. Known as the Compost Supply Chain project, the initiative aims to identify new products and markets for organic recycled material and to aggressively target these markets for recycled organics. The focus of the Roadmap project will be to develop a range of specialised products that are 'fit for purpose' for a range of uses in agriculture, horticulture, landscaping and other applications. The Roadmap is funded in part by the federal government and various state government agencies including EcoRecycle.[138]

The Compost Industry Supply Chain position paper states that the capacity of the recycled organics industry to recycle organic material within the urban environment has neared saturation point and the urban market for recycled organics is unlikely to grow substantially. In order for the industry to grow, new markets are required outside the urban areas[139] such as in broad scale agriculture.

[137] Ibid, p. 26

[138] Waste Management Association of Australia, Compost Supply Chain Roadmap, www.wmaa.asn.au/roadmap/project.html

[139] Waste Management Association of Australia, Compost Australia and the Barton Group, 2005, Compost Industry Supply Chain Position Paper, p. 23

The Department of Sustainability and Environment advised the Committee that one of the key barriers to the treatment of organic waste is that the markets for the products are weak.[140] This is a national problem. The Committee believes that industry should have the major responsibility for developing markets for organic products, as is the case of NSW, to ensure that relevant outcomes are achieved and ensure that both the risk and responsibility for outcomes is shared. The Committee notes that there are other waste treatment technologies that are not reliant on strong markets for organic products and the Committee believes these technologies should be carefully examined (refer to recommendation 7.8). Accordingly, the Committee recommends that:

**Recommendation 7.6**

**Sustainability Victoria engage industry to lead the process of further developing the recycled organics industry in Victoria to ensure that both the risk and responsibility for outcomes is shared. The need to develop a recycled organics industry is contingent on the type of alternative waste treatment facilities developed.**

## Alternative waste technologies

The European Commission landfill directive places targets on Member States to reduce the quantities of biodegradable municipal waste going to landfill. Biodegradable municipal[141] waste is not specifically defined in the directive. Biodegradable waste is capable of undergoing anaerobic or aerobic decomposition, such as food and garden waste, and paper and cardboard. Member States are obliged to develop national strategies to meet the targets of a reduction to: 75 per cent (of total weight) by July 2006; 50 per cent by July 2009; and 35 per cent by July 2016. The baseline year is 1995. It is interesting to note that since 1997, the amount of waste going to landfill in Victoria has remained relatively constant.[142] The draft *Towards Zero Waste* strategy does not contain a specific target for biodegradable municipal waste to landfill. It contains targets for the total waste stream - a 45 per cent recovery rate in household solid waste and 65 per cent recovery rate in solid industrial waste by mid 2008 is proposed.

Some countries such as Denmark, Austria and the Netherlands have already achieved all of the targets through a combination of incineration with energy recovery, central composting and recycling.[143] The Committee was advised by the European Commission that a study has been conducted of the merits of various types of household waste disposal and found that recycling is superior to incineration with energy recovery, which in turn is

[140] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 710

[141] Municipal waste is defined as waste from households, as well as other waste, which because of its nature and composition is similar to waste from households

[142] Source: www.ecorecycle.vic.gov.au/www/print.asp?casID=3457, accessed May 2005

[143] European Environment Agency, 2001, Biodegradable municipal waste management in Europe, pp. 16 and 18

preferable to landfill.[144] Sixty per cent of household waste still goes to landfill in Europe, however there is a strong policy push away from using landfill as a method of household waste disposal.[145] The cost of landfilling household waste in Europe is expected to increase with the introduction of increasingly stringent standards.

The Committee raised the issue of public acceptance of waste incineration in Europe as witnesses in Australia had advised that in the past and more recently, there has been community resistance to incineration proposals. The European Commission explained that incineration had received some negative media coverage as a result of some poor operations in France however there are rigorous emission standards and incineration is now widely accepted and used in the EU.[146] For instance the City of Copenhagen publishes the quality of incinerator flue gas emissions every half hour on the internet to ensure public transparency of the environmental performance of the treatment facilities.[147]

Alternative Waste Technologies (AWT) are a range of systems which divert waste from landfill. These technologies are designed to recover additional resources from residual waste that is deemed for landfill, after the removal of kerbside recyclables, and minimise potential harm to the environment. Typically AWTs treat waste by mechanical separation, biological processes such as fermentation and thermal treatment such as incineration or gasification.[148] They are described as 'alternative' because they are considered to offer a more sustainable solution to waste disposal than traditional methods such as landfill and 'old style' waste incinerators.[149]

In 2004 the Western Regional Waste Management Group (consisting of nine metropolitan councils) and Global Renewables, a Melbourne based waste management company proposed to construct an alternative waste technology plant in western Melbourne. A similar facility commenced operations in September 2004 at Eastern Creek in Sydney. The Sydney facility utilises a process called UR 3R (Urban Resource – Reduction, Recovery and Recycling). The plant cost $71 million and opened in September 2004.[150] According to Global Renewables the UR 3R process can extract any material that can be recycled including food scraps, metal, glass, paper and plastics. Importantly, it is claimed the system can recycle organic waste, a major component of the waste stream currently largely consigned to landfill.[151]

[144] Mr P Speight, Administrator, Waste Prevention and Recycling Strategy, European Commission, Brussels, meeting, 10 February 2005
[145] Ibid
[146] Ibid
[147] Ms L Kristensen, Waste Department, City of Copenhagen, meeting, Copenhagen, 1 February 2005
[148] Waste Service NSW, undated, Your Easy Guide to Waste Technologies, p. 3
[149] Ibid, p. 3
[150] Source: www.grd.com.au/pdf/Eastern_Creek_Progress_Summary_Issue7.pdf, accessed April 2004
[151] Source: www.grl.com.au/index.php?c=global&article_id=313

The Sydney UR-3R facility is a public private partnership between Waste Service NSW[152] and Global Renewables. According to Waste Services NSW the facility will:[153]

- initially process 11% of Sydney's household waste, up to 16% on expansion;
- divert about 80% of waste away from landfill;
- capture 100% of biogas produced;
- produce 23,500 tonnes of high quality compost each year, and
- produce green electricity, equivalent to providing 2,250 homes with year-round green power.

Global Renewables states that the target for achieving full capacity of the Eastern Creek plant is April 2005 and that the soil additive product has gained acceptance from the company's customers.[154] However, a recent report in the journal Waste Management and Environment (April 2005) notes that contamination has been a problem for the plant and that additional sorting has had to be undertaken prior to treatment to reduce contamination.[155]

The treatment process used by Global Renewables (GRL) is known as mechanical biological treatment (MBT), which combines the mechanical sorting of waste with a biological treatment.[156] The aim of MBT is to extract the maximum amount of value out of each type of waste. MBT systems remove the recyclables for recycling and divert bulky inert material to landfill. The remaining organic waste such as food and garden scraps is treated in a biological process that results in biogas for electricity generation and compost for garden and agricultural application.[157] The process results in about 20 per cent of waste going to landfill. This fraction is described by GRL as a clean, odourless, inert product that can be safely put into landfill.[158]

Another major development in metropolitan waste management relates to a report to the State Government by a working party of state and local government representatives - *Towards Zero Waste* Working Party - which

[152] The Waste Recycling and Processing Corporation of New South Wales (trading as Waste Service NSW) is a statutory state owned corporation

[153] Source: www.wasteservice.nsw.gov.au

[154] Global Renewables, 2004, Eastern Creek UR 3R Facility Progress Summary, www.grl.com.au/pdf/Eastern_Creek_Progress_Summary_Issue7.pdf, accessed April 2005.

[155] Waste Management and Environment, 2005, Commissioner Blasts Waste Industry, volume 16, no. 3, April 2005, p. 34

[156] Waste Service NSW, undated, Your Easy Guide to Waste Technologies, p. 16

[157] Ibid, p. 16

[158] Dr J White, Managing Director, Global Renewables, Melbourne Garbage Processing, Radio National Breakfast, April 1 2005, website: www.abc.net.au/rn/talks/brkfast/stories/s1335936.htm

has recommended a restructure of the metropolitan waste management system.[159] The Working Party was established by the Minister for Environment to develop an agreed implementation approach for the draft *Towards Zero Waste* strategy in metropolitan Melbourne.[160]

One of the key outcomes of the *Towards Zero Waste* strategy will be the development of facilities to process mixed residual waste for resource recovery (in other words alternative waste technologies).[161] The working party identified that current waste management technologies are unlikely to deliver the resource recovery outcomes required by the *Towards Zero Waste* strategy[162] and that 'the progressive sophistication of waste management technology needs to be matched with strengthened regional capacity and enhanced buying power'.[163] According to the working party report, the future of waste management in metropolitan Melbourne is likely to comprise a mix of:

- advanced or alternative waste technology facilities (such as the Global Renewable facility proposed for Western Melbourne) for processing municipal waste;
- material recovery facilities for specific waste streams;
- landfills for residual waste; and
- potentially some landfills receiving municipal solid waste as currently occurs.[164]

The working party has stated that, local governments alone cannot afford the costs of the best waste management technology, therefore state and federal government should have a role in sharing the cost of new technologies to ensure that the most effective waste processing systems are available to the community.[165] Consequently, the *Towards Zero Waste* Working Party report recommends merging five metropolitan regional waste management groups (RWMGs) into a single metropolitan waste management group. The working party also recommended that a Metropolitan Waste and Resource Recovery Strategic Plan be developed to implement the goals of the draft *Towards Zero Waste* strategy. The plan would take a long term view (25 to 30 years) and would include strategies for the transition from lower order containment and disposal of waste to resource recovery.[166] It would guide the type and siting of facilities for

[159] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 705
[160] Ibid, p. 701
[161] Towards Zero Waste Working Party, 2005, Report of Findings, p. i
[162] Ibid, p. ii
[163] Ibid, p. iii
[164] Ibid, p. 5
[165] Cr D Gross, City of Port Phillip, transcript, Melbourne Garbage Processing, Radio National Breakfast, April 1 2005, website: www.abc.net.au/rn/talks/brkfast/stories/s1335936.htm
[166] Towards Zero Waste Working Party, 2005, Report of Findings, p. 5

disposal and the sorts of waste that would be treated at such facilities for maximum resource recovery. Further to this a shorter five year implementation plan would be developed by the new institutional entity to decide the siting, timing and cost of any new facilities. The Committee was advised that the Towards Zero Waste Working Party report is currently being considered by the Minister for Environment.[167]

The Committee notes that the *Towards Zero Waste* strategy has been in draft form for 2 years and the recent proposals will extend the existing policy vacuum for waste management in Victoria. Accordingly the Committee recommends that:

**Recommendation 7.7**

**The metropolitan resources and waste strategic plan and business plan be finalised by 2007.**

The working party also examined how the risks associated with developing large scale alternative waste technology facilities could be managed. The Department of Sustainability and Environment explained that large AWT facilities can be developed through public private partnerships. The commercial risk of constructing and developing the facilities is borne by the private sector. However, the risks associated with the supply of the waste are borne by the public sector, since local government makes commitments to supply waste for a number of years.[168] Mr Lyon advised the Committee that the working party had recommended the development of sound guidelines for the contracting and establishment of AWT facilities. These guidelines would be developed with the assistance of Partnerships Victoria, to ensure that the risk of establishing AWT facilities is minimised.[169]

Mr Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment advised the Committee that while the working party focussed on institutional arrangements for an integrated approach to metropolitan waste management, there were other issues that were not examined in detail:

> While the working party looked very intensely at institutional arrangements, it recognised that there are other enabling programs and policies that government needs to apply to reach the sort of diversion targets that were talked about — technology innovation and assessment, community awareness, capacity building of the local government sector, market development for the recycled products you are collecting, and broader issues of pricing and environmental accounting in terms of, say, landfill externalities or recycling externalities. These were recognised although the working party did not go into these broader policy approaches in a lot of detail.[170]

[167] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 705
[168] Ibid, p. 703
[169] Ibid, p. 704
[170] Ibid, p. 703

The Committee believes that the institutional arrangements for metropolitan waste management should not be finalised in isolation from these broader policy issues. Accordingly the Committee recommends that:

**Recommendation 7.8**

**Prior to finalising the metropolitan resources and waste strategic plan for Melbourne, the State Government examine the broader context of waste management and recovery including:**

**a) technological options;**

**b) community awareness/education;**

**c) capacity building of the Local Government sector;**

**d) market development of recycled products; and**

**e) pricing and environmental accounting of externalities.**

The Department of Sustainability and Environment advised the Committee that the expected outcomes of the working party's proposals are to achieve the capacity within metropolitan Melbourne to move to large scale AWT facilities and improve resource recovery from the organic part of the waste stream.[171] Mr Lyon advised that Victoria was not locked into a single AWT in the future and that there is likely to be a mix of facilities and technologies of different scales to meet the waste treatment needs of different residential areas.[172] For example, household separation of recyclables for kerbside collection has been highly successful in Victoria and it is likely to continue to be part of the resource recovery system in many areas. Household recycling also sends messages about responsibility for household waste. However, in the inner city, where source separation is impractical, a single bin system, separated at the treatment plant may be more efficient.[173]

The Committee was advised that the key benefits of AWT lie in its ability to process organic waste. This leads to a reduction in the amount of residual waste requiring landfill disposal, a reduction in leachate and methane emissions from landfill and reduction in greenhouse gas impacts.[174] A triple bottom line analysis of AWT, which expressed environmental benefits in dollar terms, undertaken by waste management consultants Nolan ITU, has shown that Australia wide, if AWT replaced current waste collection systems, the net environmental benefit would be around $150 - $200 per household per annum.[175] These calculations are based on the reduction of waste to landfill and recovery and re-use of resources.[176] This benefit would come at an additional cost of $25-$30 per household per year, compared

[171] Ibid, p. 710
[172] Ibid, p. 709
[173] Ibid, p. 709
[174] Mr J Nolan, Director, Nolan ITU, transcript of evidence, 8 November 2004, p. 571
[175] Ibid, p. 572
[176] Ibid, p. 572

with existing services.[177] However, unless external environmental benefits are factored in, AWT cannot compete with landfill.[178] The Committee was advised that AWT is an emerging technology in Australia. Currently AWT is processing only 3 per cent of the mixed putrescible waste stream (garbage or mixed waste usually sent to landfill).[179]

The Committee is concerned that, as waste management technology and organisational arrangements develop over the next decade, the best environmental outcomes are achieved. The Committee believes that immature markets for organic waste and the insecurity of supply of raw material (from, for example, the impact of successful waste education campaigns or significant shifts in consumption patterns) may result in major risks to state and local government if large scale AWT facilities are developed throughout Victoria.

The Department of Sustainability and Environment advised the Committee that the EPA is conducting an assessment of the large scale waste management proposal in western Melbourne.[180] DSE also advised that incineration has been very unpopular with the community and that may be one of the reasons why it is not being proposed in the case of the western Melbourne facility.[181] However Nolan ITU advised the Committee that:

> There is still the old phobia in relation to incineration certainly, but when you talk about new technologies that involve waste to energy there is a broader level of acceptance.[182]

As discussed above incineration with energy recovery is a sound and increasingly popular method of waste management in Europe.

Under the Partnership Victoria policy the government is encouraged to focus on outcomes rather than inputs such as specific waste management technologies. However government also needs to ensure that it is an informed purchaser. Therefore the Committee strongly recommends that:

**Recommendation 7.9**

**Sustainability Victoria and the Environment Protection Authority assess and publicly report on the relative merits of various waste management technologies including world's best practice incineration with energy recovery and alternative waste technologies that do not require the development of a recycled organics industry before entering into any Partnership Victoria type arrangements.**

[177] Ibid, p. 572
[178] Ibid, p. 573
[179] Ibid, p. 573
[180] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 709
[181] Ibid, p. 709
[182] Mr J Nolan, Director, Nolan ITU, transcript of evidence, 8 November 2005, p. 574

## Home and community composting

According to advice provided by EcoRecycle, although previous studies have shown that around half of all Victorian households claim to do some backyard composting, few households manage all of their food and garden waste on site, and few have the capacity to manage all materials on site (particularly larger materials, such as branches). EcoRecycle also advised that few households manage backyard composts well. As such they pose environmental and social risks associated with pest animals, insects and odour.

EcoRecycle promotes well-managed backyard composting, but recognises that this is unlikely to divert enough organics from landfill alone. EcoRecycle advised that home composting was not included in its recent assessments of alternative waste technologies.

However, the Committee found that home composting was generally considered by the alternative waste industry not to offer a significant contribution to waste reduction. For example, Mr Nolan advised:

> There has been a lot of effort in many countries throughout the world to encourage and promote home composting, and certainly there are a lot of people who have taken it up and are very happy with it and using it quite effectively. But despite the promotion and the encouragement we generally find that even the cities that provide a compost bin free, that provide eduction and [are] working within the community, generally the maximum [diversion of organic waste] through [home composting] is probably 10 to 12 per cent … Certainly it should be seen as an adjunct to source separation and processing or AWT but by itself it is not going to be a solution.[183]

Despite this view, the reported high participation rate in home composting suggests that there is potential to promote composting as part of an integrated approach to the diversion of organic waste from landfill. Results of a recent household organic collection trial in Canberra, where households were provided with 'bio bins' for green and food waste, showed that this system could divert approximately 60 per cent of organic waste from landfill.[184] Although the bio bins were collected from the kerbside, the trial indicated that households can significantly reduce organic waste to landfill.

However, encouraging households to treat organic waste on site may be more difficult. The City of Darebin advised the Committee that an initiative to encourage residents to take up home composting has met with only moderate success.[185] Darebin City Council is trialling a green waste collection service combined with a home composting service. Residents pay an annual fee to have green waste collected but also have the option of purchasing a compost bin, home delivered, for the same price as a green

[183] Mr J Nolan, Director Nolan ITU, transcript of evidence, 8 November 2004, p. 57-576

[184] Australian Capital Territory Government, 2001, Household Organic Material Collection Trial, Chifley August 2000 – June 2001, p. 22

[185] Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, transcript of evidence, 27 September 2004, p. 291

waste yearly collection fee. This initiative was aimed at encouraging residents to reduce the amount of organic waste generated and collected. Despite the incentives offered to take up home composting, approximately 22,000 residents have taken up kerbside green waste kerbside collection whereas 1,200 residents have accepted compost bins and 400 have received worm farms.[186] Ms Libby Hynes, General Manager of Environment and Amenity at Darebin City Council observed that 'it is much easier to throw the stuff out and get rid of it than it is to deal with it on site.'[187] However, Darebin subsequently advised that their program was received positively by the community and the targets for compost bin distribution were exceeded. This points to an untapped potential for home composting as part of an integrated solution to waste management.[188] The Committee was advised that some councils are trialling different combinations of kerbside garden waste and food waste collection.[189]

Composting is a low cost, local solution for managing organic waste. The Committee believes that the potential of home composting to diverting organic waste from the treatment steam has not been thoroughly investigated in Victoria to date, nor the potential of home composting education campaigns to reduce the creation of organic waste, particularly food waste. Most parts of suburban Melbourne are well suited to compositing.

As noted earlier in this chapter, recent research has shown that food accounts for the most wasteful consumption in Australia, with $5.3 billion worth of food thrown away by Australian households in 2004.[190] The Committee is concerned at this level of food wastage and believes there is a critical need to address the issue of food wastage through education and behavioural change. The broad scale development of home composting should be a key component of a community engagement program to reduce food wastage in Victoria.

In Europe a number of local authorities promote composting.[191] For example residents of Milton-Keynes (United Kingdom) can purchase home composting bins from the council at close to cost price or are encouraged to make their own. In the Porto region of Portugal a home compost demonstration site has been established which includes a garden with vegetables, fruit trees and aromatic plants using the compost produced on

[186] Personal communication, Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, 4 May 2005

[187] Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, transcript of evidence, 27 September 2004, p. 291

[188] Personal communication, Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, 4 May 2005

[189] Mr P Lyon, Manager, Sustainable Futures, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 710

[190] Hamilton, C, Denniss, R and Baker, D, 2005, Wasteful Consumption in Australia, the Australia Institute Discussion Paper, No. 77, p. viii

[191] Brussels Institute for Management of the Environment and ACRR, 2004, Voluntary actions supported by local authorities to encourage waste prevention in Europe, pp. 126-133

site. People can tour the facility which includes 16 different types of home composting bins, and view the maturation, screening and bagging of compost. Tax breaks and free compost bins are offered in the cities of Martellago and Santa Giustina (Italy). The municipality of Barcelona has made various spaces in public parks available for the installation of composting bins where households living in the area can bring their organic waste.

Accordingly the Committee recommends that:

**Recommendation 7.10**

**Sustainability Victoria, in cooperation with Local Government, actively promote home and community composting as a low cost option (compared with alternative waste technologies) of diverting organic waste from the waste stream, as a matter of priority.**

## Product labelling

The Committee found that consumers are provided with little information on the life cycle analysis of retail products.[192] A recent report on the current state of green procurement in the corporate and government sectors found that green procurement initiatives in institutions are limited by a lack of understanding of the different environmental factors of a product's life cycle. This is due to very limited environmental information being provided by manufacturers.[193] This limited information means that consumers are unable to exercise their environmental preference except for a very narrow range of products.

The Australian Environmental Labelling Association has developed a national voluntary environmental labelling and declaration program. The Good Environmental Choice Label program considers key environmental impacts along a product's life cycle and delivers independent environmental information on a range of consumer and building products.[194] However, while the Good Environmental Choice label is supported by organisations that undertake green procurement within the government and corporate sector (such as Victorian local government's ECO-buy program), it is not widely known within the community. A recent survey showed that only 14 per cent of consumers recognised the label. However the survey also indicated that 64 per cent of consumers looked for environmental information on products and 82 per cent of consumers wanted more environmental information on products.[195]

The *State of Green Procurement in Australia* report points out that some manufacturers have realised there is a commercial benefit in being

[192] Mr E Bruscella, Executive Officer, Barwon Regional Waste Management Group, transcript of evidence, 29 September, 2004, p. 378

[193] Good Environmental Choice Australia, 2004, The State of Green Procurement in Australia, p. 3

[194] Australian Good Environmental Choice website; www.aela.org.au

[195] Good Environmental Choice Australia, 2004, The State of Green Procurement in Australia, p. 28

perceived as having an environmentally sound product. This has led to a large volume of product packaging and product information making misleading and inaccurate environmental claims. Consumers have picked up on this misinformation and are increasingly uncertain as to the credibility of environmental labelling.[196] The environmental labelling of products in Europe is discussed further in chapter 8.

The Committee believes that the lack of information or misleading information about recycled content is a major barrier to waste reduction. A national product labelling scheme indicating the recyclability or recycled content of products and packaging should form an integral component of integrated product policy.

Accordingly, the Committee recommends that:

**Recommendation 7.11**

**The Victorian Government, through the Environment Protection and Heritage Council:**

**a) take a lead role in developing a mandatory plain English labelling scheme indicating life cycle analysis information for consumer products and packaging;**

**b) the labelling scheme should be developed in cooperation with industry, the Australian Environmental Labelling Association and green procurement programs such as ECO–Buy;**

**c) a formal evaluation of the outcomes of existing environmental labelling schemes should be included in the development process; and**

**d) a national communication strategy should be developed for the labelling scheme.**

## Community education

In its 2001 community attitudes survey, EcoRecycle found that only 7 per cent of respondents identified that the number inside the plastics identification code is the correct way to determine if an item can be recycled.[197] Barwon Regional Waste Management Group advised that the codes that identify recyclable plastics are confusing to the public. Many householders are unaware that there are no markets for plastics numbered with codes 4 to 7 in many regions.[198] EcoRecycle notes that although the code system has been in place for some time the understanding of its

[196] Ibid, p. 32

[197] EcoRecycle, 2001, Community Attitudes Survey, p. 12

[198] Mr E Bruscella, Executive Officer, Barwon Regional Waste Management Group, transcript of evidence, 29 September 2004, p. 377

meaning is low.[199] EcoRecycle states that contamination of the recycling stream increases costs to collectors and recycling businesses and threatens the viability of kerbside recycling.[200] The recovery rate for plastic packaging in Australia (16 per cent) is low compared to the top performing countries such as Germany (53 per cent), Austria (35 per cent) and Sweden (34 per cent).[201]

Waste eduction programs have been extensive across Victoria since the establishment of EcoRecycle in Victoria. EcoRecycle states that the success of waste eduction in Victoria is demonstrated by widespread participation in kerbside recycling.[202] However, the Committee found that misconceptions about waste and recycling are still common.[203] In particular, rural communities have limited access to information about waste and recycling.[204] The Central Highlands Regional Waste Management Group reported that scepticism amongst the community about the fate of recycled material is commonly encountered by waste educators.[205]

Lack of consumer information about the environmental impact of products or packaging was also highlighted as a barrier to waste reduction.[206] A study by the NSW Department of Environment and Conservation suggests that there is little awareness and understanding within the community of the difference between recycling and waste avoidance and this indicates a need for further community engagement around broader issues of waste reduction and sustainable consumption.[207] A recent review of recycling notes that the focus of education programs on recycling may have led to the community perception that kerbside recycling is an end in itself and not the means to waste minimisation.[208] Similarly, Planet Ark advised that the community did not understand the importance of buying recycled products in order to 'close the loop' and provide an economic incentive for recycling industries.[209]

[199] EcoRecycle, 2001, Community Attitudes Survey, p. 12. This is highlighted by a high rate of inclusion of a number of non-recyclable plastic items in kerbside recycling such as 54 per cent of households that put out margarine containers, 47 per cent that put out ice cream containers and 15 per cent that put out supermarket bags

[200] EcoRecycle, Home and Community, Making Waste Wise Choices, www.ecorecycle.vic.gov.au/www.default.asp?casid=2579, accessed April 2005

[201] Nolan ITU, 2002, Recycling – How does Australia Compare?, p. 5

[202] EcoRecycle, 2003, Towards Zero Waste: A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 16

[203] Ms R Angus, Highlands Regional Waste Management Group, transcript of evidence, 28 September 2004, p. 309

[204] Ibid, p. 309

[205] Ibid, p. 309

[206] Mr E Bruscella, Executive Officer, Barwon Regional Waste Management Group, transcript of evidence, 29 September 2004, p. 378

[207] Institute for Sustainable Futures, 2005, Beyond Recycling an Integrated Waste Management Framework for local Government, Part B: Recycling in context the current situation, University of Technology Sydney, p. 18

[208] Ibid, p. 18

[209] Ms T Ha, Campaign Development Manager, Planet Ark, transcript of evidence, 9 August 2004, p. 198

EcoRecycle has recognised this in its *Towards Zero Waste* strategy, where it states that the focus of current programs needs to change, with a change in emphasis from recycling to avoidance and reduction.[210] However the strategy does not detail how this change in focus will be implemented.

The Committee believes that education and behavioural change programs underpin the regulations and infrastructure that have resulted in Victoria's high participation rate in kerbside recycling. While the Committee recognises the achievements of Victoria's Waste Wise education program and supports the on-going work of the RWMG Education Officers, it is also concerned that there are key gaps in the community's understanding of waste reduction and recycling.

EcoRecycle is undertaking a review of its Waste Wise education program.[211] This review has identified that Waste Wise programs need to be updated to reflect the approach of the *Towards Zero Waste* strategy, with an emphasis on waste avoidance, and more recent developments in community engagement such as social marketing and transformative education.[212] The review points to a need to 'reposition Waste Wise as an effective community engagement and waste minimisation program'.[213] Preliminary recommendations of the Waste Wise review include integrating the Waste Wise program with the *Towards Zero Waste* strategy and development of a Waste Wise program for the residential or household sector (one area that Waste Wise has previously not targeted).

It could also be argued that broad scale introduction of AWT could impact on people's waste management behaviour. Removing the need for householders to sort their recyclable waste could reduce people's awareness of their consumption patterns and remove any incentive or reminder to consume more sustainably. It will be important for waste education programs to address this issue as waste infrastructure and technology changes. Accordingly, the Committee recommends that:

**Recommendation 7.12**

**Sustainability Victoria redevelop the Waste Wise program to emphasise waste reduction and avoidance.**

**Recommendation 7.13**

**A Waste Wise program be developed for the residential sector that:**

**a) focuses on assisting householders to purchase recycled and recyclable packaging and consumer items; and**

[210] EcoRecycle, 2003, Towards Zero Waste: A Materials Efficiency Strategy for Victoria, Draft for Consultation, p. 16
[211] R.M Com Pty Ltd, 2005, Waste Wise Program Review, prepared for EcoRecycle, p. 3
[212] Ibid, p. 18
[213] Ibid, p. 22

**b) includes a research component to identify barriers to purchasing recycled content and recyclable items.**

## Container deposit legislation

The Committee was advised that most recyclable containers (for example glass and aluminium) are consumed and disposed of 'away from home' (in public places or commercial premises) enter the non–residential waste stream and are not recycled.[214] The average 'away from home' consumption rate of non-alcoholic recyclable beverage containers is 48 per cent.[215]

The Australian Conservation Foundation advised the Committee that container deposit legislation[216] (CDL) is an appropriate instrument to deal with the beverage containers currently not being recycled.[217] South Australia is the only state where CDL operates, where it has been in place since 1975.

However, the Committee was also advised by a number of witnesses that CDL would undermine the successful voluntary kerbside recycling system in Victoria. For example, Barwon Regional Waste Management Group advised that the introduction of CDL would mean an increase in the cost of kerbside recycling because valuable materials such as glass and aluminium would be removed from the kerbside stream, leaving low value high volume materials.[218]

The Beverage Industry Environment Council (BIEC) advised that a national CDL system would result in significant increases in beverage prices and that in Victoria, the voluntary kerbside recycling system was achieving similar recycling rates to those in South Australia.[219] However, figures published by the Boomerang Alliance, a consortium of non-government environment and local government organisations, show that South Australia's recycling rates of glass, aluminium and PET[220] plastic (85%, 85% and 75% respectively) are well above the Australian average for these materials (35%, 60% and 35%).[221] The Boomerang Alliance claims that in South Australia, CDL does

[214] Ms S. Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 649

[215] Boomerang Alliance, undated, Packaging Waste in Australia; an overview, www.boomerangalliance.org/000_files/28_container_depositis.pdf, accessed April 2005

[216] Container deposit schemes involve placing a deposit on a bottle, can or other container that is refunded when the container is returned, providing an incentive to return the container for recycling.

[217] Ms S. Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 649

[218] Mr E Bruscella, Executive Officer, Barwon Regional Waste Management Group, transcript of evidence, 29 September, 2004, p. 384

[219] Ms M McCaskill, Chief Executive Officer, Beverage Industry Environment Council, meeting, 26 October 2004, p. 490

[220] Polyethylene terephalate

[221] Boomerang Alliance, undated, Packaging Waste in Australia; an overview, www.boomerangalliance.org.au, accessed April 2005, pp.3-5. The Committee sought equivalent Victorian data but was advised by EcoRecycle that this is not available. Personal communication, Ms J Pickles, Manager, Strategy and Regional Programs, EcoRecycle, May 2005

not compete with kerbside recycling. Although the volume of deposit bearing materials collected at the kerbside is reduced, they are worth more, and provide additional revenue for local government to offset the cost of providing the kerbside service.[222]

The Committee was advised that while a number of councils are trialling public place recycling, this is currently on a limited basis.[223] Mornington Peninsula Shire advised that its trials of public place recycling had been problematic due to contamination.[224] However, the Committee is also aware that the introduction of alternative waste technology facilities, where co-mingled waste is sorted at the plant would mean that both kerbside and 'away from home' materials would be sorted for recycling. Alternative waste technologies, if introduced on a large scale, could provide a solution to the problem of disposal 'away from home' and negate the need for a CDL system. However, this would rely on the provision of adequate infrastructure to collect containers consumed away from home.

The Committee believes that CDL may have a role to play in an integrated waste management approach which combines a range of treatment technologies, kerbside collection and public place recycling. Therefore an investigation into the potential of CDL to address away from home disposal of recyclables is warranted. Accordingly the Committee recommends that:

**Recommendation 7.14**

**Sustainability Victoria review the costs and benefits of introducing measures such as Container Deposit Legislation in Victoria as part of the development of the proposed metropolitan resources and waste strategic plan for Melbourne.**

[222] Ibid, p. 2

[223] For example refer to Ms R Angus, Regional Education Officer, Highlands Regional Waste Management Group, transcript of evidence, 28 September, 2004, p. 313

[224] Mr C Cinquegrana, Manager, Infrastructure Strategy, Mornington Peninsula Shire, transcript of evidence, 11 October, 2004, pp. 416-417

Chapter

8

# Promoting water efficient households

## Key findings

### Reducing residential water consumption

**8.1** Increasing the efficiency of urban water use will be critical to ensure that demand does not outstrip supply. This can be achieved through water efficient technologies, improved management practices and behavioural change.

**8.2** The Victorian community has been highly supportive of recent water reforms and expects the government to take leadership on water conservation issues.

**8.3** All Victorian water authorities undertake education programs to promote water conservation. However, a potential conflict of interest exists for water businesses promoting water conservation measures to their customers. Demand management measures which reduce consumption also reduce revenue resulting in a lack of incentive to reduce water sales. While demand management can reduce capital expenditure and be a positive incentive for water businesses, there is a risk to these businesses which must be carefully managed.

### Permanent water saving measures

**8.4** The requirements of water restrictions across the state have varied historically, resulting in community confusion regarding the levels and types of water restrictions. There is a need to develop uniform guidelines on water restrictions in Victoria, taking regional variations into account.

**8.5** Regional and urban communities in Victoria strongly support water restrictions and community awareness of specific water restrictions is high.

**8.6** The widespread acceptance of Stage 2 (in the metropolitan area) water restrictions presents a unique opportunity to reinforce a water saving culture. A relaxation of the restrictions contained in the permanent water conservation measures is inconsistent with state and local government community programs promoting reduction in outdoor water consumption.

### Water efficiency standards for domestic appliances

**8.7** The national mandatory Water Efficiency Labelling and Standards scheme is designed to encourage appliance manufacturers to improve the water efficiency of appliances and provide customers with information at the point purchase.

**8.8** One of the most effective measures to cut household water consumption is the use of water efficient washing machines. Mandatory introduction of water efficient washing machines could deliver significant water savings.

**8.9** Environmental labelling is well recognised as an effective method of conveying complex information to consumers. There is scope for a more comprehensive environmental labelling scheme for household products incorporating energy and water efficiency measures.

### Disclosure of water efficiency for residential and public buildings

**8.10** A requirement to inform property buyers or renters of the water efficiency of houses or buildings has the potential to raise awareness, influence behaviour and cultural norms about water use and stimulate markets to promote water efficient appliances and fittings.

**8.11** A number of European countries have developed water and energy efficiency labelling schemes for public buildings. Labelling of public buildings is a direct way for government to demonstrate its commitment to water efficient buildings.

### Monitoring household water consumption

**8.12** Water meters are difficult for consumers to read. 'Smart' water meters allow households to monitor water use in real time rather than retrospectively over the last three months. The majority of Australians underestimate their water consumption. There is a need for detailed comparative water information on water utility bills to allow households to benchmark their water consumption performance against a water efficient household of the same size.

**8.13** There is limited data on consumers' daily household water use. This data is needed to enable water authorities to determine the most cost effective ways to manage demand.

### Water pricing

**8.14** The low cost of water is one of the major barriers to encouraging consumers to reduce their water consumption. The price of water in Melbourne is low by Australian standards and very low compared to other developed countries.

**8.15** Water pricing was advocated by a number of overseas experts as an effective method of promoting household water conservation. In a number of European countries increasing the price of water has been an effective demand management instrument.

**8.16** Water pricing as a management tool needs to be used in combination with education, as many people do not know what they pay for water.

**8.17** In Victoria the long term impact of the recent introduction of rising block tariffs for water is untested. While water pricing reforms send an important signal to the community, the price increase is too modest to have a significant impact on consumption. Price increases for discretionary use above essential indoor consumption should be significantly higher than the current levels under the rising block tariff structure.

### Alternative urban water supplies

**8.18** There is considerable potential for the re-use of water for a range of purposes including horticultural irrigation, watering parks and recreational areas, some industrial processes, toilet flushing and garden watering. However significant barriers remain to establishing these techniques.

**8.19** Water re-use is becoming increasingly common world wide however, recycling and re-use of stormwater and greywater is not well established in Australia, particularly in capital cities.

**8.20** Despite the establishment of a number of new developments incorporating water re-use, such initiatives remain the exception in Victoria.

**8.21** The main barriers to the uptake of alternative water supplies relate to public acceptance, economic and regulatory barriers, resistance from relevant professional trades and the quality of water for re-use.

**8.22** There is a clear need for a robust regulatory framework to support state policy promoting alternative water supplies. There is also a need for a comprehensive strategy to overcome the main barriers to the implementation of water sensitive urban design.

**8.23** There is also a need for practical demonstration projects which familiarise local government, developers and householders with new approaches to water re-use in the residential sector.

### Household greywater recycling

**8.24** Greywater systems can save an average household a significant quantity of water, however there are significant regulatory and information barriers facing households in pursuing this option. Greywater systems are technically demanding, costly to install, and

require careful maintenance. There is a poor understanding of the health risks of greywater in the community and there are no standards for the systems themselves.

**8.25** There is a clear need to review the approach to household greywater use in Victoria. The current policy and regulatory framework for greywater is inadequate and a strategic approach to household greywater use in Victoria is required.

**Information and behavioural change**

**8.26** There is a general lack of understanding in the community of natural environmental cycles, including the water cycle, and the effect urban systems have on these cycles. Coupled with this is a lack of understanding of the infrastructure that supplies and removes water from the household.

**8.27** Targeted marketing programs, aimed at reducing household water consumption, have had success in trials in Perth and Melbourne.

**8.28** There is a need to provide households with practical information on how to prevent and minimise the wider environmental impact of household water consumption.

**8.29** Changing gardening practices could result in significant water savings. However, the full potential for promotion of water efficient gardening has not been fully exploited in Victoria. Significant reductions in water consumption could be achieved through improved coordination between water retailers, state and local government and garden centres and the expansion of the DSE Water Saver Garden Centre program.

## Introduction

According to the first and second terms of reference, the Committee is required to identify barriers to households recycling and conserving water and examine how and local government can promote the efficiency of water use and supply.

As noted in earlier chapters, the projected population growth in Melbourne will result in demand for water exceeding the capacity of Melbourne's water supply by 2030 at current per capita usage rates.[1] The maximum yield of the metropolitan catchment is 566 gigalitres (GL)[2] per annum. Melbourne now uses about 480 GL, leaving a relatively small margin for emergencies and growth.[3] By 2030 Melbourne will potentially have one million more people and, at current per capita usage rates, the city will require 659 GL

[1] Department of Sustainability and Environment, submission no. 70, p. 18

[2] 1 Gigalitre (GL) = 1,000,000,000 litres, or a volume of approximately 444 Olympic swimming pools.

[3] Millis, N, 2004, Urban Water Cycle, Chapter 7, Water and the Australian Economy, Committee for Economic Development of Australia, Melbourne, p. 55

per annum, some 93 GL more than the current supply capacity. Most large regional centres and coastal settlements will also grow in population and this will increase demand for domestic water outside the metropolitan area.[4]

Most urban water is potable water, that is, drinkable water. Urban users consume 17 percent of Victoria's total potable water supply. However, most potable water is used for purposes other than drinking or food preparation. For example, in an average Melbourne household, 35 per cent of water is used in the garden, 26 per cent in the bathroom, 19 per cent for the toilet, 15 per cent in the laundry and 5 percent in the kitchen[5] with only a minor proportion of water used for drinking and food preparation. The average household water consumption in Melbourne is 240 kilolitres per year.[6] However, 2001-02 consumption data indicates that it can be as high as 342 to 834 KL in some suburbs.[7]

Increasing the efficiency of urban water use will be critical to ensure that demand does not outstrip supply. Water efficiency aims to use less water while maintaining community well-being and quality of life. This can be achieved through water efficient technologies, improved management practices and behavioural change.

This chapter outlines Victoria's residential water supply and the strategic framework for urban water conservation. The main barriers and opportunities for promoting household water efficiency are then examined. Regulatory measures are investigated including permanent water saving measures, water efficiency standards for domestic appliances and building labelling. Consumer monitoring of water consumption and the need for informative bills are discussed. Economic management methods such as water pricing are explored. The challenges associated with alternative water supplies such as household greywater use are also discussed. The importance of education and information, which underpins the other management methods, is outlined. Specific opportunities for minimising the environmental impact of household water and reducing water use on gardens constitute the final sections of this chapter.

## Residential water supply in Victoria

The Victorian water industry covers metropolitan, rural, and regional urban sectors of the State. All Victorian water businesses are owned by the State Government and pay annual dividends through the Treasurer who acts as the shareholder.[8] A map of the water supply system for Melbourne and Victoria is set out in Figure 23. Melbourne's water harvesting and

[4] Department of Sustainability and Environment, submission no. 70, p. 18

[5] Ibid, p. 19

[6] Source: www.museum.vic.gov.au/watersmarthome/aboutdetails.aspx?ID=b, accessed May 2005

[7] Bayside City Council tabled data at the Environment and Natural Resources Committee hearing on 11 October 2004 indicating that the highest household water consumption within the municipality ranged from 342-834 KL per year.

[8] Source: www.vicwater.org.au/default.php3?sectionid=2, accessed March 2005

distribution systems consist of uninhabited catchments, 13 large storage dams, 57 service reservoirs and 1,280 kilometres of water mains, reticulation pipelines, aqueducts and siphons and five filtration and 65 water treatment plants.[9]

Melbourne and Victoria's water supply and sewerage systems are set out in Figure 23. The 19 water authorities that operate in Victoria operate 174 sewage treatment plants. Most of these plants handle small volumes and discharge inland with high levels of re-use (half being at 100 per cent).[10] A minor percentage of treated wastewater is currently re-used in Victoria (40 GL of 295 GL/year). In Melbourne 2 per cent of treated wastewater is re-used. Very little stormwater - the water that runs off roofs, paths, roads and other hard surfaces when it rains - is harvested for residential or industrial use in Victoria, despite the average annual volume being almost equal to the average urban water usage of Melbourne and regional Victoria.[11]

## Urban water

The urban retail water industry provides reticulated water, wastewater and tradewaste services to domestic, commercial and industrial customers. Three retail companies have operated the water distribution and sewerage systems for the Melbourne metropolitan area since a restructuring of Melbourne's water industry in 1994. [12] They are supplied by one wholesaler - Melbourne Water - who controls the headworks and major wastewater treatment plants. The three metropolitan retail suppliers are corporatised companies operating under licences. A key element of those licences is a customer contract monitored by the Essential Services Commission. As reform of the water industry progresses, it is expected that a similar licensing structure will eventually apply to the non-metropolitan urban and rural authorities.

Melbourne Water manages catchments, dams and main aquifers. The three metropolitan water retail corporations, Yarra Valley Water, South East Water and City West Water reticulate water to customers and collect wastewater for treatment by Melbourne Water.

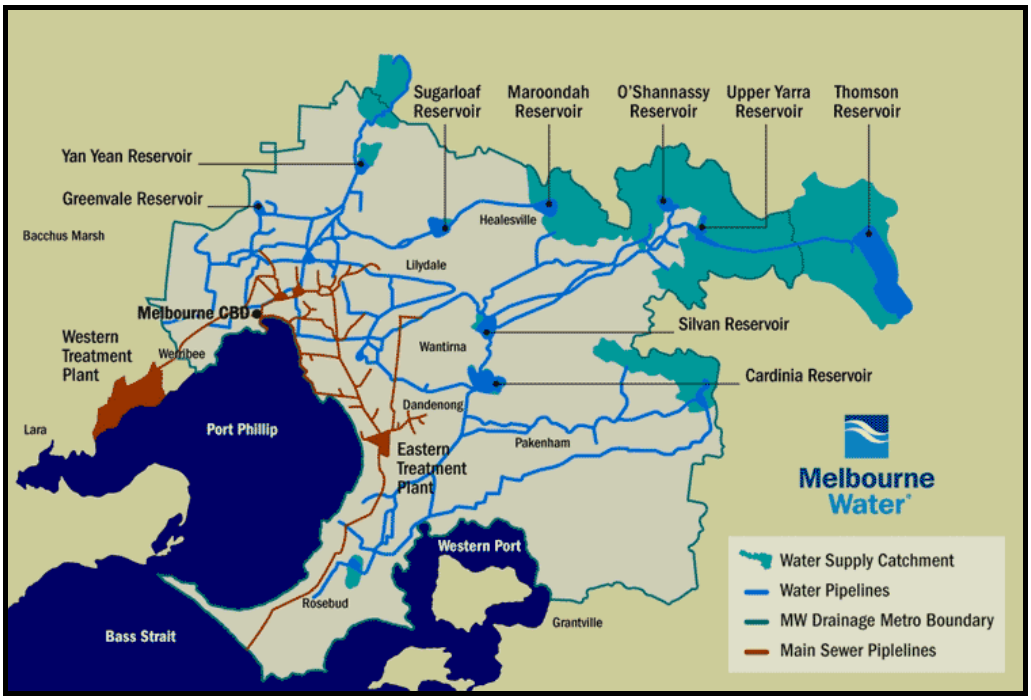
[9] Department of Sustainability and Environment, 2003, Securing Our Water Future, Victorian Government Green Paper for Discussion, pp. 37-38

[10] This section is sourced from the Australian Academy of Technological Services and Engineering, 2004, Water Recycling in Australia, p. 77

[11] Department of Sustainability and Environment, 2003, Securing Our Water Future, Victorian Government Green Paper for Discussion, p. 40

[12] This section is sourced from www.vicwater.org.au/defaultphp3?sectionid=2, accessed March 2005

**Figure 23: Melbourne's Reservoirs, Water Supply Pipelines and Sewage Treatment Plants**




Source: © Melbourne Water, www.melbournewater.com.au accessed May 2005

## Rural water

Rural businesses comprising four authorities and one irrigation trust, provide a range of services including farm supply, irrigation, stock and domestic supply, and the wholesale supply of water to non-metropolitan urban distributors. The geographic boundaries of Victoria's rural water authorities overlap those of non-metropolitan urban authorities, but the two have quite different roles.

## Regional urban water

There are 15 regional urban water authorities which have widely diverse characteristics, serving customer bases ranging from approximately 8,000 to 99,000 properties. Geographic areas are generally larger than the metropolitan retail territory. Water supplies for non-metropolitan urban authorities come from a mixture of sources, bulk supply from rural authorities, significant storage areas of their own and/or groundwater.

## Catchment Management Authorities

There are 10 Catchment Management Authorities (CMAs) who are primarily responsible for maintaining and improving the quality of land and water

resources. For example, one of the goals of the Glenelg Hopkins CMA is to maintain and improve the quality of water and condition of rivers.[13]

## Local government

The Committee received evidence of a significant number of local governments that have introduced water conservation measures into their own operations and are implementing behavioural change programs to reduce water consumption in their communities. The City of Bayside, for example, advised the Committee that, due to the number of separate agencies and organisations with an interest in urban water conservation, local government has an important coordinating role to ensure residents are presented with an integrated water conservation program.[14]

**City of Boroondara Water Management Program[15]**

The City of Boroondara was one of the first councils in Australia to join the ICLEI Water Campaign and has completed an inventory for council and community water consumption. The *Water Strategy for Council Operations* contains water reduction targets for council operations of 25 per cent by 2008-09 and a further 5 per cent by 2014.

Through a series of water saving initiatives, Boroondara was able to reduce its water consumption in parks and gardens by 23 per cent in three years. Water audits undertaken at council swimming pools identified significant opportunities to reduce water consumption. Installation of flow control valves at council swimming pools has reduced water consumption by 25 per cent.

Actions undertaken by the council include water audits of all council facilities; installation of rainwater tanks at some council facilities; re-use of swimming pool water for a range of purposes including tree watering; installation of irrigation timing and control systems at parks and gardens; and selection of drought tolerant species in council plantings.

Council is also working with the community to challenge and change community expectations of green parks and sports fields. The council's water strategy states that there is a growing community acceptance that parks and sports fields will be brown for some periods.

## Reducing residential water consumption: the strategic context

The Government's White Paper, *Securing Our Water Future Together*, is the strategic document for the campaign Our Water Our Future. The paper sets out a comprehensive policy framework for sustainable urban and regional

[13] Glenelg Hopkins Catchment Management Authority, submission no. 24, p. 2
[14] Bayside City Council, submission no. 29, p. 8
[15] City of Boroondara, 2004, Water Strategy for Council Operations, pp. 11-18

water management for the next 50 years. Reducing residential water consumption is a major component of the strategy. The government has set a target to reduce per capita drinking water consumption in Melbourne by 15 percent by 2010, compared to the 1990s average (i.e. reduce consumption from 423 litres per person per day to 360 litres per person per day) and requires regional urban water authorities to develop water conservation targets within 12 months.[16]

The White Paper reports that since water restrictions have been in place in response to the prolonged drought, significant water savings have been made.[17] In 2004 water consumption in Melbourne was reduced by 20 per cent in comparison with the 1990s average.[18] This was achieved through a combination of water restrictions and water saving efforts of Melbournians over and above the restrictions.[19]

The Department of Sustainability and Environment (DSE) advised the Committee that the community has been highly supportive of the water reforms and expects the government to take leadership on water conservation issues.[20] As DSE explained to the Committee, the community 'wants to play their part but they also want to see government and business play their part as well'.[21]

The White Paper sets out a series of actions designed to maintain reduced levels of water consumption, once the drought ends. These actions are based on established methods of reducing residential water consumption and include: pricing, permanent water saving measures (restrictions), education and awareness campaign, water efficiency labelling for appliances and rebate schemes, as illustrated in Figure 24.

At the same time, the government has developed policies to increase the use of alternative water supplies ('re-used' or 'fit for purpose' water) including recycled effluent, stormwater, rainwater and greywater.[22] For example the target for recycled water use in Melbourne is 20 per cent by 2010.[23]

As noted, established methods of reducing residential water consumption have the potential to achieve significant water savings.[24] The most effective

[16] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, pp. 96-97

[17] Ibid, p. 96

[18] Gray, D, 'Water curbs relaxed after almost 2 years', The Age, 22 February 2005

[19] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 96

[20] Mr R Posner, Deputy Director, Communications and Stakeholder Relations, Department of Sustainability and Environment, transcript of evidence, 27 September, 2004, p. 266

[21] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 265

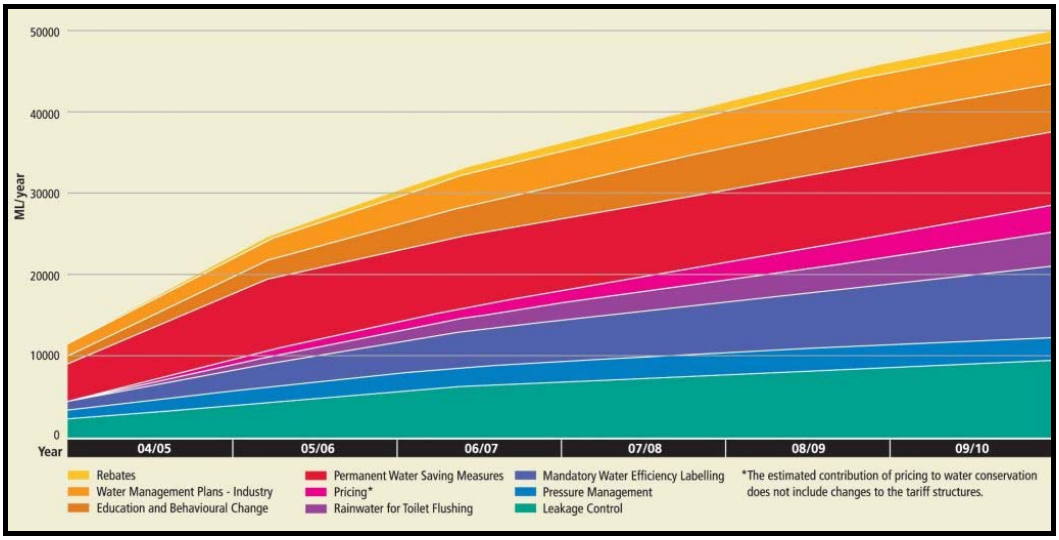
[22] Ibid, p. 106

[23] Ibid, p. 107

[24] Water Resources Strategy for the Melbourne Area Committee, 2002, 21st Century Melbourne: a Water Smart City, Strategy Directions Report, p. 124.

measures include the use of water efficient appliances, such as dual flush toilets, water efficient washing machines and low volume shower roses, behavioural change such as reducing shower times, and changing gardening practices.

## Figure 24: Projected Water Savings for Melbourne




Source: Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper p. 97.

© State of Victoria, Department of Sustainability and Environment 2004

Melbourne Water advised that the Melbourne Water Resources Strategy has projected that, with a combination of established water conservation measures and water re-use measures, water demand can be reduced to meet the target set by the Government for 2010. Further, these measures aim to ensure that Melbourne's available water yield will meet demand by 2050.[25]

The Victorian Government has deliberately not opted for large scale infrastructure solutions to address the increasing demands on the State's limited water supplies, rather it has focussed very strongly on managing demand through promoting household water efficiency. In contrast, some other states have included in their strategic approach large scale projects to boost supply such as desalination and the construction of additional dams.[26] Such large scale infrastructure solutions have been criticised because of the high cost and potential environmental impacts.

*Securing Our Water Future Together* (the White Paper) states that all urban water authorities will be required to incorporate demand management

[25] Dr D Jayasuriaya, Manager, Resources Strategy, Melbourne Water, transcript of evidence, 23 November 2004, p. 654

[26] For example, the desalination process emits large amounts of greenhouse gases. The Australian Conservation Foundation argues that funding for large scale infrastructure projects would be more effective if put towards water conservation and efficiency measures for businesses, individuals and households. Source: www.acfonline.org.au/asp/pages/document.asp?idDoc=2324, accessed April 2005

measures and supply options into their water supply-demand strategies.[27] The Committee was advised that water authorities already have considerable experience in the design and delivery of programs to improve water efficiency. For example, Barwon Water, Victoria's largest regional urban water authority, advised the Committee that it has reduced residential water consumption by 30 per cent over the past 20 years from 300 KL[28] per annum in 1984 to 210 KL per annum in 2004, one of the lowest residential consumption rates in Australia.[29] Barwon Water attributes this reduction to a combination of factors including the introduction of a user pays system in 1991, two severe droughts and regulatory mechanisms such as water efficiency ratings for white goods and the compulsory use of dual flush toilets in new homes and replacements.[30] Barwon Water also introduced community education in the early 1980s, which, it advised, played an integral role in encouraging water conservation practices among its customers.[31] The permanent water saving measures for Melbourne outlined in *Securing Our Water Future Together* are based on permanent measures adopted by Barwon Water in 2003.[32]

The Committee was advised by the Victorian Water Industries Association that all Victorian water businesses undertake education programs to promote water conservation. However, the Committee also received evidence that a potential conflict of interest exists for water businesses in promoting water conservation measures to their customers. Although they are required by the state government to reduce consumer demand, water authorities earn their revenue from selling water. Simply put, demand management measures which reduce consumption, also reduce revenue for water retailers resulting in a lack of incentive to reduce water sales. Central Highlands Water explained this issue to the Committee as follows:

> … our costs are probably 85 to 90 per cent fixed — our labour force, our power, our chemicals are fixed — so when dealing with pricing, water authorities have to be very intelligent about the way they structure the variable and the fixed [prices] because you can get into a position of a loss of revenue if demand [falls] because of the fixed … nature of some of our prime costs.[33]

Mr Neil Brennan, Chief Executive Officer of Central Highlands Water advised that demand side management to reduce consumption can allow

[27] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 94

[28] KL is a kilolitre or 1,000 litres

[29] Barwon Water, submission no. 77, p.1

[30] Dual flush toilets have been required under Victorian plumbing regulations since the mid 1980s when 11 litre full flush and 5 litre half flush cisterns were introduced. The use of AAA rated 6 litre full flush/ 3 litre half flush toilets has been mandatory since 1993. It is estimated that a potential saving of 13 kilolitres per household per year will be achieved by 2050 through replacements with dual flush toilets. Source: Water Resources Strategy for the Melbourne Area Committee, 2002, 21st Century Melbourne: a Water Smart City, Strategy Directions Report, p. 57

[31] Barwon Water, submission no. 77, p.1

[32] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 99

[33] Mr N Brennan, Chief Executive Officer, Central Highlands Water, transcript of evidence, 28 September 2004, p. 332

water retailers to defer the costs of new infrastructure and augmenting supply. This delay of capital works can be a financial benefit to water businesses, which offsets the impact of reduced demand. For example, Central Highlands Water is working with the Daylesford community to determine whether demand side management can reduce the volume of wastewater discharged into the Daylesford treatment plant. Achieving a 10 per cent reduction in domestic wastewater will mean that a costly upgrade of the treatment plant can be avoided. Deferring this capital investment is an important financial incentive for the water business.[34]

The Committee was advised that, while demand management can reduce capital expenditure and be a positive incentive for water businesses, there is a risk to these businesses which must be carefully managed. As Mr Brennan told the Committee:

> Demand-side solutions at the customer end can sometimes offer a cost-effective alternative to supply side investments … demand-side solutions are also riskier, especially where they depend on customer behaviour. Pricing becomes a big issue. Again it is untested whether in changing pricing the customers' behaviour will remain long-term or whether they will slip back to some of the old habits. That is yet to be seen. To divert scarce funds from supply side solutions to customer-side solutions is a rigorous process ... Demand-side investments that fail increase the financial burden on the authority and its customers – we are into big dollar investment, big capital works; if we get it wrong, we get it wrong in a big way and it is there for a long time. I think we have to be very rigorous about the way we do it.[35]

Therefore the Committee recommends that:

**Recommendation 8.1**

**The State Government, through the Essential Services Commission closely monitor the impact of reduced consumer demand for household water on the revenue and financial viability of water authorities, particularly in regard to the maintenance and upgrade of water infrastructure.**

While the strategy, *Securing Our Water Future Together* is comprehensive, the Committee found that there are important barriers to implementing residential water conservation measures. This chapter discusses the key issues raised by witnesses and in written submissions to the Inquiry. Opportunities for further progress on urban water conservation are set out in the Committee's recommendations.

[34] Ibid, p. 330
[35] Ibid. p. 332

Opportunities and barriers to promoting household water efficiency

## Permanent water saving measures

The government introduced permanent water saving measures in Melbourne in March 2005 following almost two years of stage two water restrictions.[36] The permanent measures relax the restrictions under stage two on lawn watering and car washing, as illustrated in Figure 25. A number of regional urban water authorities had already introduced permanent water saving measures.[37] Historically, the requirements of water restrictions across the State have varied. VicWater, the water industry peak body has initiated the establishment of a working group to develop a set of guidelines on water restrictions for Victoria.[38] The Committee believes that uniformity in this area would reduce community confusion regarding levels and types of water restrictions.

The Committee was advised that permanent water saving measures are similar to stage one water restrictions for the metropolitan area, but are intended to promote long term behavioural changes, whereas more stringent water restrictions are a short term emergency response.[39] However, the Committee also received evidence that the community has readily accepted stage two water restrictions (stage two and higher in some rural areas).[40] Commenting on the suggestion that people may accept restrictions on a permanent basis, Mr Mark Harvey, Chief Executive Officer of the Victorian Water Industries Association told the Committee:

> One of the dangers is that you will get a backlash from people. They will accept it for a short time, but people might see it as too draconian, and you will then run into the problem of non compliance, and these regulations are difficult to enforce. A combination of a low level mandatory restriction which might save 3 per cent of water, followed by community education … is a better policy response …[41]

[36] Gray, D, 'Water curbs relaxed after almost two years', The Age, 22 February 2005

[37] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 98

[38] Victorian Water Industry Association, submission no. 57, p. 6

[39] Ms K Nixon, Senior Project Officer, Victorian Water Industries Association, transcript of evidence, 23 August 2004, p. 235

[40] Professor J Lowe, Director, Centre for Regional Innovation and Competitiveness, University of Ballarat, transcript of evidence, 28 September 2004, p. 355

[41] Mr M Harvey, Chief Executive Officer, Victorian Water Industries Association, transcript of evidence, 23 August 2004, p. 235

## Figure 25: Permanent Water Restrictions in Melbourne Introduced on 1 March 2005 and the Difference Between Stage 1 and 2 Water Restrictions (Melbourne)

| | |
|---|---|
| **Permanent restrictions (Melbourne)** | 1. Manual watering systems can only be used to water gardens and lawns between 8pm-10am, any day of the week. This rule also applies to public gardens and recreational areas.<br><br>2. Automatic watering systems (sprinklers and drip systems that are set to turn on and off automatically at preset times) can only be used to water gardens and lawns between 10pm-10am. A rain or soil moisture sensor must be fitted to all new systems installed from 1 September 2005. These rules also apply to public gardens and recreational areas.<br><br>3. A hand-held hose must be fitted with a trigger nozzle and can be used to wash the car and water the gardens and lawns at any time.<br><br>4. Hosing down driveways, paths, concrete and other paved areas is not permitted. There are exemptions to cater for exceptional circumstances.<br><br>5. Before filling a new pool or spa with a capacity of 2,000 litres or more, owners must submit a plan and have it approved by the water retailer. This plan must show how the volume of water required to fill the pool or spa will be, or has been, offset by water saved around the home. This rule only applies to new pools or spas. |
| **Key changes from stage 1 to stage 2 restrictions (Melbourne)** | Private lawns cannot be watered at any time.<br><br>Vehicles can only be cleaned with a bucket or watering can. No hoses can be used, except those connected to a high pressure water cleaning unit.<br><br>No grass sports grounds can be watered except for; formal cricket pitches, golf and bowling greens and tennis courts. |

Source: www.savewater.com.au, accessed April 2005

Research in Victoria confirms that regional and urban communities strongly support water restrictions.[42] For example, a survey of Geelong and Melbourne residents in 2001 found strong support and acceptance of water restrictions.[43] The majority (73 per cent) of those surveyed believed compliance with water restrictions was socially responsible. Frequent less

[42] Professor J Lowe, Director, Centre for Regional Innovation and Competitiveness, University of Ballarat, transcript of evidence, 28 September 2004, p. 355

[43] Newton Wayman Chong and Associates, 2001, Customer Value Study Quantitative Research Stage, Research Report prepared for System Security Standards Study Group, pp. iv-x

severe restrictions were preferred to less frequent but more severe restrictions and, in particular there was strong support for bans on hosing pavements and use of garden sprinklers in daylight hours every summer.[44] Research in Melbourne in 2003 found that 80 per cent of respondents supported the introduction of permanent water restrictions.[45] The survey also found that community awareness of specific water restrictions was very high.[46] The survey found that over 70 per cent of people were exceeding the requirements of stage two water restrictions.[47]

In Perth, longitudinal surveys between 1988 and 2002 have shown that people support restrictions in garden watering, not only in times of water shortage or drought, but also as a permanent tool for water conservation.[48] Importantly, as people have experienced increasingly stringent water restrictions over 14 years, there has been greater support for regular restrictions every year to conserve water.

The Committee supports the introduction of permanent water saving measures as a long term behavioural change strategy. The Committee also believes that widespread community acceptance of stage two water restrictions presents a unique opportunity to reinforce a water saving culture. However, in view of the significant proportion of potable water households used outdoors, particularly on gardens and washing cars, the Committee is concerned that the relaxation of the restrictions contained in the permanent measures is inconsistent with state and local government and community programs promoting reduction in outdoor water consumption. Therefore the Committee recommends that:

**Recommendation 8.2**

**The ban on watering private lawns and the requirement for hoses used to clean vehicles to be fitted with a high pressure cleaning unit, be reviewed to ensure consistency with the principle of water conservation.**

## Water efficiency standards for domestic appliances

A national mandatory Water Efficiency Labelling and Standards (WELS) scheme, through the *Federal Water Efficiency Labelling and Standards Act* 2005, was introduced in February 2005. The Minister for the Environment and Heritage declined the Committee's request to meet with federal departmental officials to discuss urban water issues including the WELS

[44] Ibid, p. v

[45] Source: www.southeastwater.com.au/sewl/index.asplink_id=1.1146

[46] For example, 97 per cent of respondents were aware of restrictions on vehicle cleaning

[47] Source: www.southeastwater.com.au/sewl/index.asplink_id=1.1146, accessed March 2005

[48] Nancarrow, B, Kaercher, J. & Po, M., 2002, Community Attitudes to Water Restrictions Policies and Alternative Sources: A Longitudinal Analysis 1988-2002, CSIRO Land and Water Australian Research Centre for Water in Society, pp. 28-32

scheme.[49] Victoria passed the relevant legislation in March 2005 and the water efficiency rating system will be phased in over one year from mid-2005.[50] The WELS scheme, an initiative of the Australian Water Fund, will introduce mandatory water efficiency labels for a range of water appliances.[51] Appliances will be labelled from one star to six stars based on performance against Australian and New Zealand standards for water efficiency.

The WELS scheme will introduce:

- mandatory water efficiency labels on all showerheads, washing machines, toilets, dishwashers, urinals and some types of taps;
- voluntary water efficiency labels on flow control devices;
- a minimum efficiency standard for toilets; and
- capacity to incorporate additional products into the scheme over time, subject to satisfactory cost/benefit analysis in respect of those products.

The Committee received evidence from a number of witnesses that this measure will encourage appliance manufacturers to improve the water efficiency of appliances, provide consumers with information at the point of purchase and maintain choice.[52] The Victorian Water Industry Association (VicWater) advised the Committee that the market penetration of water efficient washing machines (and other appliances) has already increased as a result of rebates and awareness campaigns. According to VicWater, the WELS scheme is likely to result in a flow on effect where market forces drive manufacturers to develop more affordable and efficient appliances which will eventually become the norm.[53]

However, Professor John Langford, Director of the Melbourne Water Research Centre suggested to the Committee that the WELS scheme does not go far enough. Professor Langford advised that one of the most effective measures to cut household water consumption is the use of water efficient washing machines. He advocates the mandatory introduction of

[49] Correspondence from the Minister for the Environment and Heritage, Senator the Hon. Ian Campbell to the Committee Chair, dated 13 December 2004

[50] Thwaites, J (Minister for Water), 2005, 'New Water Efficiency Labelling Will Cut Water Use' media release, 28 March

[51] Source: www.deh.gov.au/water/urban/facts.html. Appliances covered by the WELS scheme include labels for showerheads, washing machines, toilets, dishwashers, urinals, and some types of taps and minimum efficiency standards for toilets

[52] For example, Mr R Beaton, Manager Business Strategy, Yarra Valley Water, tabled material, Environment and Natural Resources Committee hearing, 8 November 2004. Also refer to Mr M Harvey, Chief Executive Officer, Victorian Water Industry Association, transcript of evidence, 23 August 2004, p. 232

[53] Victorian Water Industry Association, submission no. 57, p. 6

water efficient washing machines over the long term[54] and told the Committee:

> … with washing machines my preference would be to announce or project a minimum efficiency standard by a date in the future and say, 'You have got an opportunity to get there voluntarily and if you do not, we will mandate that'. So you give the manufacturers time to adjust …[55]

Professor Langford cited the example of the mandatory introduction of replacement dual flush toilets in Victoria in 1984 and told the Committee that dual flush toilets now make up 65 per cent of existing stock (from 2 per cent in 1984).[56] He suggested a similar scenario could occur with front loading washing machines.

The Victorian White Paper states that from 1 July 2004 mandatory water efficient plumbing measures will be introduced for all new houses and other buildings and for new fittings within existing buildings.[57] However, the Government does not propose to mandate water efficient appliances such as washing machines and dishwashers 'at this stage',[58] although it was proposed, in the preceding discussion paper (Green Paper), *Securing Our Water Future* to mandate the introduction of AAAA[59] washing machines by 2010.[60] In an earlier report, the Water Resources Strategy Committee for the Melbourne area proposed that water efficient shower roses (by 2005) and washing machines (by 2010) be mandated because these measures can deliver the largest water savings.[61]

The Committee believes that the mandatory introduction of water efficient washing machines has significant merit. Accordingly the Committee recommends that:

**Recommendation 8.3**

**The Victorian Government:**

**a) introduce a minimum efficiency standard for washing machines to be phased in over three years; and**

[54] Professor J Langford, Director, Melbourne Water Research Centre, University of Melbourne, transcript of evidence, 23 November 2004, p. 639

[55] Ibid p. 642

[56] Ibid p. 639

[57] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 102

[58] Ibid, p. 102

[59] The water conservation rating scheme administered by the Water Services Association of Australia has been superseded by the new star rating system. The industry run scheme used a system of one to five A's to denote water efficiency. A 4A appliance had a very high level of water efficiency

[60] Department of Sustainability and Environment, 2003, Securing Our Water Future Together, Victorian Government Green Paper for Discussion, p. 43.

[61] Water Resources Strategy for the Melbourne Area Committee, 2002, 21st Century Melbourne: a Water Smart City, Strategy Directions Report, p. 85

**b) seek to have a minimum efficiency standard for washing machines included in the national Water Efficiency Labelling and Standards scheme.**

The *Water Efficiency Labelling and Standards Act* 2005 mandates a six star water rating system for products such as dishwashers, toilets, washing machines and showerheads.[62] The government states that the scheme will provide consumers with the information required to make an informed decision about purchasing these products.[63] However, while the Committee recognises that the WELS scheme is an important first step in providing consumers with information, it also notes that consumers will now have two separate rating systems, energy and water, to consider when they buy many household appliances. Consumers may in the case of many products need to weigh up the relative importance of energy and water labels.

Environmental labelling is well recognised as an effective method of conveying complex information to consumers. The environmental labelling of products is widespread in Europe with a European Union model (the Flower) as well as national schemes such as the German Blue Angel and Nordic White Swan. The EU eco-label was introduced in 1992 to encourage the production of products of high environmental quality and to give consumers in Europe clear and easy guidance on greener products.[64] The most 'successful' labels extend to a wide range of products, are trusted and recognised by the community and in the case of the Flower label, are comprehensive (take into account the life cycle of a product and not just the energy and water consumption in the use phase).[65] The Committee was also advised that consumers trust government sources of information more than industry sources, as discussed in chapter 4.[66]

The Committee believes that WELS is a sound scheme. There have been extensive problems associated with energy appliance labelling schemes in Europe, as the labels are not regularly updated making it very difficult for consumers to differentiate between products. However there is scope for a more comprehensive environmental labelling scheme to be introduced nationally. The Committee was advised that consumers do not regard energy and electricity as separate/segmented issues as government agencies do. The importance of product-specific environmental information is expected to grow over the next few years.[67] Accordingly, it is recommended that:

[62] Thwaites, J (Minister for Water), 2005, Media Release, 'New Water Efficiency Labelling Will Cut Water Use', media release, 28 March 2005

[63] Ibid

[64] European Commission, 2004, Sustainable Consumption and Production in the European Union, p. 24

[65] Professor J Thøgersen, Aarhus School of Business, Department of Marketing, Denmark, meeting, Copenhagen, 28 January 2005

[66] NSW Department of Conservation and Environment, 2004, Who Cares About the Environment 2003?, p. 54

[67] Federal Environment Agency (Germany), 2004, Environmental information for products and services, p. 7

**Recommendation 8.4**

**The Victorian Government, through the Environment Protection and Heritage Council and other relevant forum, promote the development of a comprehensive national environmental labelling scheme for household products and appliances that includes energy and water efficiency.**

## Building regulations

From July 2005 the newly introduced 5 star building regulations require new houses to meet a 5 star energy rating for the building fabric, fit water efficient fixtures and to fit either a solar hot water service or a rainwater tank for toilet flushing.[68] Plumbing regulations to be introduced in July 2005 also require all new fittings in new or existing houses to have reduced flow rates.[69] The Committee supports the introduction of water efficient flow rates for all new fittings and believes this water conservation measure will result in significant water savings in the long term.

## Disclosure of water efficiency when a dwelling is sold or leased

The Committee understands that from July 2007, all dwellings in Sydney will be required to meet a minimum standard of water efficiency when sold.[70] The legislation will be supported by a low cost retrofit program available to all householders.[71]

The Committee also notes that the Green Paper proposed an amendment to legislation to include the disclosure of a hydrological assessment when a property is sold. Such an assessment would include leakages and water efficiency of appliances.[72] However, these measures are not included in the White Paper.

The Committee was advised that tenants of rental properties are often neglected in household sustainability initiatives. Renters bear the cost of water and energy consumption but often have little choice regarding the infrastructure/appliances.[73]

The Committee believes that the requirement to inform property buyers or tenants of the water efficiency of houses or buildings has the potential to raise awareness, influence behaviour and cultural norms about water use and stimulate markets to promote water efficient appliances and fittings.

[68] Source: www.buildingcommission.com.au/asset/1/upload/5_Star_houses_are_better_houses1.pdf

[69] Source: www.pic.vic.gov.au/pdf_file/5_star_plumbing_stop_press.pdf

[70] NSW Government, Department of Infrastructure, Planning and Natural Resources, 2004, Meeting the challenges: Securing Sydney's Water Future. The Metropolitan Water Plan, p. 18

[71] Ibid, p. 18

[72] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government Green Paper for Discussion, p. 45

[73] Ms N Krause, Team Leader, Sustainable Development, Moreland City Council, transcript of evidence, 23 August 2004, p. 221

Importantly, inclusion of rental properties would address a sector of the housing stock, where water (and energy) efficiency is largely neglected. Therefore it is recommended that:

**Recommendation 8.5**

**The State Government, through Sustainability Victoria:**

**a) examine the merit of a requirement for houses sold or rented in Victoria to meet minimum water efficiency standards; and**

**b) as an incentive for householders to move beyond a minimum standard, create a system of mandatory disclosure of water efficiency on the sale or lease of residential property.**

## Public building labelling

The European Directive on the Energy Performance of Buildings[74] is to be integrated into all Member States' national legislation by January 2006. For buildings over 1,000 $m^2$ occupied by public authorities and by institutions providing public services to a large number of persons, an energy certificate not older than 10 years is to be placed in a prominent place clearly visible to the public.[75] The European Union is also giving consideration to further non-energy related environmental performance requirements to complement Directive 2002/91 such as indoor air quality, accessibility, noise levels, comfort, environmental quality of the materials and the life-cycle cost of the buildings.[76] Ahead of this, Denmark and a number of European municipal authorities have introduced building labelling that includes information on water consumption. For instance the French non-governmental organisation – Energie-Cités – is conducting a Display campaign.[77] The campaign encourages European municipalities to display a poster in municipal buildings that are open to the public, providing information on the performance of buildings in terms of primary energy use, water consumption and carbon dioxide emissions, as illustrated in Figure 26. The Danish

[74] The objective of the European Union Directive 2002/91 on the energy performance of buildings is to promote the improvement of the energy performance of buildings within the Community, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.

The Directive lays down requirements as regards:

a) the general framework for a methodology of calculation of the integrated energy performance of buildings;

b) the application of minimum requirements on the energy performance of new buildings;

c) the application of minimum requirements on the energy performance of large existing buildings that are subject to major renovation;

d) energy certification of buildings; and

e) regular inspection of boilers and of air-conditioning systems in buildings and in addition an assessment of the heating installation in which boilers are more than 15 years old.

Source: European Union Directive 2002/91 on the energy performance of buildings

[75] Ibid, Article 7(3)

[76] European Union, 2004, Towards a Thematic Strategy on the Urban Environment, section 2.3.3

[77] Mr C Frering, Project Manager, Energie-Cités, Paris, meeting, 9 February 2005

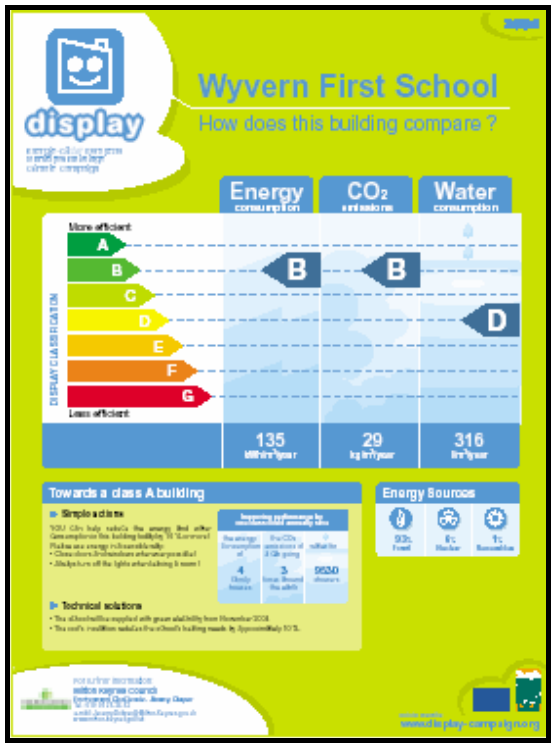
Energy Authority (DEA) has also developed a comprehensive labelling scheme for small buildings including houses.[78] Water consumption by households is audited. This scheme is discussed further in chapter 9. The performance of the DEA building itself is displayed in the public reception area.

The Committee believes that that labelling of public buildings is a direct way for government to demonstrate its commitment to water efficient buildings. Therefore, the Committee recommendations that:

**Recommendation 8.6**

**The level of water consumption of Local and State Government buildings be displayed in prominent public areas. The data should include a reference point to enable the public to make an assessment of performance.**

### Figure 26: Poster from the Energie-Cités Display Campaign




Source: Energie-Cités, www. energie-cités.org

## Monitoring household water consumption

As noted previously, the Water Services Association of Australia recently found that the majority of people underestimate their water consumption. In a recent survey it was found that 90 per cent of respondents believed their

[78] Mr J Lausten, Danish Energy Authority, Ministry of Economic and Business Affairs, meeting, Copenhagen, 31 January 2005

water use was either low or average.[79] The research indicated that householders whose water consumption is high do not realise this because their water bill does not contain comparative data other than their previous consumption over the last few quarters. The need for detailed comparative information on utility bills was highlighted by a number of witnesses in the case of both water and energy consumption.

The Committee was also advised that water meters are difficult to read and are not 'user friendly' therefore consumers find it difficult to monitor their water use and cannot monitor water use in different areas of the house, as Dr Sofoulis commented:

> Water meters are neither user friendly or saver friendly; they are only utility friendly. Engineers and computer experts … came up with these really complicated computer programs that analyse the fluctuations in flow at the water meter outside the house to find out what water is being used for and how much … whereas what people want is cheap, easy, accessible flow meters in their kitchens … or booklets of information about the different appliances and tasks … that tell them how much water is being used … what people really want is something that is a bit smaller and accessible … How can you start changing what you do if you do not know what it is that you are doing already? That is one very simple obstacle - that is, we do not know what we are doing. There is not that information around.[80]

According to *Securing Our Water Future Together* water authorities will be required to make their water bills more informative to enable households to better monitor their water use over time and compare their consumption with similar households.[81] However no time frame is given for this initiative.

The Committee received evidence that the metropolitan retailers are redesigning their customer accounts to enable direct comparison of the customer's daily water usage to that of water efficient households of the same size, using data sourced from end-use surveys. For example, Yarra Valley Water released its redesigned customer account in late 2004, as illustrated in Figure 27. However, the Committee understands that most regional water authorities have not redesigned their water bills yet.[82] One of the difficulties for regional urban water authorities in developing informative bills is a lack of data on household water use.[83]

The Committee was advised that 'smart' water meters allow households to monitor water use in real time, rather than retrospectively over the last three months.[84] However, these water meters are currently not available to

[79] Piccinin, C, 2004, Pricing for Water Conservation, Water Services Association Of Australia Journal, Issue 1, p. 3

[80] Dr Z Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, p. 601

[81] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 100

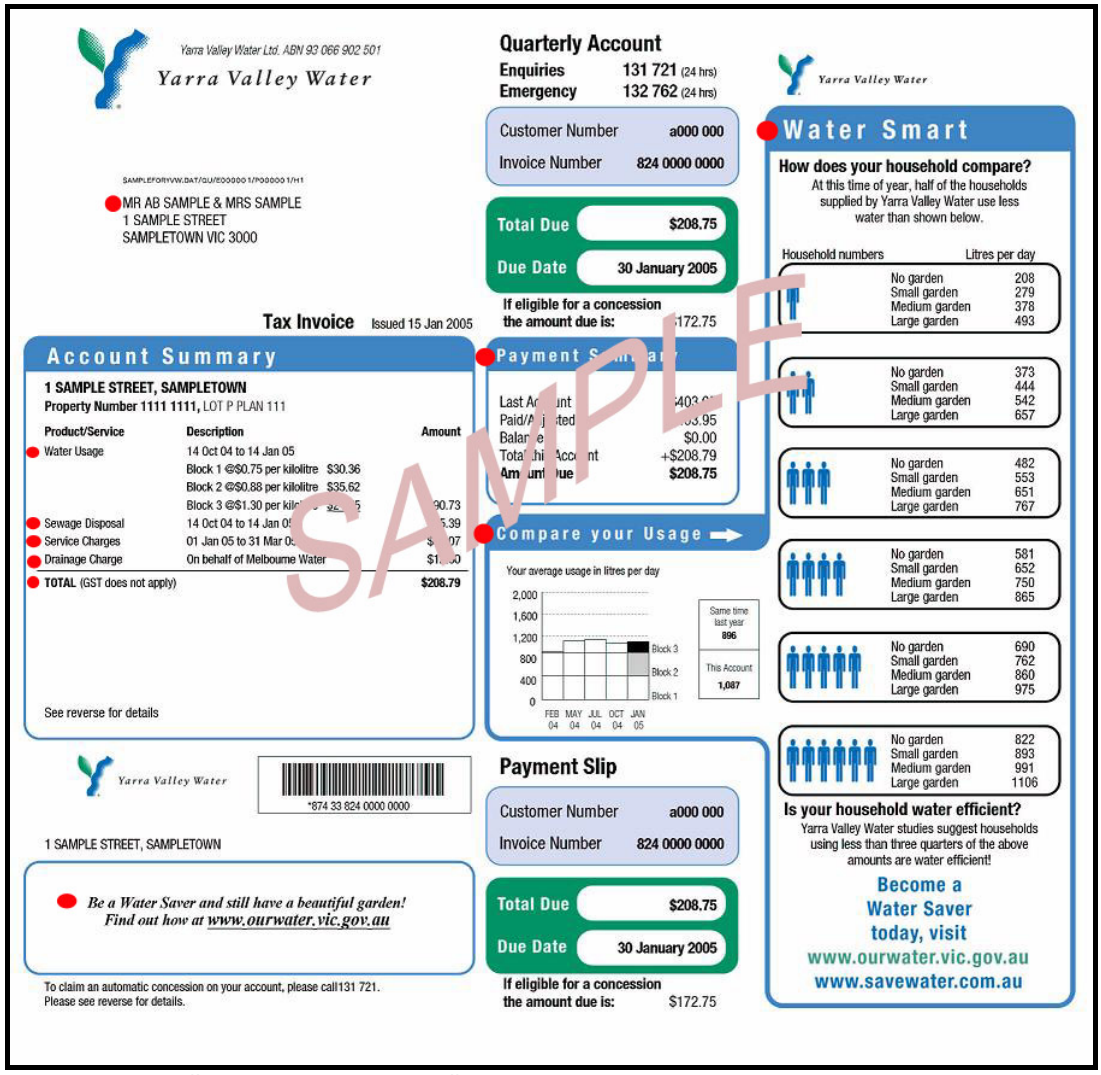
[82] Personal communication, Ms K Nixon, Project Officer, Victorian Water Industries Association, March 2005

[83] Ibid

[84] Dr D Jayasuriya, Manger, Resources Strategy, Melbourne Water, transcript of evidence, 23 November, 2004, p. 660

Victorian consumers. The Essential Services Commission has mandated the roll out of interval electricity meters to domestic and small business customers commencing in 2006. The Committee believes there is potential for a similar introduction of smart water meters.

## Figure 27: Yarra Valley Water's Informative Water Bill




Source: Yarra Valley Water, www.yarravalleywater.com.au

The need for data on how consumers' use water was identified as an issue by some of the water authorities and water businesses and discussed in chapter 5. The Committee was advised that the amount of information available to assist water authorities to manage customer demand is limited.[85] This lack of data is being addressed through a number of new projects. Central Highlands Water advised the Committee that detailed data on water use in specific communities and locations will enable water authorities to determine the most cost effective ways to manage demand. For example, the water authority outlined an innovative research project in

[85] For example refer to Mr N Brennan, Chief Executive Officer, Central Highlands Water, transcript of evidence, 28 September 2004, p. 330

Daylesford, based on detailed household data collection, to determine whether demand management measures could be put in place to reduce wastewater discharge and negate the need for a new water treatment plant (discussed in more detail below).[86] Accordingly, the Committee recommends that:

**Recommendation 8.7**

**The State Government, in partnership with water authorities, follow Yarra Valley Water's lead and introduce customer accounts that provide a comparison of the customer's average daily usage with that of a water efficient household of a similar size and location by mid 2006.**

**Recommendation 8.8**

**The Essential Services Commission investigate the impact of 'smart' water meters on household water consumption, as a matter of priority.**

## Water pricing

The Committee heard from several witnesses that the low cost of water is one of the major barriers to encouraging consumers to reduce their water consumption. The low cost of potable water[87] also means that there are few incentives to encourage the use of alternatives such as recycled water, stormwater and greywater because these sources are not competitive.[88] The price of water neither reflects its scarcity nor the environmental cost of its extraction and for households the water bill represents one of the smaller items of yearly expenditure (about $200 a year in urban Melbourne for the water only component).[89]

The low cost of water also impacts on initiatives such as the promotion of water saving products. While the government's White Paper highlights the success of the Water Smart rebate scheme for the purchase of rainwater tanks, water efficient appliances and greywater systems[90] it was also pointed out to the Committee by a number of witnesses that the purchase of water saving products does not always offer a financial advantage.[91] Water is so cheap that even with rebates, the payback period for rainwater tanks or

[86] Ibid, p. 330

[87] Mr H Rose, Group Manager, Pricing and Regulation, Melbourne Water, transcript of evidence, 23 November, 2004, p. 657; Mr T Kelly, Managing Director, Yarra Valley Water, transcript of evidence, 8 November 2004, p. 595

[88] Mr T Kelly, Managing Director, Yarra Valley Water, transcript of evidence, 8 November 2004, p. 595

[89] Professor J Langford, Director, Melbourne Water Research Centre, University of Melbourne, transcript of evidence, 23 November 2004, p. 640. The average yearly wage in Australia calculated in November 2004 was approximately $52,000, Source: www.abs.gov.au, accessed March 2005

[90] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 102

[91] For example, refer to Mr M Harvey, Chief Executive Officer, Victorian Water Industries Association, transcript of evidence, 23 August 2004, p. 230; Mr K Powell, Marketing and Business Development, Hunter Water, meeting, 25 October 2005, p. 457

greywater systems is long term. For example, a rainwater tank costing $3,000 to install may save a household 100 KL a year, a significant amount of water, but the dollar saving would be in the order of $100. VicWater advised that it may take 30 years to recoup the cost of a water tank.[92]

Melbourne Water advised it is possible that, for Melbourne at least, the real price of water could actually decline in the future because its costs to supply water could fall.[93] High water quality (low treatment costs) and little need to pump Melbourne's water supplies mean that Melbourne Water's costs to supply water are relatively low. Improvements in technology could mean that supply costs decline even further in the future. Therefore, if water prices are based only on costs of supply, Melbourne Water advised that it will be important to ensure pricing includes the scarcity of water as well as the costs to supply it and that prices continue to encourage water conservation.[94]

Melbourne Water advised that the price of water in Melbourne is low by Australian standards[95] and, compared with other developed countries, the price of water in Australia is very low, as illustrated in Figure 28.

European Union states are required under the Water Framework Directive to ensure by 2010, that water pricing policies recover the (environmental and resource) costs of water services and provide adequate incentives for the sustainable use of water.[96] Water pricing was advocated by a number of overseas experts as an effective method of promoting household water conservation.

The European Environment Agency (EEA) fact sheet on water prices states that:

> Increased water prices are more important as an enabling measure to produce a behavioural response [to water consumption]. Demand for water is relatively inelastic to changes in price and few large-scale studies have demonstrated a clear link between water prices and a percentage reduction in water use. Nonetheless, evidence suggests that all users alter their water consumption patterns in response to water charges, metering penetration and seasonal pricing (price elasticity), although prices in the domestic and industrial sectors are usually an order of magnitude higher than for agriculture.[97]

[92] Mr M Harvey, Chief Executive Officer, Victorian Water Industries Association, transcript of evidence, 23 August 2004, p. 230

[93] High water quality (low treatment costs) and little need to pump Melbourne's water supplies mean that Melbourne Water's costs to supply water are relatively low. Improvements in technology could mean that supply costs decline even further in the future. Source: Mr H Rose, Group Manager, Pricing and Regulation, Melbourne Water, transcript of evidence, 23 November, 2004, p. 657

[94] Ibid, p. 655

[95] Ibid, p. 657

[96] European Union, Water Framework Directive 2000/60/EC, Article 9

[97] European Environment Agency, 2003, Water Prices, Indicator Fact Sheet, p. 2

The EEA advised the Committee that in a number of EU countries, increasing the price of water has been an effective instrument.[98] For example in Denmark and Hungary, water consumption per person has decreased by up to 50 per cent over a ten year period of price increases, as set out in Figure 29.

## Figure 28: International Water Cost Comparison (2002)

| Rank | Country | Cost (US cents / m3* ) |
|---|---|---|
| 1 | Germany | 178.1 |
| 2 | Denmark | 172.0 |
| 3 | United Kingdom | 123.2 |
| 4 | The Netherlands | 113.8 |
| 5 | France | 108.3 |
| 6 | Belgium | 101.9 |
| 7 | Italy | 72.7 |
| 8 | Spain | 71.2 |
| 9 | Finland | 64.3 |
| 10 | Sweden | 61.5 |
| 11 | Australia | 54.7 |
| 12 | United States | 54.3 |
| 13 | South Africa | 42.8 |
| 14 | Canada | 37.6 |

Source: NUS Consulting Group International Water Survey and Cost Comparison, 2002
submitted by Mr Howard Rose, Group Manager, Pricing and Regulation, Melbourne Water

* 1 cubic metre of water = 1 kilolitre

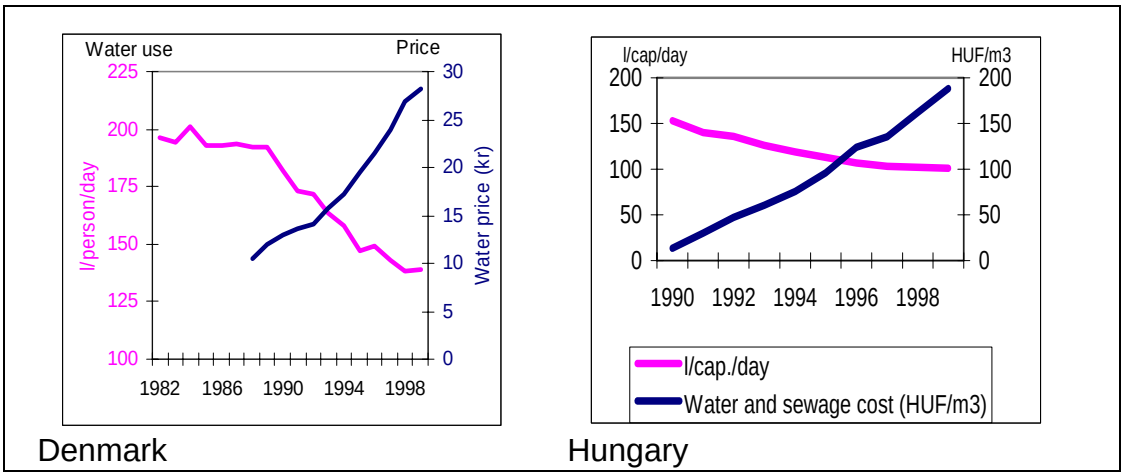
According to the Danish Environmental Protection Agency (DEPA), between 1993 and 2002, the price of household water increased by 150 per cent.[99] In other words in 2002, one cubic metre of water (1,000 litres) cost two and a half times as much as it did in 1993 (15 Denmark Kroner to 35 Denmark Kroner[100] per cubic metre). In 1989, each Dane used an average of 170 litres of water per day. This fell to 125 litres in 2002. The DEPA attributes the decline in consumption to water pricing as well as greater environmental awareness among the population.

[98] Mr L Mortensen, Program Analyst, Sustainable Consumption, European Environment Agency, Copenhagen, meeting, 1 February 2005

[99] The information in the this section is sourced from Danish Environmental Protection Agency 2004, Nature and Environment 2003 – Theme: Water in Denmark

[100] On current conversion rates 1 Denmark Kroner is equivalent to approximately 0.2 Australian dollars

## Figure 29: The Impact of Price Increases on Water Consumption in Denmark and Hungary




Source: Mr L Mortensen, Project Analyst, Sustainable Consumption, European Environment Agency, Copenhagen, meeting, 1 February 2005

The OECD advised the Committee that water pricing as a management tool needs to be used in combination with education as many people do not know what they pay for household water.[101] For example, the most expensive household water in Europe is in Germany, where the majority of people do not know the price they pay for water nor the volume of their consumption.[102] The United Nations Environment Program emphasised the importance of water metering as part of the process of educating households about water consumption and promoting conservation, in conjunction with water pricing that reflects the value of the resource.[103]

The Victorian Government introduced a new pricing structure, the rising block tariff, for domestic water in Melbourne in October 2004, as illustrated in Figure 30.

The structure is designed to reward water conservation and reflect the environmental cost of high water use by charging more for discretionary water use. In regional areas, water authorities will also be required to design pricing structures that reward water conservation.[104] The pricing structure is part of a larger water pricing reform package outlined in the White Paper.

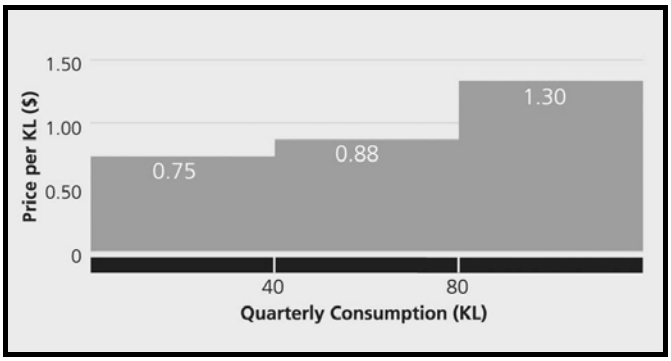
[101] Mr K Ruffing, Deputy Director, Sustainable Materials and Waste Management, National Policies Division, OECD, meeting, Paris 7 February 2005

[102] Organisation for Economic Cooperation and Development, 2002, Towards Sustainable Household Consumption: Trends and Policies in OECD Countries, p. 80

[103] Ms A Z Farah, Programme Officer, United Nations Environment Program, Division of Technology, Industry and Economics, meeting, Paris, 9 February 2005

[104] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p.127

## Figure 30: New Rising Block Tariff for Household Water in Melbourne




Source: Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 127

© State of Victoria, Department of Environment and Natural Resources 2004

Some experts advised the Committee that while the price of water has a role to play in reducing demand, and historically the introduction of volumetric charging has contributed to reduced consumption, that role is limited because water is a price inelastic commodity - a large increase in the price of water does not produce a comparable reduction in consumption.[105] Further, the Committee was advised that it is difficult to separate the effect of price from other demand management measures.[106]

The mixed evidence the Committee received suggests that household water is an inelastic commodity until substantial price increases are made.

However, in Victoria, the long term impact of the recent introduction of rising block tariffs remains untested, and it is yet to be determined whether under the new pricing arrangements consumers will maintain the changes in behaviour currently observed or whether they will 'slip back into old habits'.[107]

A simple example illustrates the likely impact of the new rising block tariff on a typical household in Melbourne. A recent study of daily water use in a sample of Melbourne households found the average daily water consumption of households in the study to be 1,023 litres (the average size of households in the study was 3.3 people).[108] Prior to the introduction of the new water pricing structure, this amount of water would have cost 0.84

[105] For example refer to Professor J Lowe, Director, Centre for Regional Innovation and Competitiveness, University of Ballarat, transcript of evidence, 28 September 2004, p. 353; Mr H Rose, Group Manager, Pricing and Regulation, Melbourne Water, transcript of evidence, 23 November 2004, p. 657

[106] Professor J Langford, Director, Melbourne Water Research Centre, University of Melbourne, transcript of evidence, 23 November 2004, p. 642; Mr H Rose, Group Manager, Pricing and Regulation, Melbourne Water, transcript of evidence, 23 November 2004, p. 656

[107] Mr N Brennan, Chief Executive Officer, Central Highlands Water, transcript of evidence, 28 September 2004, p. 332

[108] Gato, S, et al., 2004, Understanding Residential Water Use, paper presented at Water Futures: re-imagining the suburb, Melbourne Museum, 19 October 2004, p. 4

cents a day.[109] Under the new structure the cost of water increased by only 0.10 cents per day to 0.94 cents, representing an increase in the annual water bill of approximately $37.

The Committee requested information from the Department of Sustainability and Environment regarding the estimated impact of the rising block tariff on consumption. DSE advised that the demand forecasts that were used to determine the rising block tariff prices set out in the White Paper are not publicly available.[110] The impact on demand of the new rising block tariff has been calculated by several water authorities for 2004-05, as follows:[111]

| **Water authority** | **Impact on residential consumption for 2004-05 (note: the new tariff was introduced on 1 October 2004)** |
|---|---|
| City West Water | 1.75% reduction |
| Yarra Valley Water | 1.5% reduction |
| South East Water | 2% reduction (permanent) |

The proposed price increases for water in Victoria over the next three years are also negligible. The Essential Services Commission (ESC) has released its draft decision on prices for water, sewerage and related services for the period 1 July 2005 to July 2008. The price increases for water are proposed within the existing rising block tariff system. According to the ESC the proposed pricing adjustments imply an increase in the water and sewerage bill for the average Victorian household of about 3 per cent per annum over the three year pricing period beginning 1 July 2005.[112] The average statewide household bill (including water, service and sewerage charges) may increase from the current level of $507 to $555 by June 2008.[113] In the metropolitan area, bills may rise between $9 and $18 by 2008. The Commission's final decision on pricing will be made in June 2005.

While the water pricing reforms send an important signal to the community, the Committee believes that the price increases under the new rising block tariff structure are too modest to have a significant impact on consumption. Accordingly, the Committee recommends that:

[109] Under the previous pricing scheme water cost 82.74c per KL (1000 litres).

[110] Personal communication, Mr W Guthrie, Senior Policy Advisor, Water Sector Group, 14 April 2005

[111] Sources: City West Water, 2004, Water Plan 2005-06 to 2007-08, p. 68; Yarra Valley Water, 2004, Water Plan Overview 2005-06 to 2007-08, p. A7:9; and South East Water, 2004, 2005 Water Plan, p. 44

[112] Infrastructure investment (including increased recycling) is the key driver for the price increases. Source: Essential Services Commission, 2005, Water Price Review Draft Decision Fact Sheet 1

[113] Ibid

**Recommendation 8.9**

**The State Government, through the Essential Services Commission:**

**a) Further investigate the pricing of metropolitan water, within the rising block tariff structure, to promote water conservation, including discretionary use above essential indoor consumption;**

**b) Pricing structures outside the metropolitan area should reflect the same principles; and**

**c) The revised water pricing structure should ensure a safety net is in place to protect low income consumers.**

## Alternative urban water supplies

*Securing Our Water Future Together* outlines the state government's policy for the use of alternative water supplies (recycled water, greywater and stormwater) for non-drinking uses where there is a net benefit to the community and to minimise detrimental discharges to the environment.[114] The strategy sets out a series of actions for the Government and community to meet the water recycling target of 20 per cent by 2010 for Melbourne, and recycling targets for regional Victoria. These actions include the assessment of large-scale effluent recycling schemes and the development of third pipe schemes in new residential developments. The government will not place recycled water directly into the drinking water supply system (however technical development and implementation elsewhere will be monitored) and will not mandate third pipe systems in all new greenfield residential developments.[115] The water industry advised the Committee that the recycled water target for Melbourne of recycling 20 per cent of waste water by 2010 will be difficult to meet.[116]

The government's White Paper *Securing Our Water Future Together* sets a target for new developments to achieve at least 25 per cent savings in water use.[117] The White Paper notes that further work is required to determine how the 25 per cent should be measured and achieved.[118] The White Paper states that the government will prepare WSUD guidelines to assist stakeholders to achieve the target, provide funding to support WSUD innovation and require urban water authorities to plan for new growth areas in the development of their water supply and demand strategies.

[114] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 106

[115] Ibid, p. 111

[116] Mr M Harvey, Chief Executive Officer, Victorian Water Industry Association, transcript of evidence, 23 August 2004, p. 232

[117] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper pp. 103

[118] Ibid p. 103

**Water Sensitive Urban Development (WSUD)**

Water sensitive urban development (sometimes called water sensitive urban design) is the integration of urban planning and development with the management, protection and conservation of the water cycle.

The water cycle is a complex interaction of rainfall, evapo-transpiration, overland flow and groundwater flow. The key principles of WSUD include:

- reducing potable water demand through water efficient appliances, and rainwater and greywater re-use;
- minimising wastewater generation and treatment of wastewater to a standard suitable for re-use or release into receiving waters;
- treating urban stormwater to meet quality standards suitable for re-use or release into receiving waters; and
- using stormwater in the urban landscape for visual and recreational amenity in developments.

WSUD addresses water resource management at the catchment, suburban, precinct, cluster and allotment scale. WSUD makes the entire stormwater treatment network part of the urban environment. Vegetated swales, filter strips, extended detention basins and constructed wetlands are all part of fully functioning stormwater treatment systems. It maximises infiltration and on-site storage, treatment and re-use and utilises natural runoff channels where appropriate.[119]

The principles of water sensitive urban development are well established however there have been a number of barriers to implementation, not only in Victoria but throughout Australia. As Mr Tony Kelly, Managing Director of Yarra Valley Water stated that:

> …. five years ago we used to talk about what are sensitive urban designs but then we realised we've got to get people to actually build these things so let's start calling them developments, not just designs. But there has been a problem as far as I can see and these ideas have been around for a while and there [were] some good demonstration projects. And we probably haven't had really good third party tough evaluation of them to spread the good word and to learn from them … I think we know how to put all those bits together, we're just not getting enough runs on the ground where we're actually doing it.[120]

[119] Department of Environment and Heritage, 2002, Introduction to Urban Stormwater Management in Australia, www.deh.gov.au/coasts/publications/stormwater/design.html

[120] Mr T Kelly, Managing Director, Yarra Valley Water, transcript, Greywater Forum at the Melbourne Museum, 10 November 2004, p.24

There is considerable potential for re-use of water for a range of purposes including agricultural and horticultural irrigation, watering parks and recreational areas, some industrial processes, toilet flushing and garden watering, however, significant barriers remain to establishing these techniques. Water recycling is not well established in Australia and while there has been a trend towards the use of recycled water from sewage treatment plants in regional areas, rates of adoption have been slow and very little recycling is taking place in capital cites.[121] The Australian Academy of Technical Sciences and Engineering (ATSE) recently reviewed water recycling in Australia and states that about 10 per cent of treated effluent from sewage treatment plants is recycled throughout Australia.[122]

The Committee was advised that there has been extensive experience of alternative water supplies overseas. According to the academy, recycled water treated to drinking water standard is technically feasible, completely safe and practised overseas.[123] World wide, water re-use is becoming increasingly common. Water recycling is well developed in the United States, densely populated European countries, Japan and Singapore.[124] In California for example, reclaimed wastewater was first used for irrigation of crops in 1912.[125] California now has a well developed set of public health laws and regulations related to recycled water. Adoption of water recycling is widespread with approximately 600 GL of recycled water used annually in 4,800 locations across the state.[126] Los Angeles County has been augmenting a groundwater basin with reclaimed water since 1962, potable water is subsequently withdrawn from the basin. It is estimated that up to 23 per cent of the potable groundwater is indirectly recycled water.[127]

The main barriers to the uptake of alternative water supplies identified by witnesses relate to public acceptance, economic and regulatory barriers, resistance from the relevant professional trades (e.g. engineers, planners, architects, developers, plumbers) and the quality of water for re-use (this issue is discussed under a separate section of this chapter). These issues are discussed in turn below.

**Public Acceptance**

According to the CSIRO, public acceptance of greywater varies. Householders are more willing to accept using greywater from their own houses for garden and toilet flushing, than neighbourhood scale greywater reuse.[128] The ATSE reports that, while public acceptance of recycled water

[121] Australian Academy of Technological Sciences and Engineering, 2004, A Summary of the ATSE Report on Water Recycling in Australia, pp. 6-7

[122] Ibid, p. 6

[123] Ibid, p. 19

[124] Australian Academy of Technological Sciences and Engineering, 2004, Water Recycling in Australia, pp. 21-46

[125] Ibid, p. 23

[126] Ibid, p. 24

[127] ibid, p. 25

[128] Dr C Diaper, CSIRO Urban Water, transcript, Greywater Forum, Melbourne Museum, 10 November 2004, pp. 11-10

for irrigating gardens, parks, ovals and farms is high, there remains a strong psychological objection in the community to drinking or showering in recycled water.[129] This mistrust of recycled water for domestic purposes may extend to concerns about contamination of products in the horticulture industry.[130] For example, following the introduction of recycled water for irrigation of vegetable crops for the first time in Victoria, a recent press report suggested that there remains considerable lack of confidence amongst vegetable growers, eligible to receive the recycled water.[131] The ATSE points out that local communities have rejected recycling proposals because of a failure to take into account community priorities:

> Apart from those [examples] described earlier in Queensland, there are many other examples around the world where local communities have rejected recycling proposals because of a failure to take into account the various factors that such communities see as important. The reasons for failure are commonly a lack of coordination between the authorities involved in planning health, water supply and environmental management, and inadequate community consultation on the issues. Part of the problem is probably due to the "top down" expert-based approach to water planning where experts develop solutions and then consult the community … Success stories often show the recycling agenda being driven by community organisations that are able to encourage integration between the various arms of Government. These observations indicate that sustainability cannot be achieved through technical and administrative means alone. The active participation and "ownership" of households and consumers in the decision-making process is essential. [132]

Although surveys indicate public support for use of recycling in gardens and recreation fields, there is very little familiarity with recycled water in Victoria. Further, the Committee believes promotion of water re-use (and overcoming the existing barriers) will require a process of long term familiarisation. At a recent forum on greywater re-use, the Chair of the Victorian Water Trust Advisory Council, Professor Peter Cullen commented:

> … people get accustomed to [recycled water] and they become very comfortable with it … I'm of the view that there's probably a 10 year learning curve here as the community learns to accept some of these options …[133]

### Economic barriers

Yarra Valley Water advised the Committee that the water recycling options available are relatively expensive when compared with other demand management options. The Committee was advised that recycling projects need to be considered carefully based on the characteristics of the particular site as different sites have different embedded energy requirements to

[129] Australian Academy of Technological Sciences and Engineering, 2004, A Summary of the ATSE Report on Water Recycling in Australia, pp. 18-19

[130] Professor I Rae, Technical Director, Academy of Technological Sciences and Engineering, transcript of evidence, 6 July 2004, p. 100

[131] Noble, T, 'This is recycled water from the city's sewage. It's going on your vegetables', The Age, 2 April 2005

[132] Australian Academy of Technological Sciences and Engineering, 2004, Water Recycling in Australia, ATSE 2004, p. 143

[133] Professor P Cullen, 2004, transcript, Greywater Forum, 10 November 2004, Melbourne Museum, p. 26

supply reticulated water and sewerage. For example, in Yarra Valley Water's case, 90 per cent of its water is supplied by gravity to customers and requires little energy to treat and supply. Recycled water requires significant amounts of energy to treat and pump to customers. Therefore, for Yarra Valley Water, recycled water is both more expensive to supply and generates significant amounts of greenhouse gases. In other situations, where pumping potable water large distances is expensive and ecologically costly because of the energy required, localised recycling may be more cost effective.[134]

Melbourne Water advised the Committee that, it may not always be economically viable for water authorities to provide recycled water.[135] As noted above, provision of recycled water to new developments can be expensive due to the high cost of pumping water to some areas. There are additional costs associated with providing infrastructure for recycled water use in new developments.[136] There are several examples of greenfield developments incorporating aspects of water sensitive urban development, including stormwater capture and third pipe systems to reticulate locally treated waste water to homes.

The Aurora development on Melbourne's northern fringe incorporates a local treatment plant that will provide high quality recycled water to homes through a third pipe system. In August 2004, the government also announced the development of a township of 3,000 dwellings in western Melbourne which will be fully connected to recycled water from a neighbouring treatment plant. The proposed township of Eynesbury will use recycled water for toilet flushing, domestic gardens and irrigation of public open space.[137] However, despite such initiatives, developments incorporating third pipe recycled water systems and other aspects of water sensitive urban development remain the exception rather than the rule in Victoria.

The Committee was advised by the Inkerman Oasis developers that there is no economic incentive for an on site water recycling scheme. Although water sensitive urban development reduces the demand on the reticulated water, sewerage and stormwater systems, there are no financial incentives for developers such as rebates based on the reductions in infrastructure costs ('head works' charges). The City of Port Phillip explained that water authorities and state agencies are cautious about WSUD:

> I think water authorities in general have a conflict of interest between profit objectives and the objectives of the state in water recycling. I think some clearer framework on

[134] Mr R Beaton, Manager, Business Strategy, Yarra Valley Water, transcript of evidence, 8 November 2004, p. 590

[135] Mr C Chesterfield, Manager, Development Planning, Melbourne Water, transcript of evidence, 23 November 2004, p. 656

[136] Department of Sustainability and Environment, 2003, Green Paper Technical Paper No. 1: Water Recycling Scenarios for Melbourne, Victorian Government, Melbourne, p. 27

[137] Thwaites, J (Minister for Water and Environment), 2004, 'New Town to be Fully Connected to Recycled Water', media release, 13 August

> how to proceed will address some of that because it is very difficult. There is also the conflict between health risk, because water authorities are the operators of the systems, and for good reasons they do not want to take unacceptable risks and be liable for that, and yet innovation is saying, 'Try out new things because we have targets to achieve for water recycling'.[138]

### Regulatory barriers

The Committee was advised that a number of programs such as the MAV's Clearwater Program are assisting local government and industry to become familiar with WSUD[139] and Melbourne Water has completed technical guidelines for WSUD.[140] However, the MAV points out that there is still great confusion and lack of understanding amongst the various stakeholders, including local government officers and developers about the principles and practices of WSUD, common misconceptions and reluctance to adopt, based on costing, maintenance and safety concerns.[141] In a recent report on recycled water in Australia, the Australian Academy of Technical Sciences and Engineering summarised the situation as follows:

> The processes that have to be undertaken and the approvals obtained for subdivisions with creative water supply and effluent treatment provisions can be very cumbersome, involving multiple interactions with a number of different agencies at state and local government level, and serve to inhibit innovation.[142]

In existing urban areas, small neighbourhood scale systems using rainwater or treated effluent from local treatment plants are potentially viable options for reducing demand for potable water. There are few such schemes operating at present. The Inkerman Oasis development in St Kilda is an example of a successful local scale water re-use scheme. However, the City of Port Phillip advised the Committee that approvals for the water recycling systems for the Inkerman Oasis, an inner city apartment block development, took over two years and resulted in considerable uncertainty for the developer The City of Port Phillip stated that the regulatory framework for the approval of residential recycling schemes is not well developed and advised the Committee that, while there are state government targets for water recycling, the current regulatory framework does not allow for innovative approaches to re-use of water, making it difficult for developers to pursue cost-effective options for different sites.

> There is a lack of regulatory framework for water recycling, and a lack of framework for taking innovation further. The state Environment Protection Agency and Department of Human Services guidelines were written on the back of the negotiation process [for the Inkerman Oasis development]…The guidelines take on a risk management approach without seeking to facilitate and support innovation…or at least provide a framework for understanding what further innovation could be

[138] Mr G Spivak, Housing Development Officer, City of Port Phillip, transcript of evidence, 11 October, 2004, p. 432

[139] Municipal Association of Victoria, submission no. 28, p. 14;

[140] Municipal Association of Victoria, 2004, Summary of Impacts: Securing Our Water Future Together, p. 6,

[141] Ibid, p. 6

[142] Academy of Technological Sciences and Engineering, 2004, Water Recycling in Australia, p. 144

> acceptable on a health risk basis, and what would not be and under what conditions.[143]

On the basis of this experience, the Inkerman Oasis developers advised the Committee that many other developers interested in WSUD, had been put off the process because it was seen as simply 'too difficult'.[144] There is clearly a need for a robust regulatory framework to support the policy promoting alternative water supplies.

*Securing Our Water Future Together* sets out actions to update the regulatory framework and guidelines for the use of recycled and re-used water and alternative supplies.[145] These actions include:

- reviewing the Victorian Planning Provisions to ensure consistency with the government's policy for sustainable water management;
- reviewing the building approvals framework to provide a consistent performance-based approach to sustainable urban water management; and
- requiring water authorities, drainage authorities, catchment management authorities and local government to develop local planning policies that are consistent with sustainable urban water management.

However no time frame is given for this review in the White Paper. The EPA and the Department of Human Services are also reviewing the framework and guidelines for alternative urban water sources including recycled water, greywater, stormwater and rainwater by mid 2005.[146] The Committee supports these actions and believes they are a prerequisite to the widespread uptake of alternative household water supplies.

The Committee believes there is considerable potential for the harvesting and re-use of stormwater both in new developments and existing urban areas. For example extensive paved areas and car parks are a significant source of runoff. However, the Committee is concerned that a range of barriers is preventing further development of this resource.

The Committee recognises that the state government is encouraging the harvesting of stormwater through the Stormwater and Urban Water Conservation Fund, an initiative to develop local-scale stormwater conservation, recycling and water sensitive urban development. This fund provides $10 million over three years for local water re-use projects, with a particular emphasis on stormwater. The fund will support the development

[143] Mr G Spivak, Housing Development Officer, City of Port Phillip, transcript of evidence, 11 October 2004, p. 431

[144] Mr G Kerans, Director, Integrated Eco Villages Pty Ltd., transcript of evidence, 11 October 2004, p. 432

[145] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p.122

[146] Ibid, pp. 122-123

of infrastructure, demonstration sites and education projects. The Committee supports this initiative and believes the outcomes of projects supported under the fund should contribute to the long-term strategic approach to stormwater conservation and re-use. The Committee also believes that it is critical to the promotion of stormwater re-use that projects supported under the fund be required to address water quality and best practice water sensitive urban development.

The Committee is also concerned that the uptake of third pipe schemes in new developments remains minimal. While the Committee acknowledges that third pipe systems are not always the most cost effective means of alternative water supply in all areas, it believes that third pipe systems have the potential to provide significant water savings in many new developments and should be considered in the planning of new residential developments in areas where the costs of transporting recycled water or recycling water on site are not prohibitive.

**City of Darebin Reservoir Civic Centre**

The Reservoir Civic Centre was completed in August 2004. The building provides an example of sustainable technologies that can be transferred into the homes of residents - one of the Council's key aims in re-developing the building. Educational materials available at the centre and through other council facilities emphasise these opportunities and encourage residents to pursue them. These include a touch screen explaining how the sustainable design features work and a series of brochures outlining steps the community can take towards sustainability in energy, water, materials, air quality and waste.[147]

Water efficiency features of the building include: low flow taps, toilets and showers; waterless urinals; efficient dishwashers; and rainwater harvesting for re-use in flushing toilets and drainage of rainwater from the car-park for use in flushing toilets. Council expects to save about 1.5 million litres or about 10 swimming pools full of water every year and achieve annual savings of $1,505. This will pay for the installation of the system over a period of around 16 years.[148]

Challenges included the need to show that the quality of water is of equal to or higher quality than required; the initial cost of pay back was slow; and there was difficultly in co-ordinating water and sewage planning issues between the EPA, health authorities and utilities. [149]

[147] Municipal Association of Victoria, submission no. 28, pp. 22-23

[148] Source: www.savewater.com.au/default.asp?SectionId=69&ContentId=91&Page=1&SortTag=, accessed March 2005

[149] Ibid

The Committee understands from the White Paper that DSE is to prepare a set of guidelines on WSUD.[150] The Committee believes that this is unnecessary given the number of guidelines available on WSUD, including the technical guidelines prepared by Melbourne Water. Instead, the Committee believes that DSE should develop a comprehensive strategy to overcome the main barriers to the implementation of WSUD. Accordingly, the Committee recommends that:

**Recommendation 8.10**

**The review of the Victorian Planning Provisions and building approvals framework should be completed as a matter of priority, in order to ensure a consistent approach to sustainable urban water management.**

**Recommendation 8.11**

**The Environment Protection Authority and the Department of Human Services review of the framework and guidelines for alternative water sources including recycled water, greywater, stormwater and rainwater, should be completed as a matter of priority.**

**Recommendation 8.12**

**The Department of Sustainability and Environment develop a comprehensive strategy to address the main barriers to the implementation of water sensitive urban design principles including public acceptance, economic and regulatory barriers, resistance from the relevant professional trades (e.g. engineers, planners, architects, developers, plumbers) and the quality of water for re-use. The strategy should be developed as a matter of priority and take into account the findings of:**

**a) the review of the Victorian Planning Provisions and building approvals framework; and**

**b) the Environment Protection Authority and the Department of Human Services review of the framework and guidelines for alternative water sources.**

**Recommendation 8.13**

**The Department of Sustainability and Environment, as part of the strategy to address the barriers to the implementation of water sensitive urban design, develop an assessment tool to assist developers to determine the cost effectiveness of providing a third pipe system in new developments.**

[150] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p.104

**Resistance from the relevant professional trades**

The Committee recognises that there are a number of excellent programs to promote sustainable water use principles and provide training within the building and design industries. The Clearwater Program, for example is an initiative of the MAV and stormwater industry which aims to facilitate the development of sustainable environmental management practices for urban stormwater. The GreenPlumbers Program, is a training and accreditation program developed by the Master Plumbers and Mechanical Services Association of Australia to enhance plumbers' skills and knowledge about the environmental considerations of their work. The Greensmart program, an initiative of the Housing Industry Association (HIA) and the Department of the Environment and Heritage, also provides training to the building industry on environmentally sustainable housing.

However, despite these initiatives the Committee believes that one of the key barriers to the adoption of many sustainable practices at all levels was the lack of practical demonstration projects which familiarise people, whether local government officers, developers or householders, with new approaches. Therefore, the Committee recommends that:

**Recommendation 8.14**

**The Department of Sustainability and Environment in collaboration with the Municipal Association of Victoria, Master Plumbers and Mechanical Services Association of Australia, the Housing Industry of Australia, water authorities and Local Government develop water sensitive urban development demonstration projects that will become models of best practice for Local Government, developers and the community:**

a) **these projects should be rigorously evaluated and the results from the evaluation widely publicised;**

b) **the demonstration projects should include the use of greywater, recycled effluent and stormwater and developments of different scales; and**

c) **the demonstration projects should integrate, where possible, with energy efficiency demonstration projects and extend across Victoria.**

**City of Port Phillip – Inkerman Oasis**

The Inkerman Oasis is a sustainable housing development resulting from collaboration between the City of Port Phillip and Inkerman Developments Pty Ltd.

Located in St Kilda, the 236 apartments incorporate a range of passive and active sustainable design principles and demonstrate how a relatively high

density of housing can be achieved whilst retaining open space and avoiding tower buildings.

The development marks the first time in Australia that greywater and stormwater in a high density development will be recycled for irrigation and toilet flushing.

The Inkerman Oasis development has been awarded the UN Association of Australia World Environment Day Award 2000; the Stockholm Partnership for Sustainable Cities Award 2002 and the Greenhouse Building Nomination 2002.

## Household greywater recycling

Dr Zoe Sofoulis gave the Committee an insight, from a social scientist's perspective, into why water conservation was a difficult task in modern urban environments. The infrastructure and everyday technologies associated with water supply create a barrier to household water efficiency because they are designed to use and dispose of water rather than conserve and recycle it. Dr Sofoulis advised that:

> This produces a strange situation where technologies like the drain or the washing machine pump and hose, which we barely notice and have taken for granted and did not even think to have an attitude about, suddenly appear inconvenient and awkward, not because they have stopped working but because people are wanting to do different things with them. They are wanting to take that water out to the garden and to save rather than use water. My point here is that we cannot expect to bring about significant changes in water use practices without there being changes in all these three dimensions: the system, the objects and the habits of users.[151]

Dr Sofoulis contends that there is a lack of cheap accessible water saving technologies appropriate to people's varying situations and that the nature of water supply and disposal in urban environments means that consumers have little control over their domestic water. Therefore attempting to reduce demand in times of water restrictions can be difficult.

In existing housing stock, the means of controlling water supply and disposal for individual households are limited. Householders can recycle greywater either manually using hoses or buckets or through a greywater recycling

[151] Dr Z Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, p. 599

system or install a rainwater tank to harvest stormwater. However, there are significant barriers for householders in pursuing some of these options, particularly the installation of a household greywater recycling system. While greywater systems can save an average household a significant quantity of water, they are technically demanding, costly to install and require considerable commitment on the part of the householder to maintain.[152] There are health risks involved with storage of greywater, therefore it must be stored in an appropriate tank and a septic tank permit is required. There are no standards for greywater systems and there are a number of regulatory barriers (discussed below) faced by householders wishing to install them.

The Committee was advised that the installation of permanent household greywater re-use systems presented a problem for local government. While greywater recycling is promoted through the government's Smart Homes rebate scheme, some local government by-laws prevent the installation of these systems due to concerns about long term soil degradation and public health risks.[153]

Bayside City Council advised that from their experience there is a poor understanding of the health risks of greywater in the community. Under the current EPA guidelines a septic tank permit is required to store greywater for more than 24 hours or to treat it.[154] Mr Michael Dodd from Bayside City Council advised the Committee:

> People are very interested but there is a poor understanding of the associated risks of greywater. I tread very warily when promoting greywater to people. As the EPA guidelines exist at the moment, for domestic properties you require a septic tank permit to put in a greywater system. I always stress that to people. A septic tank permit is required if you are going to store the greywater for 24 hours or if you are going to treat it in any way … People are interested but the understanding around the issue, especially the health risks, are not there in the community.[155]

Central Highlands Water, in its options paper for development of its long term water resources strategy, has excluded the development of permanent household greywater systems as a viable option for water conservation in Ballart and the surrounding district. Central Highlands Water states that permanent household greywater systems present significant challenges to their customers to ensure damage to soil and the local environment is avoided and that waste can be contained on site during persistent wet weather.[156] Some local government agencies will not approve permanent outdoor greywater systems due to health and environmental concerns (although a permit can be issued for a connection for toilet flushing).

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[152] Mr T Kelly transcript, Managing Director, Greywater Forum, Melbourne Museum, 10 November 2004, pp. 8-9

[153] Central Highlands Water, submission no. 52, p. 3

[154] Mr M Dodd, Environment Policy Officer, Bayside City Council, transcript of evidence, 11 October 2004, p. 422

[155] Ibid, p. 422

[156] Central Highlands Water, 2005, Options Paper: Securing Ballarat and District's Future Water Supply, p. 25

Ms Helen Lewis, Director of the RMIT Centre for Design posed the question:

> Should we be relying on you and me to put in a greywater system and to run it properly and protect our health and the health of our neighbours; or should we go the third pipe and look at it from a neighbourhood or community development level? I think that is a decision that needs to be made very quickly, because on the one hand we are giving people the message that we will give them rebates for using greywater and so on. On the other hand, there are community risks, and we have spent ... many years setting up really fantastic safe ways to use water and sewage treatment and we risk compromising health by going down a more decentralised and leave-it-to-the-people sort of system.
>
> I think it is a decision that has to be taken. Maybe it is a mix of the two, that in new developments it's third pipe but elsewhere people put in their own system. But there is a risk, because if I sell my house and somebody moves in and they don't really understand greywater and how to manage it properly.[157]

The Committee found that, based on the evidence received, there is a clear need to review the approach to household greywater use in Victoria. The critical need to reduce household water consumption has prompted Government to send a signal that household greywater use is a desirable conservation practice, however, at the same time, regulations, based on the need to protect health and the environment, limit the use of greywater.

Results of a recent survey undertaken by the Alternative Technology Association (ATA) indicate that most greywater systems are low cost and installed by homeowners who have no contact with their local council regarding the safe use of greywater. The ATA believe this trend indicates that many household greywater systems are in breach of current EPA guidelines and local government requirements and that the systems are installed without any guidance or concern for human and environmental health.[158] For example the survey found the use of open greywater systems to irrigate vegetable gardens and the use of greywater containing laundry detergents with high salt levels to be common practice. Both of these practices have potential health or environmental risks.[159]

At a practical level, there is a lack of information and guidance on the suitability of household greywater systems for different situations. There is a need for clear guidelines to assist the community and those advising the community, such as local government officers, to determine where greywater re-use is appropriate. The ATA comments that management of greywater must be focussed on the needs of the consumer with regards to information, regulatory and incentive measures, otherwise greywater systems will continue to be installed without correct guidance and the risks will remain unmanaged.[160]

[157] Ms H Lewis, Director Centre for Design, RMIT, transcript of evidence 6 July 2004, p. 80

[158] Alternative Technology Association, 2004, 'Greywater Sneaking Under the Radar', media release, 6 November, p. 4

[159] Ibid, pp. 4-5

[160] Ibid, p. 5

*Securing Our Water Future Together* states that the government will review the framework for alternative urban water supplies, including the use of greywater in individual households by mid 2005.[161] The review will consider the level of regulation needed, the most efficient approaches for approving the use of individual alternative water supplies and reporting and auditing requirements to ensure the safety of alternative water supplies.

The Committee believes that although greywater can be used safely and effectively to replace potable water in individual households and multi-unit apartments, the current policy and regulatory framework is inadequate and a strategic approach to household greywater use in Victoria is required.

Accordingly the Committee recommends that:

**Recommendation 8.15**

**The Department of Sustainability and Environment's strategy on the implementation of water sensitive urban design include:**

**a) an outline of the roles and responsibilities of various public authorities with regards to household greywater use;**

**b) a clear regulatory framework for the installation and maintenance of greywater systems for multi-unit dwellings;**

**c) a greywater communications strategy to inform householders of the risks, benefits and maintenance requirements for greywater diversion devices and treatment systems and the purposes for which greywater can be used safely. This strategy should be developed in cooperation with the Environment Protection Authority, Department of Human Services, Municipal Association of Victoria and other relevant authorities;**

**d) a training package on all aspects of domestic recycled water including greywater, for Local Government officers responsible for the assessment and approval of household greywater systems and for plumbers who install the systems;**

**e) a requirement for point of sale information to be provided with greywater systems that includes guidance on compatible bathroom/laundry/kitchen products and the importance of subsurface irrigation for food plants;**

**f) a review of the accreditation of greywater diversion and treatment systems and the need for accreditation of service technicians for greywater systems; and**

[161] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p.122

**g) a commitment by the Department of Sustainability and Environment to engage with appliance manufacturers and the plumbing industry to improve technologies for diverting greywater for appropriate household re-use.**

## Information and behavioural change

Most Victorian water businesses and authorities provide detailed information and tips on saving water.[162] There are numerous web sites with detailed water saving information relevant to Victoria. These include local government, water authorities, water business associations and the savewater website.[163] A number of local governments presented evidence relating to their own water conservation programs, and ICLEI has initiated a water campaign to facilitate local government water efficiency initiatives. Furthermore, the offices of many water businesses and local governments demonstrate sustainable water use in their gardens and buildings.[164]

DSE presented the results of market research on the impact of its campaign showing a community trend towards increased awareness, changes in attitudes, changed behaviour and broad community support for water restrictions and permanent water conservation measures.[165] Mr Neil Brennan, Chief Executive Officer of Central Highlands Water told the Committee that:

> the effects of the drought [in terms of community support for water conservation] are actually coming through more strongly [than] I have ever seen. It is a matter of capitalising on it …[166]

Mr Tony Kelly, Managing Director of Yarra Valley Water pointed out:

> The community in Melbourne has reacted pretty well to the water conservation message, but we are only about halfway to the 2010 target, and we only have another six years to save the additional half of the forecast amount.[167]

The Committee was advised that a significant barrier to sustainable consumption existed in the general lack of understanding of natural environmental cycles (including the water cycle) and the effect urban systems have on these cycles.[168] Coupled with this is a lack of understanding of the infrastructure (the water supply and sewerage

[162] Mr M Harvey, Chief Executive, Victorian Water Industry Association, transcript of evidence, 23 August 2004, p. 230

[163] Source: www.savewater.com.au. The Savewater website is a national website sponsored by the water industry, organisations from all levels of government, non governmental environmental organisations and industry

[164] Source: wwww.savewater.com.au/default.asp?Sectionid=69&contentid=91&page=1&SortTag

[165] Mr R Posner, Deputy Director, Communications and Stakeholder Relations, Department of Sustainability and Environment, transcript of evidence, 27 September, 2004, p. 263

[166] Mr N Brennan, Chief Executive Officer, Central Highlands Water, transcript of evidence, 28 September 2004, p. 333

[167] Mr T Kelly, Managing Director, Yarra Valley Water, transcript of evidence, 8 November 2004, p. 594

[168] Moreland City Council, submission no. 64, p. 9

systems) that supplies and removes water from the household. British Sociologist, Elizabeth Shove notes that much environmentally significant consumption, particularly energy and water, is literally invisible. Use of water is bound up with routine and habit.[169]

*Securing Our Water Future Together* states that there is a need to move public awareness beyond saving water during droughts towards saving water all the time[170] and commits the government and water authorities to continue to undertake community education and information campaigns in urban and regional Victoria.[171]

The Committee received evidence that awareness campaigns alone do not change behaviour and a more sophisticated approach is needed for behavioural change. The Committee also received evidence that the water industry, despite having been involved in water conservation education for at least a decade, is unfamiliar with the techniques of social research and marketing:

> Most of the people in the industry ... are good at building pipes and pumps, but we are not good at social engineering. This is a whole new field for us ... I think it is critically important for energy and water. We will need to develop our skills in this area because it provides the greatest potential at the least community cost.[172]

A behavioural change approach, known as individualised marketing, has been trialled in Perth (known as WaterSmart) and in Melbourne (WaterSaver) to encourage targeted households to save water. The program relies on direct contact between householders and the water authority or agency staff, who provide information and regular feedback to households on their progress. In most cases households required considerable assistance to find ways to save water. In Perth, the program resulted in a seven per cent reduction in yearly water consumption for participating households.[173] A similar program, trialled with 350 households in Melbourne resulted in annual savings of 29 KL per household or 12 per cent.[174] The project also demonstrated that behavioural change persisted at least six months, with evidence suggesting that the changes made had become habitual.[175] DSE advised that the cost of individualised marketing is relatively high (a similar program targeted at travel behaviour cost $100 per household).[176] The Water Smart program report estimates that, based on

[169] Shove, E, 2002, Converging Conventions of Comfort, Cleanliness and Convenience, Department of Sociology, Lancaster University, p. 1

[170] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 100

[171] Ibid, p. 100

[172] Mr T Kelly, Managing Director, Yarra Valley Water, transcript of evidence, 8 November, 2004, p. 594

[173] Department of Sustainability and Environment, submission no. 70, p. 36

[174] Socialdata Australia Pty Ltd, 2004, WaterSaver Pilot Project: a Pilot Study of Voluntary Behaviour Change to Reduce Household Water Consumption, Draft Final Report, p. 46

[175] Ibid, p. 50

[176] Mr J Collins, General Manager, Strategic Policy and Projects, Department of Sustainability and Environment, briefing, 17 May 2004, p. 5

the cost of the pilot program, a large scale program would cost approximately $25-$30 per person, for a saving of 11 KL per person per year. In other words the estimated cost benefit is $2.30-$2.80 per KL of water saved or $1.6 million to save 687 ML, the same quantity saved by rebates costing $4.7 million.[177]

Yarra Valley Water advised the Committee that the Smart Homes Water Audit Program funded by the Department of Human Services (DHS) and water authorities and targeting low income households, has resulted in significant water savings for participating households. However, the program has not been widely adopted by water authorities other than Yarra Valley Water.

The Committee supports the continuation of water conservation education and behavioural change programs to encourage water conservation and believes that such programs must be strategically targeted, based on sound research which identifies how different groups within the community relate to water and the barriers they experience to water conservation and contain robust performance indicators. For example, the need to target the rental sector and teenagers has been identified. [178]

Accordingly the Committee recommends that:

**Recommendation 8.16**

**The Department of Sustainability and Environment and water authorities target water education and behavioural change programs to specific segments of the community identified as having been traditionally neglected in water conservation campaigns. These groups include the rental sector and young people.**

**Recommendation 8.17**

**The individualised marketing approach adopted in the Our Water, Our Future Water Saver pilot program be further trialled to develop a cost effective methodology to encourage behavioural change.**

[177] Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government White Paper, p. 102

[178] Dr Z Sofoulis, Senior Researcher, Centre for Cultural Research, University of Western Sydney, transcript of evidence, 22 November 2004, p. 604

**Recommendation 8.18**

**The Department of Human Services and the Department of Sustainability and Environment expand and promote the Smart Homes water audit program for low income households to water authorities throughout Victoria.**

## Reducing the environmental impact of household water

WWF-Belgium has conducted a number of water campaigns and developed a guide for households on the rational use of water.[179] The Committee was particularly interested in learning that the guide - *My drop of water*[180] - not only addresses the quantity of water used by households but also the impact of household water use on the environment. The guide encourages people to calculate their consumption of water, explains the impact of households on the wider natural environment and contains practical advice on how to save water. The details of suppliers of water efficient appliances and other devices are set out in the appendix. But importantly, the guide also encourages people to not degrade water through the use of certain types of synthetic garden fertilisers, washing powders, dishwashing products, fabric softeners and cleaning products. It advises people to check product labels and provides information on how to make sound environmental choices.[181]

Although the *Our Water Our Future* campaign promotes 'fit for purpose' water use, it does not provide households with practical information on how to prevent or minimise water degradation in the first instance. For example, many domestic detergents on the market in Victoria are high in salt which has contributed to problems with water recycling in the Werribee Plains region.[182] Therefore, the Committee recommends that:

**Recommendation 8.19**

**The State Government and water authorities community education and information programs extend to not only encourage household water saving, but also to minimise the wider environmental impact of household water consumption.**

## Reducing water use on gardens

The cultural attachment to European style gardens, requiring significant amounts of water coupled with the size of typical Australian gardens was identified as another significant cultural barrier to reducing household water consumption. The Committee was advised that changing gardening practices could result in significant water savings and that this was an area

[179] Ms H Evenpoel, Water Policy Officer, WWF-Belgium, Brussels, meeting, 11 February 2005

[180] WWF Belgium, 2002, My drop of water, A practical guide for the rational use of water

[181] Ibid, p. 44

[182] Almost half the salt is produced by industry and commerce. Source: Department of Sustainability and Environment, 2004, Securing Our Water Future Together, Victorian Government Green Paper for Discussion, p. 48;

where the full potential of water savings has not been fully realised.[183] Similarly, Professor Peter Cullen, Freshwater Ecologist and Chair of the Victorian Water Trust Advisory Council has argued that:

> All of the demand impacts that we've had have been with dual flush toilets and shower heads and a bit of education but none of it's focussed on the outdoor use, on the gardens where there's 35% [of household water use] in Melbourne, 50% in some … suburbs … So I'm hoping that in the Federal National Water Initiative there's quite an emphasis on a water smart gardens type element …[184]

**Bayside City Council: Be a Bayside Watersaver**

Bayside City Council has the highest residential water consumption in the South East Water area of operation and has initiated a number of initiatives to reduce water demand and consumption. The Be a Bayside Water Saver program is a partnership between and the City of Bayside to target outdoor (garden) water use of identified 'hot spot' areas of Bayside. The program is unique in that the communications activities are specifically designed for Bayside residents.

The key elements of the program are:

- local media profile and promotion;
- identification of local 'water heroes' – promoting preferred role models in the community;
- delivery of information pack to all households and offer of free garden water audits; and
- information resources specifically targeting local garden businesses to enable them to effectively advise their customers on water conservation.

According to the government's Our Water Our Future update,[185] there has been an overwhelming response to the Water Smart Gardens and Homes Rebate Scheme with 80,000 rebates approved up to December 2004.[186] However the Committee notes that this represents less than 4 per cent of Victorian households. Under the scheme people can receive a rebate for purchasing products such as a water efficient dishwasher ($100), high pressure cleaning device ($30) and a rainwater tank ($150). People

[183] Professor J Langford, Director, Melbourne Water Research Centre, University of Melbourne, transcript of evidence, 23 November 2004, p. 639

[184] Professor P Cullen, 2004, transcript, Greywater Forum, 10 November 2004, Melbourne Museum, p. 22

[185] Department of Sustainability and Environment, 2004, Our Water Our Future Update

[186] The estimated number of residential dwellings in Victoria is 1,950,000, therefore the percentage of households taking up a rebate is 4 per cent

spending $100 on garden products such as mulch, flow control valves, wetting/moisture agent, compost/mulch bin, moisture/rain sensor, garden tap timer, drip watering system/weep hose, trigger nozzle or temporary greywater diverter are eligible for a $30 rebate. The White Paper commits the government to continuing the rebate scheme until June 2006.[187]

DSE also promotes drought tolerant plants as a way of saving water in the garden through its web site.[188] Suggested plants include the bird of paradise, canna lily and kangaroo paw. However the Committee is concerned that DSE is promoting the planting of weeds, for example, by recommending the African Daisy as a drought tolerant plant. According to the Department of Primary Industries, the African Daisy is a regionally prohibited weed for the Mallee, Glenelg-Hopkins and North Central Catchment Management Authorities (CMAs).[189] It is a regionally controlled weed in the Port Phillip and Westernport CMAs. It has also been nominated as a regional priority weed by the Glenelg-Hopkins CMA. Landowners in areas where the African Daisy is regionally prohibited must eradicate or control it on their land.[190] Landowners in areas where the African Daisy is regionally controlled must take all reasonable steps to control it and prevent its spread on their land and the roadsides which adjoin their land. Therefore, the Committee recommends that:

**Recommendation 8.20**

**The Department of Sustainability and Environment review the list of drought tolerant plants it recommends to the community to ensure no weeds are listed.**

The Committee received evidence that there is enormous potential for promoting garden water conservation through nurseries and garden centres. Sustainable Gardening Australia, a non-profit, non-governmental organisation that works with nurseries and garden centres to promote sustainable gardening practices in Australia, estimates that a modest program involving only 30 retail nurseries influencing their customers, could result in water savings of 340 ML per year[191] (this would amount to about half the estimated savings through the Water Smart Gardens and Homes rebate scheme). The Committee was also advised that irrigation techniques and technology from the horticulture industry could be applied to municipal and domestic gardens to significantly reduce water use.[192]

[187] Ibid, pp. 103

[188] Source: www.ourwater.vic.gov.au/ourwater/dsenowof.nsf/childdocs/-99D4D08354491FDCA256F49008333CC-769F2181946EC000CA256F9B001F6FE5?open, accessed April 2005

[189] Source: www.dpi.vic.gov.au/dpi/vro/vrosite.nsf/pages/weeds_herbs_annual_african_daisy, accessed April 2005

[190] http://www.dpi.vic.gov.au/dpi/nreninf.nsf/LinkView/CC7730694CB98DFDCA256BCF000AD55DECC844336D72F0634A256DEA00293F8A, accessed April 2005

[191] Sustainable Gardening Australia, submission no. 78, p. 3

[192] Professor J Langford, Director, Melbourne Water Research Centre, University of Melbourne, transcript of evidence, 23 November 2004, p. 639

**Mildura Rural City Council Low Water Use Nature Strips**

Since 1995 Mildura Rural City Council has supported a program where residents convert their nature strip from traditional irrigated grass to mulched indigenous plantings. Council provides the plant material, mulch and advice and residents undertake the site works. The program has developed over 200 nature strips throughout the municipality and demand for the program remains strong.

Mildura Rural City has also created low water use landscapes in urban parks, garden features and median strips.[193]

The Committee was advised that there are a number of initiatives in place that target nurseries, but these are small scale at present.[194] The Victorian Government is supporting a new pilot program called Water Saver Garden Centres. The staff at the centres are fully accredited to provide advice on saving water in the garden and promote water saving products and ideas. There are currently only eight nurseries listed on the DSE website with more to follow by the end of June 2005. The Nursery and Garden Industry Association of Victoria estimates that there are more than 450 retail garden centres currently operating in Victoria, excluding the large chain retailers.[195] The Committee believes that this program has merit but needs to be rolled out far more extensively and include bulk nursery suppliers such as Bunnings where at least 50 per cent[196] of household plants are purchased in Victoria.

Prominent labelling of water efficient plants would also greatly assist consumers. In Victoria one commercial propagation nursery[197] has developed a labelling system to inform consumers of the relative water needs of plants. The 'Water Miser' label consists of a scale of water droplets included on the plant label indicating the level of soil moisture required to maintain a particular plant in a healthy condition, assisting consumers with decisions on whether the plant is appropriate for a water efficient garden. This system recently received a Savewater award in 2003.[198] The Victorian Branch of the Nursery and Garden Industry Association advised that while this system is currently limited to one commercial supplier of retail plants there is considerable potential to develop and promote such a labelling system throughout the nursery industry.[199]

[193] Mildura Rural City Council, submission no. 49

[194] Sustainable Gardening Australia, submission no. 78, pp. 1,3

[195] Personal communication, Mr A Hollandson, Retail Manager, Nursery and Garden Industry Association of Victoria, 18 April 2005

[196] Ibid

[197] Greenhills Propagation Nursery markets the brand Touch of Class Plants with the 'Water Miser' label

[198] Source: www.savewater.com.au/default.asp?SectionId=590, accessed May 2005

[199] Personal communication, Mr M Ganger, Chief Executive Officer, Nursery and Garden Industry Association, Victorian Branch, 10 May 2005

The Committee was advised of a campaign conducted by WWF-Spain in partnership with the European Union, Alcobendas Town Council, the Community of Madrid, Tagus River Basin Authority and Caja de Ahorros del Mediterráneo to promote water conservation in Alcobendas, one of the satellite towns on the outskirts of Madrid.[200] The campaign was multifaceted in that it used legislative, financial, technical, educational and marketing tools.[201] WWF noted the importance of focussing on technologies in order to sustain water saving:

> In Spain a number of campaigns have been undertaken to increase public awareness at times of drought, but there have been no changes in the technology installed, so when it rains again the habits of saving are forgotten and consumption increases again. For example, a campaign to raise awareness in Madrid by Canal de Isabel II, the city's water authority, succeeded in reducing consumption by 22%, but because it was not accompanied by the introduction of water-saving technologies, consumption returned to pre-campaign levels. Recent projects to reduce consumption in Zaragoza and Teror (Canary Islands) have demonstrated the capacity for structural savings based on public awareness combined with municipal initiatives.[202]

Another component of the campaign that was of particular interest to the Committee was the encouragement of household gardening with species that require little water. A partnership was established with the largest garden centre in Alcobendas to provide exhibitions of dry gardening for various promotional events and create a dry-climate garden display at the administrative headquarters of the project. A conference on dry gardening in the Mediterranean Basin was also organised.

The Committee believes that the potential for promotion of water efficient gardening has not been fully exploited, and significant reductions in water consumption could be achieved particularly with greater coordination between water retailers, state and local government, nurseries and garden centres.

Accordingly, the Committee recommends that:

**Recommendation 8.21**

**The Department of Sustainability and Environment initiate a research and development program, to develop and promote efficient low cost irrigation techniques and technology for municipal and residential gardens, in cooperation with the horticultural industry, nursery industry and research institutes**

[200] Ms E Royo Gelabert, Senior European Water Policy Officer, WWF European Policy Office, meeting, Brussels, 11 February 2005

[201] WWF Spain and European Commission, 2001, Alcobendas, city of water for the 21st century: action and results

[202] Ibid, p. 4

**Recommendation 8.22**

**The Department of Sustainability and Environment's Water Saver Garden Centres pilot program, if successful be significantly expanded to nurseries and garden centres across the state and include bulk household garden suppliers.**

**Recommendation 8.23**

**A voluntary water efficiency labelling scheme for garden plants, similar to the Water Miser plant labelling system or the 6 star scheme for appliances, to assist consumers in making informed decisions about water efficient gardening at the point of purchase, be developed and implemented by the Department of Sustainability and Environment, in conjunction with water authorities, Local Government, the nursery industry and non government sector.**

**Recommendation 8.24**

**State and Local Government introduce a policy of planting low or no-water gardens at all public buildings.**

Chapter

9

# Promoting energy efficient households and renewable energy

## Key findings

**9.1** While the current Victorian 5 star energy rating standards are a significant step forward and lead by Australian standards, they are low by world standards and easy to meet. The standards only apply to new homes, do not take major fittings or house size into account and should encompass other environmental design elements, not just energy and water.

**9.2** Moreland City Council and the City of Port Phillip are two local governments in Victoria that have taken the lead on integrating energy efficiency and sustainable housing/developments through voluntary measures and local planning provisions. A state-wide approach led by the Department of Sustainability and Environment is required to ensure consistency, however the proposed sustainability assessment tool has a narrow focus.

**9.3** The national system of minimum energy performance standards and labelling is amongst world's best practice. However the system is reactive and could apply to a wider range of household appliances.

**9.4** Local government has shown strong leadership on the management of energy and greenhouse gas emissions through active involvement in the Cities for Climate Protection program.

**9.5** The status of government requirements for state funded infrastructure projects to take energy efficiency into account is unclear.

**9.6** The energy efficiency labelling of public buildings and houses for sale or rental, as is the case in Denmark, would make energy more 'visible', promote energy efficiency and better inform consumers.

**9.7** There is little incentive for owners of rental properties to make energy or water efficiency improvements to a property that they do not live in. On the other hand there is limited incentive for a tenant to invest in improving a property that they do not own and may only occupy for a short period of time. In France, landlords are required to retrofit all

tenanted properties every ten years. Double-glazed windows must be installed, if they have not already been fitted.

**9.8** ResCode only suggests that developers orientate buildings to maximise solar benefits and energy efficiency. A minimum standard regarding the solar orientation of buildings should be established.

**9.9** The Committee believes that energy retailers in Victoria require incentives to promote energy saving and energy management advice. There are a number of successful and cost effective regulatory models that have been used overseas to create such incentives.

**9.10** The lack of training of sustainable design professionals and the absence of accreditation and performance standards for the installation of energy appliances and related fittings are major barriers to the implementation of the Victorian government's 5 star energy rating for houses and sustainable housing design, in general. Although consumers also have a role in requesting sustainable design, most consumers are heavily reliant on the professional advice provided by builders, designers, planners, architects, plumbers and electricians.

**9.11** Many European governments have a far more active role in fostering the energy services sector than is the case in Victoria, through for instance, mandatory energy saving targets for energy retailers funded by a levy on power sales, developing relationships with industry (both manufacturers and retailers of equipment) to roll out high performance energy efficient technologies, large scale housing demonstration projects and commitments to purchase minimum amounts of new technology.

**9.12** The Victorian government is in a position to establish its own mandatory renewable energy target. Such a proposal has significant merit. The Victorian government has already made a commitment to 10 per cent of electricity being generated from renewable sources by 2010. This target should be consolidated into an MRET framework before the industry begins to stall in 2006-07.

**9.13** There is currently a lack of information on the performance of household renewable energy technologies, including those that qualify for government rebates.

**9.14** The cost of renewable energy to households compared with conventional electricity is recognised as a major barrier, with prices not reflecting environmental externalities. However in rural and regional Victoria where access to electricity and natural gas in some areas is limited or non-existent, the cost discrepancies are less prominent and there are opportunities for the application of renewable energy.

**9.15** Although Green Power has been available since 2000 the take up rate has been low. In February 2005 only two per cent of Victorians were purchasing Green Power. The main barriers to the purchase of Green

Power are the abstract concept itself, lack of confidence in the accreditation system, lack of promotion and the additional cost.

**9.16** The pricing signals to consumers regarding renewable energy are flawed as people purchasing conventional greenhouse gas intensive electricity are rewarded with cheaper prices than those electing to purchase Green Power. In principle, people should not have to pay a premium for purchasing Green Power.

**9.17** Green Power needs to be promoted on an ongoing basis by Government as consumers are often distrustful of information provided by industry. Information on how to subscribe to Green Power should be provided on residential electricity bills and consumers who opt to purchase Green Power should also receive recognition of this on their energy bill (beyond the changed tariff).

**9.18** Some electricity and gas providers have declining block tariffs that discourage energy conservation.

**9.19** Greenhouse gas emissions information is already provided on bills in Victoria, however, information that allows consumers to compare their consumption with a similar sized household is not provided. Such benchmarking would allow consumers to readily determine whether they are an energy efficient household.

## Introduction

> … To make three jumps between turning off the light and making greenhouse gas and killing a coral polyp [from coral bleaching caused by climate change] is just too much for most people [to grasp].[1]
>
> Gould League

The terms of reference of the Inquiry required the Committee to investigate state and local government initiatives that encourage the reduction of greenhouse gas emissions by households, foster renewable energy and improve energy efficiency. Unlike household water use and waste production, discussed in chapters 7 and 8, energy is invisible and less tangible to consumers, presenting unique challenges for effective management.

Energy efficiency is defined by the Sustainable Energy Authority Victoria as using less energy to achieve the same or greater levels of output. In the case of households the output may be the level of comfort in relation to cooling, warmth and light.

The institutional arrangements and policy frameworks regarding household energy are set out in chapter 4. Full retail contestability was introduced to

[1] Mr J Grant, Chief Executive Officer, Gould League, transcript of evidence, 27 September 2004, p. 284

the Victorian retail gas and electricity markets in 2002. There are currently five distributors operating in Victoria and nine licensed electricity and gas retailers active in the residential and small business market.[2] Distributors own and manage the infrastructure that delivers electricity to households. Distributors generally charge consumers through retailers, which mean that the retailer bills the resident and pays the distributor the cost of using the network.[3] Retailers buy the electricity in bulk and on-sell it to consumers. From 2002 domestic consumers have been able to choose their electricity retailer, although only 20 per cent of households have changed to a different provider.[4]

The main approaches to promoting energy efficiency and the uptake of renewable energy by households are to address infrastructure (home design), appliances/products and behavioural issues (how the consumer uses the home). All of these management approaches are examined in this chapter.

This chapter is divided into four main sections. The first section discusses the role of regulation, including national, state and local regulations and electrical appliance standards and labelling. The second section investigates the role of government in establishing policy frameworks that promote energy efficiency and the uptake of renewable energy by households. The importance of government leadership is discussed, the contribution of urban form and transport policy and the role of energy retailers and state agencies such as the Sustainable Energy Authority Victoria are outlined. The development of an energy services industry and skills, knowledge and training is discussed. The third section explores renewable energy and Green Power. The fourth section addresses the education of consumers through informative billing and interval metering and emphasises the value of price signals in promoting energy savings, through the abolition of declining block tariffs.

## Regulatory framework – national, state and local (building fabric)

The Committee was advised that regulation is used in the building industry to eliminate worst building practice in Australia rather than to promote best practice. As Master Builders Australia stated:

> If you simply followed the Building Code of Australia performance regulations [regarding sustainable design] it is the lowest common denominator ... The master builders movement ... only instituted the first issues of energy 10 years ago. Nobody wanted to know about it, and it only comes back to the building code of Australia. Those performance requirements have only been in for two years.[5]

[2] Source: www.esc.vic.gov.au accessed May 2005

[3] Ibid

[4] Department of Infrastructure, submission no. 81, p. 7

[5] Mr D Wilson, National Director, Training, Master Builders Australia, meeting, 27 October 2004, pp. 525-526

Similarly, the Housing Industry Association stated that: *'… reality tells us there is always a role for regulation, and regulation has traditionally played a role in terms of eliminating worst practice'*.[6] The Committee believes that such an approach to the regulation of sustainable housing design in Australia is limited and that regulation should also be used to promote sustainable design, as is the case in other jurisdictions.

## National developments

It is important to understand the Victorian 5 star energy rating regulations in the context of residential energy efficiency developments occurring elsewhere in Australia.[7] Energy efficiency standards were introduced in January 2003 to the National Building Code. The code required houses built in northern zones to achieve a 3.5 star rating and those built in the southern zones to achieve a 4 star rating. The 3.5 rating was adopted as the minimum rating based on a standard set by some NSW local government authorities. A proposal to revise the National Building Code to be raised to a minimum 5 star energy rating for houses in all climate zones in the 2006 edition of the Building Code, is currently subject to a regulatory impact assessment. The Committee was advised by the Building Commission that the 5 star standard for residential buildings will be adopted nationally in 2006.[8] The Productivity Commission has noted that: *'it appears that the minimum required star rating under the Building Code has been driven in large part by a desire to catch up to the most stringent State or Territory standards'* [9] including New South Wales, the ACT and Victoria.

Further developments at the national level will have an impact on Victorian standards. The Building Commission stated that:

> The Australian Building Codes Board, through the Building Code of Australia, has committed to introducing sustainability as a high-level objective of the building code within a few years – that process is under way – and it has highlighted the fact that in addressing sustainability in the building code the priority issues will be energy efficiency, water management, indoor environmental quality and materials management, including waste disposal. As that progressively rolls into the building code it will be picked up in Victoria through the Building Code of Australia.[10]

## Victorian 5 star energy rating

From July 2005, all new houses built in Victoria must comply with a 5 star rating for building fabric, incorporate water-saving measures and have either a rain water tank or a solar hot water system.

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[6] Mr W Gersbach, Executive Director, Planning and Environment, Housing Industry Association, meeting, 27 October 2004, p. 533

[7] The information in this section is taken from the Productivity Commission, 2005, Draft Report: Energy Efficiency

[8] Mr R Enker, Manager, Sustainability Policy, Building Commission, transcript of evidence, 6 December 2004, p. 691

[9] Productivity Commission, 2005, Draft Report: Energy Efficiency, p. 141

[10] Mr R Enker, Manager, Sustainability Policy, Building Commission, transcript of evidence, 6 December 2004, p. 692

An extensive variety of housing rating schemes are used by different jurisdictions. The most relevant, for the purposes of this report are outlined below.

**House Energy Rating Software Tools**

Nationwide House Energy Rating Scheme (NatHERS): NatHERS and FirstRate are the two officially recognised software tools in Victoria. NatHERS was developed by the CSIRO and is described by the SEAV as a sophisticated house energy rating simulation program.[11] The NatHERS software assesses factors such as insulation levels, window orientation and area, wall type and ventilation to provide an estimate of the heating and cooling energy required over a twelve-month period to maintain comfortable temperatures.[12] Alternatively, it can estimate temperatures in a house without the use of heating and cooling. A star rating, from zero to five, will indicate the efficiency of the design for heating and cooling energy. A low rating will result in either high energy bills or a relatively uncomfortable house. A four or five-star design is a sign of a thermally comfortable house that will minimise the need for heating and cooling. NatHERS rating levels are incorrect for Victorian climates and require some adjustments.

FirstRate: According to the SEAV, the FirstRate house energy rating software is a powerful design tool which enables the energy performance of each part of a house to be evaluated and, by testing the effects of design changes instantly, makes designing for energy efficiency easy.[13] The house energy rating measures the energy efficiency of a house by allocating a point score for various design features (such as building fabric, window design, insulation, orientation and other features) and provides an overall rating on a scale from 0 to 5 stars, with half star increments. An energy efficient house rates 4 stars or higher. The house energy rating is independent of the size and type of housing. This means that both large and small houses, attached and detached dwellings each have the potential to achieve a good energy efficiency rating. The SEAV explains that a FirstRate energy rating typically takes substantially less time to complete than a NatHERS rating.

Building Sustainability Index (BASIX): BASIX is a NSW Department of Infrastructure, Planning and Natural Resources initiative. It is a web-based design tool that ensures each new residential dwelling design meets the NSW Government's mandatory targets of a 40 per cent reduction in water consumption and a 25 per cent reduction in greenhouse gas emissions,

[11] Source: www.sea.vic.gov.au/buildings/firstrate/other_software.asp accessed 11 May 2005

[12] This explanation is sourced from www.csiro.au/index.asp?type=activity&id=NatHERS&stylesheet=aboutCSIROActivity accessed 11 May 2005

[13] This explanation is sourced from www.seav.vic.gov.au/buildings/firstrate/index.asp, accessed 11 May 2005

compared with the average home. The features of a house that are rated are:

- landscape (area of vegetation and number of indigenous species);
- stormwater (collection and use of rainwater);
- water (use of recycled water and installation of water-efficient showerheads and tap fittings);
- thermal comfort (glazing and shading details which influence the heating and cooling loads of the dwelling); and
- energy (type of hot water system used and use of cooling and heating systems).[14]

Witnesses advised that the 5 star energy rating for houses in Victoria was an important development given that the average new house had a rating of around 2.2 stars, and houses predating 1991 insulation regulations have a significantly lower energy efficiency.[15] However witnesses identified a number of significant limitations with the framework which are discussed below.

The 5 star energy rating is low by international best practice standards and easy to meet. Master Builders Australia described the 5 star standard as 'dead easy' to achieve.[16] Mr Dennis Olmstead, Manager of the National Centre for Sustainability, University of Ballarat noted that it would be very easy to achieve 6, 7 or 8 stars and not overly expensive for the consumer.[17] Mr Alan Pears, Policy Advisor, Business Council for Sustainable Energy, made the observation that: *'while some building industry associations have complained about the high stringency [of the 5 star standard], if they were in California they would have to meet about a seven-star rating; so we are not really pushing that hard'.*[18] California has a similar climate to Victoria's.

Some witnesses including the Energy Supply Association of Australia argued that there remain opportunities through building regulations for *'vastly improved thermal efficiency in houses and office accommodation'*.[19]

[14] Source:www.basix.nsw.gov.au/information/faq.jsp#detail2 Accessed May 2005

[15] Sustainable Energy Authority Victoria, submission, no. 72, p. 19

[16] Mr D Wilson, National Director, Training, Master Builders Australia, meeting, 27 October 2004, p. 526

[17] Mr D Olmstead, Manager, National Centre for Sustainability, University of Ballarat, transcript of evidence, 28 September 2004, pp. 348-349

[18] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

[19] Mr B Page, Chief Executive Officer, Energy Supply Association of Australia, transcript of evidence, 23 November 2005, p. 631

Having inspected the Vauban housing development in Freiburg, southern Germany, which contains passive houses that represent world's best practice in energy efficient housing design, the Committee would agree. Passive houses require only 15 kilowatt hours per square metre of energy per year which equates almost to a zero energy requirement, in a much colder climate than Victoria. According to NatHERS standards for 5 star houses in Victoria, houses may use between 38 (i.e., Mildura) and 61 (i.e., Ballarat) kilowatt hours/$m^2$/year of energy for heating and cooling alone, which in the average Australian home constitutes less than half of the energy used by households.[20]

The fact that the 5 star energy rating only applies to new homes was identified as a shortcoming. The average number of new homes built in Victoria each year represents about 2 per cent of the housing stock.[21] As the Planning Institute Australia stated in their written submission, the main problem remains improving the vast bulk of built form – existing buildings.[22] The rating also does not apply to renovations which constitute a substantial proportion of the housing investment market. The Building Commission noted that more building permits for home renovations – around 43,000 per year – are issued than for new houses – 35,000 per year in Victoria, so *'There is a big opportunity to improve the sustainability of our housing stock when people renovate, extend or otherwise alter their houses'*.[23]

As part of Stage One of the National Framework for Energy Efficiency measures announced by the Ministerial Council on Energy (2004), the Australian, state and territory governments have agreed that they will also apply energy efficiency standards to all major renovations.[24] The Committee was advised that by October 2005, the NSW BASIX rating scheme will include renovations.[25]

Unlike the energy rating system in NSW (BASIX), the Victorian scheme does not take energy consumed by major fittings into account. BASIX accounts for major fixed equipment for cooking, lighting and hot water and contains incentives for the installation of solar hot water and photovoltaics.[26] Combined, cooking, lighting and hot water account for approximately 24 per cent of an average household's greenhouse gas emissions.[27]

NSW BASIX also addresses the issue of house size which the Victorian scheme does not. As Mr Alan Pears explained:

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[20] Information provided by Mr R Enker, Manager Sustainability, Building Commission, 7 January 2005

[21] Source: Mr D Harley, Senior Economist, Housing Industry Association, 16 May 2005

[22] Planning Institute Australia, submission no. 38, p. 13

[23] Mr R Enker, Manager, Sustainability Policy, Building Commission, transcript of evidence, 6 December 2004, p. 692

[24] Productivity Commission, 2005, Draft Report: Energy Efficiency, p. 138

[25] Ms S Koreman, Group Program Manager, Energy Efficiency, NSW Department of Energy, Utilities and Sustainability, meeting, 26 October 2004, p. 483

[26] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

[27] Australian Greenhouse Office, 2003, Global warming: cool it!, p. 3

> One of the interesting things that BASIX tries to do instead of saying that a house has to meet, say, a 5 star rating – which is actually energy consumption per square metre – BASIX says, 'If you have a four-bedroom house, on average that will have three and a half people in it, and whether it is a 200 square metre four-bedroom house or a 400 square metre one, it will have the same number of people. Therefore the 400 square metre home will have to meet much tougher standards because it has to meet the same energy and greenhouse targets as a smaller house with the same number of bedrooms. [28]

Other witnesses[29] advised that a more holistic approach to the environmental rating of buildings was needed rather than just focussing primarily on energy to encompass indoor air quality, water efficiency and building materials. As noted above the Australian Building Codes Board is investigating this approach. There is also currently a voluntary Federal Government National Australian Built Environment Rating System (NABERS) for existing homes that measures a variety of environmental indices including energy use and greenhouse gas emissions, water use, stormwater runoff, transport, landscape diversity, waste, toxic materials and indoor air quality.[30]

The new 5 star energy rating scheme in Victoria represents an important step towards improving energy efficiency in the housing sector. The Australian housing sector's performance on energy efficiency has been poor to date and costly to consumers and the environment.[31] However the Committee believes that the scheme should be benchmarked to (climate adjusted) international best practice. DSE advised the Committee that Victoria's 5 star standard is regarded as 'leading edge by overseas practitioners'[32] but has not been 'formally benchmarked' against codes in overseas jurisdictions.[33] The evidence the Committee has received strongly indicates that the 5 star standard in Victoria and similar standards elsewhere in Australia are low by world standards.[34] Accordingly, the Committee recommends that:

[28] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

[29] For example refer to Ms R Leeson, Acting Director, Sustainability and Innovation, City of Melbourne, transcript of evidence, 9 August 2004, p. 175

[30] The NABERS can rate commercial office buildings, commercial office tenancies and residences (except multi-unit developments). Refer to http://www.deh.gov.au/industry/construction/nabers/, accessed May 2005

[31] As noted earlier in the chapter, houses predating the 1991 insulation regulations have an energy efficiency rating that is significantly less than 2.2 stars and the average Victorian household spends $1,300 per year on energy bills.

[32] Mr M Dess, Manager, Greenhouse Policy, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 726

[33] Mr I Porter, Executive Director, Sustainability Strategies, Department of Sustainability and Environment, letter dated 13 May 2005

[34] For example, refer to Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

**Recommendation 9.1**

**Sustainability Victoria, as a matter of priority, benchmark the Victorian 5 star energy rating scheme for houses against international best practice. The findings should be made publicly available.**

Furthermore, the Committee believes that the current 5 star energy rating scheme in Victoria should be substantially strengthened. Accordingly, the Committee recommends that:

**Recommendation 9.2**

**a) The Victorian Government take a lead by revising the 5 star energy rating scheme for new houses to include:**

- **major renovations; and**
- **major pieces of fixed equipment and appliances.**

**b) The scheme should consider the occupancy/house size ratio, as is the case with the New South Wales Building Sustainability Index system, and be comprehensive by including provisions, for example, on water management, indoor environmental quality and building materials.**

## Local government

Some Victorian local government authorities have also been actively promoting energy efficient and sustainable housing/developments through voluntary measures and local planning provisions. The Municipal Association of Victoria stated that in some instances councils are actually pushing ahead of the state planning system.[35]

Two of the most progressive councils are the Moreland City Council and City of Port Phillip. The Moreland City Council is trialling the use of its own STEPS environmental sustainability assessment tool.[36] The tool will be used to assess residential planning applications, with a view to incorporating the tool into the Moreland Planning Scheme. The STEPS tool contains additional elements to the DSE Sustainability Assessment Tool (explained below) such as sustainable materials, the area required for waste collection and bicycle storage.[37] The City of Port Phillip has developed a scorecard, whereby developers are encouraged to consider sustainable design as part of the planning application process. As Ms Natasha Palich, Sustainable Design Officer, City of Port Phillip explained:

[35] Mr P Lyon, former Senior Policy Adviser, Environment, Municipal Association of Victoria, transcript of evidence, 5 July 2004, p. 63

[36] Source: www.morelandsteps.com.au, accessed May 2005

[37] Personal communication, Ms C Collins, Engineer, Moreland City Council, 13 May 2005

> What we are asking our developers for is for a commitment to implementing [sustainable design features] …, even if they have not fully designed them at [the planning] … stage because issues such as orientation, building form, openings, even building use and envelopes – while some of these things affect the relationship of that building to the urban form, they also relate to the performance of the building in respect of environmental issues as well. We feel that with a scorecard there is a lot of value in bringing these things up at a very early stage. If [developers] … are not familiar with doing that in a great level of detail, then essentially at a later stage they become more of a tack-on solution and you have missed opportunities.[38]

The council advised that despite the process being voluntary and requiring self-assessment, developers have been keen to achieve a high score.[39] The Port Phillip Council is also using the STEPS tool and has developed an assessment tool for commercial and industrial developments. The council is examining ways of incorporating the system into the local planning provisions.

Port Phillip and Darebin City Councils pointed to the NSW BASIX framework as a sound and comprehensive approach to incorporating sustainability design early on in the planning process. The Committee believes that the state government needs to develop a statewide framework for incorporating ESD principles into the Victorian planning scheme rather than local government individually developing similar processes and frameworks. The Committee also believes that such an approach would also, in part, address the concerns of the housing industry regarding the consistency of sustainability standards across jurisdictions.

The Committee understands that DSE, in cooperation with a range of stakeholders, has developed a sustainability assessment tool (SAT) that has been piloted and is being refined prior to staged implementation.[40] The department has been collating feedback on the SAT which covers energy, water and stormwater, since November 2004. Staged implementation of the SAT is expected post July 2005.

The Committee believes that the scope of the proposed Sustainability Assessment Tool is limited. Given developments that are occurring in New South Wales and at the national level on sustainable housing design, the Committee believes that the tool needs to be more comprehensive, if it is to ensure consistency and be a useful guide to local government and the housing industry. Furthermore, the Committee notes that the Sustainability in the Built Environment process has been conducted over a lengthy period, with the initial discussion paper released in September 2003, and should be finalised as a matter of priority. Accordingly, the Committee recommends that:

[38] Ms N Palich, Sustainable Design Officer, City of Port Phillip, transcript of evidence, 11 October 2004, p. 434

[39] Mr R Palmer, Manager, Infrastructure and Environment, City of Port Phillip, transcript of evidence, 9 August 2004, p. 193

[40] www.dse.vic.gov.au/dse/nrenpl.nsf/LinkView/C823A0F380C3B780CA256DA3001F3055C4EB543DC77A77864A256DEA002C5760, accessed 11 May 2005

**Recommendation 9.3**

**The scope of the Victorian Sustainability Assessment Tool be made more comprehensive to encompass a broad range of design features including sustainable materials and indoor environmental quality. The Sustainability Assessment tool be finalised and implemented as a matter of priority.**

## Appliance standards and standby power

As noted in chapter 3, there are a number of trends that are contributing to the growth in energy consumed by appliances, despite gains made in improving efficiency. The Committee was interested to learn that people are becoming less tolerant of variations in temperature, especially with increased use of air conditioned cars and offices. The International Energy Agency advised the Committee of a recent study that showed there is a 1 degree bandwidth of external temperature people will tolerate before they turn to artificial heating or cooling.[41] The number and variety of appliances used in the home and growth of information and communication technologies (i.e., computers, audio equipment) in the home have also contributed to increased energy consumption. In 1954, an average Victorian house had six appliances – a kettle, radio, toaster, fridge, lamp and heater.[42] By 2004, the average home had 30 appliances, of a choice of 54 types, including rice cookers, electric toothbrushes, electric blankets and answering machines.

Australia has robust systems for regulating minimum energy performance standards (MEPS) for many household electrical and gas appliances. Some appliances require mandatory labelling while other appliances require voluntary labelling. The system informs consumers of the energy efficiency of appliances. The Australian framework is amongst world best practice, as Mr Philip Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania explained:

> … it is easy to understand; it has been capable of being updated and [is] being kept up to date whereas, for example, the well-known and previously well-regarded European appliance labelling scheme has not been able to be updated since 1990 and is essentially getting to the point where they have an A to G scale and just about everything is A. They are having to introduce A-plus and A-plus-plus, which gives the impression that everything is efficient, some just a little more than others. Our energy [appliance] standards, while not strong compared to the United States, are certainly stronger than Europe for the most part.[43]

Many residential electrical appliances are subject to mandatory MEPS and labelling under the National Appliances and Equipment Energy Efficiency

[41] International Energy Agency, meeting, Paris, 8 February 2005

[42] Fyfe, M., 'Waste not: weee man to bring his weighty warning to Australia', The Age, 14 May 2005, p. 7

[43] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 619

Program (NAEEEP), as set out in Figure 31, of which Victoria is an active member. Residential gas appliances are labelled and subject to MEPS under an industry scheme, which will convert to a fully government regulated scheme from mid-2005, modelled on the NAEEEP.[44] Heating and hot water account for approximately 79 per cent of household energy consumption in Victoria.[45] There are MEPS for electric storage water heaters however only voluntary labelling is required. There are also MEPS for gas heaters but not plug-in electric heaters and the like.

## Figure 31: Residential Appliances Subject to Mandatory MEPS and/or Labelling by the End of 2004

| Product | MEPS and/or Labelling |
|---|---|
| Air conditioners, single phase* | MEPS – 2004 ML - 1992 |
| Clothes washers | ML - 1992 |
| Clothes dryers | ML - 1992 |
| Dishwashers | ML - 1992 |
| Electric water heaters* | MEPS - 1999 |
| Refrigerators and Freezers* | MEPS - 1999 ML - 1992 |
| Gas water heaters | MEPS – 1983 ML - 1988 |
| Gas room heaters | MEPS – 1983 ML- 1993 |
| Gas ducted heaters | MEPS – 1983 ML- 1994 |

Source: Sustainable Energy Authority Victoria, submission no. 72, p. 21

ML = mandatory labelling; VL = voluntary labelling, usually based on a defined high efficiency level
* upgrades to existing MEPS levels on these appliances, currently scheduled to take place between 2005 and 2007

The Australian Greenhouse Office stated that MEPS are being developed for televisions and VCRs, digital set top boxes and computers for, possible implementation in 2006.[46] A ten year lighting strategy – Greenlight – is also being developed and electric ovens are under consideration. The AGO explained how the MEPS are established and revised:

> We have a policy approach of matching world best regulatory standard, though not the best technology. If you make your minimum standard too high, you force

[44] Sustainable Energy Authority Victoria, submission no. 72, p. 21
[45] Ibid, p. 7
[46] Australian Greenhouse Office, meeting, 27 October 2004

> manufacturers out of the market, reduce competition and make life tough for consumers. So our approach has been to look for the world's best minimum standards and say to Australian industry and importers 'It is not a technical issue; someone else can do it, so why can't we match that standard a couple of years down the track?'.[47]

The issue of stand-by power has also been addressed through the national framework. Stand-by power is the electricity consumed by end-use electrical equipment when it is switched off or not performing its main function and is estimated to account for 11 per cent of household electricity use in Australia[48] which the AGO has calculated to be $500 million of electricity per year.[49] The IEA forecast that stand-by power may account for the fastest growing component of residential electricity consumption over the next 20 years because of the increasing number of appliances in the home.[50]

The Committee was advised that the range of appliances covered by MEPS and labelling could be widened. There are seven classes of residential products covered by the Australian MEPS system in contrast to 56 in Canada, for example. As Mr Alan Pears explained:

> We also need to work with the commonwealth and other states to get stronger energy performance standards and better labelling. You cannot find energy labels on televisions and yet a plasma screen uses four times as much energy as a liquid crystal screen of the same size. One of the problems we face is that public servants cannot keep up with the variety of new equipment coming on [the market]. The Business Council [for Sustainable Energy] takes the view that all manufacturers of all new products, just as they have to meet safety requirements, should have to demonstrate compliance with energy performance as well. That way, instead of playing catch-up all the time, we can be on the front foot and we can made sure that designers and importers of all these products get it right at the optimal time.[51]

The Committee believes that a more proactive approach should be taken to energy standards for appliances and the that types of household products classified be significantly increased through the National Appliances and Equipment Energy Efficiency Program. Accordingly, the Committee recommends that:

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[47] Dr T Marker, Manager, Buildings, Government Efficiency and Transport Team, Energy Efficiency and Community Branch, Australian Greenhouse Office, Department of the Environment and Heritage, meeting, 27 October 2004, p. 549

[48] Sustainable Energy Authority Victoria, submission no. 72, p. 7

[49] Dr T Marker, Manager, Buildings, Government Efficiency and Transport Team, Energy Efficiency and Community Branch, Australian Greenhouse Office, Department of the Environment and Heritage, meeting, 27 October 2004, p. 548

[50] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 625

[51] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 580

**Recommendation 9.4**

**Sustainability Victoria review every three years requirements for appliance manufacturers and importers to meet minimum energy performance standards, as is currently the case regarding safety requirements. The review findings should be presented to the National Appliances and Equipment Energy Efficiency Program Committee as a matter of priority and identify additional household products that should be included in the program.**

The state government has made a commitment under the *Victorian Greenhouse Strategy Action Plan* to examine the management of growth in air conditioner use and the implications for summer peak electricity demand by next summer. The Committee understands that this issue is of major concern to the energy industry, as the Energy Supply Association of Australia argued:

> This issue of pricing is significant because in the wholesale electricity market on these days of very hot weather and very high demand when our systems start getting towards their capacity, the prices vary substantially … Firstly, there is a price risk for the retailers; secondly, that very high peaking demand is causing distribution networks to have to invest in some cases 80 per cent of their capital allocation each year on just 20 per cent of their network to strengthen it for air conditioning for about 24 hours of total use in a year. Yet in every jurisdiction state governments have imposed price caps and do not allow the retailers to reflect a time-of-use component.[52]

However the Committee notes that air conditioning, according to the most recent data available, accounts for only 0.5 per cent of average household energy consumption in Victoria.[53] Therefore, the Committee believes that air conditioning is not a significant priority regarding household energy efficiency and policy development and resources should be directed towards initiatives that will deliver wider community benefits. The Committee was interested to learn that in Switzerland a consumer may not purchase and install air conditioning in a small commercial or residential building unless the building has met basic energy efficiency requirements. The building must be insulated, double glazed and not have any air leaks.[54]

## Government leadership

The importance of government setting an example in promoting sustainable consumption to the community has been discussed earlier in this report and also applies to renewable energy and energy efficiency. If government is to have credibility and legitimacy as an environmental manager and policy maker, it needs to demonstrate through its own purchasing power and

[52] Mr B Page, Chief Executive Officer, Energy Supply Association of Australia, transcript of evidence, 23 November 2004, pp. 629-630

[53] Sustainable Energy Authority Victoria, submission no. 72, p. 7

[54] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 618

actions, its commitment to environmental sustainability, including sustainable consumption.

## Local government

The Committee believes that Local Government in Victoria has shown strong leadership on energy issues, primarily through the International Council for Local Environmental Initiatives (ICLEI) Cities for Climate Protection program (CCP). Under the program, councils are required to audit their own greenhouse gas emissions and those of their community. Targets are set by the council to reduce emissions and a strategy developed to achieve the reduction targets. There are 58 councils out of a total of 79, involved in the program in Victoria. ICLEI advised that the program has resulted, across Australia, in greenhouse gas emission reductions of 1.8 million tonnes over the last fours years and local government has invested $67 million in emission reduction activities.[55]

Some examples of measures taken by councils to reduce their own and their communities emissions through CCP and other initiatives include the following:

- the City of Melbourne has set a target of zero net emissions by the end of 2020 through building design; greening the power supply; and sequestering residual emissions (planting trees). It also delivers, in partnership with City West Water and GreenPlumbers, a subsidised retrofitting program where a household water and energy assessment is conducted by an accredited GreenPlumber and recommendations are tailored for a household;

- Banyule City Council has established, through an alliance with several other Councils and Moreland Energy Foundation, the Banyule Energy Action Team (BEAT). BEAT offers households and businesses free energy assessments, advice on saving energy and ongoing support with managing energy. The project may be expanded to schools, churches and community organisations;[56]

- Macedon Ranges Shire Council advised the Committee that it has created carbon sinks through the planting of 37,000 trees, purchased energy efficient computers and photocopiers, conducted energy audits for the larger council facilities and purchases 20 per cent Green Power;[57]

[55] Ms M Simonelli, Manager and Campaign Director, International Council for Local Environmental Initiatives, transcript of evidence, 5 July 2004, p. 33

[56] Banyule City Council, submission no. 2

[57] Mr B Whelan, Manager, Environmental Services, Macedon Ranges Shire Council, transcript of evidence, 27 July 2004, p. 131

- Nillumbik Shire has made a commitment to CCP and established a revolving fund to upgrade council buildings and reduce energy consumption. The savings made are reinvested in energy management;[58] and

- the City of Greater Bendigo, through a partnership with Origin Energy is retrofitting council buildings, providing an additional rebate to residents who install solar hot water systems, conducting community workshops on household energy usage and introducing a community buildings energy management program for eight high-profile buildings to raise awareness of energy management and climate change issues.[59]

The City of Melbourne has also developed a funding model, the Sustainable Melbourne Fund, to finance water efficiency improvements to the sustainability of businesses and community organisations.[60] Initially the fund targeted water efficiency, through partnerships with the metropolitan water retailers. However, the Committee was advised that the model could be expanded to include the financing of energy efficiency and waste reduction measures.[61]

Through the fund, water retailers offer businesses and organisations such as schools and universities the opportunity to undergo a water audit to determine where savings can be made. Customers pay for the capital works through payments in lieu of savings from reduced water usage over a nominated payback period. Throughout this period the customer continues to pay the same amount for their water bills until the money invested by the fund is paid back with interest. The benefits to the customer through water savings and reduced water bills are ongoing.[62] Customers do not have to make any upfront payment for the purchase and installation of water saving technology nor do they have to source funding to implement the improvements. The City of Melbourne advised that the model would be made available to other municipalities who wish to pursue similar projects.[63]

The Committee believes that the funding model, also used by some councils in the form of revolving funds to reduce energy consumption, addresses one of the main barriers to minimising the environmental impacts of consumption - the upfront cost of new technology and infrastructure. The Committee believes that the benefits that would arise from access to such financing arrangements by households and industry would be extensive. Accordingly the Committee recommends that:

[58] Nillumbik Shire, submission no. 7

[59] Mr B Gould, Executive Manager, Economic Development, City of Greater Bendigo, transcript of evidence, 27 July 2004, p. 124

[60] Sustainable Melbourne Fund, submission no. 41, p. 2

[61] Ibid, p. 2

[62] Ibid, p. 2

[63] Ms R Leeson, Acting Director, Sustainability and Innovation, City of Melbourne, transcript of evidence, 9 August 2004, p. 176

**Recommendation 9.5**

**Sustainability Victoria facilitate the introduction of a statewide revolving fund based on the Sustainable Melbourne Fund 'Payment by Savings' model to promote sustainable consumption by the residential and other sectors.**

## State government

The section on government leadership in the *Victorian Greenhouse Strategy Action Plan Update* (April 2005) states that:

> The public sector has a key role in Victoria's response to climate change through facilitation of planning for a low carbon future; showing leadership by demonstrating the potential for achieving emissions reductions in the Government's own operations; and in dealing with future climate change impacts.
>
> As highlighted in the 2002 Victorian Greenhouse Strategy, improvements in the energy efficiency of government operations provide a powerful demonstration of commitment and a model for community action – as well as helping to manage government energy costs. These efforts can be strengthened by adopting procurement policies which enhance environmental performance within government that support the market for greenhouse-friendly goods and services …[64]

The strategy sets out five ways in which the state government will demonstrate leadership on greenhouse gas emissions management, through:

1. government energy efficiency and emissions reduction targets;
2. improving energy efficiency in the healthcare network;
3. environmental management systems, which have been discussed earlier in this report;
4. utilising government procurement to drive greenhouse outcomes; and
5. vulnerability to climate change – assessment of risk for government operations.

As noted above, the 2005 policy document refers to the 2002 *Victorian Greenhouse Strategy* which also sets out a series of different measures to demonstrate government leadership on greenhouse gas emissions management. The status of some of the measures in the 2002 document are unclear to the Committee. For example, the 2002 policy document states that energy efficiency will be given a stronger focus in the design and management of government-funded infrastructure, with for instance, the government requiring all Major Project developments in Victoria to incorporate high levels of energy efficiency. However the 2005 policy

[64] Department of Sustainability and Environment, April 2005, Victorian Greenhouse Strategy Action Plan Update, p. 31

document only refers to healthcare infrastructure. The Committee believes that minimum sustainable design requirements (not just energy efficiency standards) should be integrated into all state government funded infrastructure and not just Major Projects and healthcare infrastructure.

The Committee was also provided with evidence that indicates there is a gap between the initiatives outlined in the 2002 greenhouse policy and outcomes. For example, the 2002 policy states that schools will be supported to incorporate sustainable energy in the upgrade of existing school facilities, and in the design of new school buildings.[65] However the Moreland Energy Foundation advised that there is a lack of standards for school buildings:

> … we have discovered, for instance, that one particular school we are working with is going to be demolished and a new school is going to be built in its place at some stage in the near future. The school plans are exactly the same as the old school, so they haven't actually taken on board any of the knowledge we have now about how you design buildings to be more energy-efficient; it is going to be the same old 'cold in winter hot in summer' type school, and there is nothing that actually prevents them doing that, so that is a problem.[66]

Accordingly, the Committee recommends:

**Recommendation 9.6**

**Mandatory minimum environmental design standards be developed for State Government infrastructure projects, including schools.**

The Committee also believes that the targets set out in the 2005 policy document are too short term. For example, the government energy efficiency and emissions reduction targets are to be achieved by June 2006. There are no targets beyond June 2006. The Committee believes that a medium to long term approach to government leadership on greenhouse gas emissions management needs to be taken.

## Building labelling

In Victoria, 23 per cent of households are rental properties.[67] The ability of a tenant to make physical changes to the building they rent is often limited to superficial alterations. Most leases prevent tenants from making any changes without the consent of the owner, however there is often a process for requesting permission. The inability to make significant changes is a barrier to adopting many methods for saving water and energy, for example replacing blinds with curtains and installing efficient light fittings. Even minor actions, like blocking drafts and installing a water saving showerhead are more difficult for a renter than an owner occupier.

[65] This measure is not identified as a new measure in the 2002 policy document

[66] Ms E Abram, Chief Executive Officer, Moreland Energy Foundation, transcript of evidence, 6 July 2004, p. 88

[67] Australian Bureau of Statistics, 2005, Year Book Australia 2005, p. 256

There is little incentive for owners of rental properties to make energy or water efficiency improvements to a property that they do not live in. The tenant pays the utility bills, so the landlord does not receive any direct benefit.[68] On the other hand there is limited incentive for a tenant to invest in improving a property that they do not own and may only occupy for a short period of time.[69] Financial incentives to encourage more sustainable behaviour in the household, such as rebates, are often mismatched so that the person who invests in the technology may not be the one who will benefit.[70]

When people are looking to rent they are rarely provided with information on the energy efficiency of a property. Unless the renter specifically asks and is given an accurate response, it is often not until they have moved in and lived in the property for a period of time that the amount of energy it takes to heat or cool the house is known.

The Committee was told that in the metropolitan housing market landlords who upgrade or retrofit their property, or have a property with environmentally sound features are not necessarily able to command a higher rental price than those who have not. [71] The end result is a lose/lose situation for both the landlord and the tenant. The Committee was interested to learn that in France, landlords are required to retrofit all tenanted properties every ten years.[72] Double-glazed windows must be installed, if they have not already been fitted.

In chapter 8, the merits of labelling the water consumption of public buildings and disclosing water consumption on the rental or sale of houses was discussed. The Committee made two recommendations on this issue. The Committee believes that such labelling should also include energy consumption and efficiency. The ACT is the only jurisdiction in Australia that currently requires the energy efficiency of homes to be disclosed on sale and rental. However the Committee was advised by Mr Hugh Saddler, Managing Director of Energy Strategies that the current scheme has several important weaknesses, including:

- a lack of support from the ACT administration and real estate industry;
- a lack of enforcement, for example with regards to the requirement to disclose the energy rating when advertising a rental property, there is 5-15 per cent compliance rate; and

[68] City of Yarra, submission no. 12, p. 2

[69] Sustainable Energy Association Victoria, submission no. 72, p. 11

[70] Department of Sustainability and Environment, submission no. 70, p. 24

[71] City of Stonnington, submission no. 62, p. 3

[72] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 617

- in many cases home buyers are not provided with the energy rating documentation.[73]

Although the ACT Planning and Land Authority advised that it is mandatory that all existing dwellings that have been occupied and are about to be sold, have a current energy efficiency rating statement forming part of the contract for sale.[74]

The Committee received a briefing from the Danish Energy Authority (DEA), on the energy labelling scheme that has been introduced in Denmark for small buildings including houses.[75] The system is comprehensive and rigorous. Energy labelling is mandatory for residential buildings, public buildings, buildings used for trade and private uses. It applies to new and existing buildings. Buildings that are exempt are those used for commercial production and energy production as well as buildings with very low energy consumption. Importantly the energy labelling process also reports on water consumption.

The DEA defines energy performance of buildings as the amount of energy actually consumed or estimated to meet different needs associated with the standardised use of the building, which may include heating, hot water heating, cooling, ventilation and lighting. The audit includes electricity, heating, water and the environmental impact of the building. The performance of the building is ranked. It also contains proposals regarding heating, electricity, water and carbon dioxide emissions in plain language. For instance the heating energy plan will recommend improvements, outline the cost of the investment, annual heating savings and annual overall savings. The audit is to be conducted at the point of sale of the property, by an engineer or architect with a minimum of five years experience.

The new certification scheme in Denmark is based on the number of users of a building, rather than the size of the building. Approximately 40,000-45,000 small buildings are labelled every year with 20-25 per cent of small buildings labelled since the inception of the program. The payback time for investments is approximately seven years on average with the benefits lasting more than 25 years. The return on investment is 3.5 times or more. However the DEA advised that it is difficult to get households to invest in energy efficiency, despite the financial benefits. There are also some problem regions in Denmark where house labelling has not been implemented to the extent expected including northern, western and south western Denmark (less than 43 per cent).

The new Danish act on energy efficiency in buildings introduced in 2005 means buildings must be certified on sale or rental, there is regular

[73] Mr H Saddler, Managing Director, Energy Strategies, meeting, 27 October 2005, pp. 515-517

[74] Personal communication, Ms J Warren-Wilson, Senior Energy Planner, ACT Planning and Land Authority, 22 October 2004

[75] Mr J Lausten, Danish Energy Authority, Ministry of Economic and Business Affairs, meeting, Copenhagen, 31 January 2005

certification of public buildings, regular inspection of boilers, heating systems and air conditioning. The DEA monitors and reports on the energy consumed in its buildings on site, in the public reception area.

The Danish example illustrates that sophisticated energy labelling systems have been developed and implemented in other jurisdictions to make energy visible to consumers and in the process better inform them. Accordingly, in following on from the discussion in chapter 8 on building labelling, the Committee recommends that:

**Recommendation 9.7**

**The State Government, through Sustainability Victoria investigate the introduction of a system of compulsory disclosure of energy efficiency on the sale or lease of residential property.**

**Recommendation 9.8**

**A system of minimum environmental performance standards be investigated for application to rental properties, similar to the French system.**

**Recommendation 9.9**

**The environmental performance, including energy consumption of Local and State government buildings, be displayed in prominent public areas. The data should contain a reference point to enable the public to make an assessment of performance and as an awareness raising tool.**

## Urban form and transport

Urban form is a strong determinant of household sustainability, particularly in relation to energy consumption and greenhouse gas emissions. The Committee was provided with few details by state government departments on the planning aspects of sustainable communities. However the Committee was advised that there are shortcomings with the zoning laws and regulations that influence urban form. As Philip Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania explained:

> I would say the overall standard of land development and redevelopment in Australia lags a long way behind best practice. I could give you many examples of those. Every day I see residential developments that are not properly orientated from a solar perspective. These are just zero cost options that are still not being taken up in many cases. There are things like strict separation of residential and commercial

> zones that prevent … working from home … Generally there is a need to encourage densification – that is to say, high-density housing.[76]

The Committee understands that the current ResCode Building Envelopes Information Kit (June 2003), only suggests that developers take energy efficiency protection into account. The kit states *'Where possible, orient building envelopes along north-south/east-west axes to maximise solar control'*. The Committee believes that there should be minimum regulatory requirements for housing developments to ensure building envelopes are orientated to maximise energy efficiency and solar control.

**Recommendation 9.10**

**The State Government investigate the introduction of regulatory standards to ensure buildings are orientated to maximise energy efficiency and solar control.**

Professor Currie, Chair of Public Transport, Institute of Transport Studies, Monash University also cited the geographical spread of Melbourne, in contrast to Europe, as being a significant challenge for promoting sustainable travel options.[77] Transport accounts for 17 per cent of greenhouse gas emissions in Victoria with passenger motor vehicles accounting for two-thirds of road transport emissions.[78] Melbourne, and rural and regional Victoria are car dependent societies.

A detailed investigation of the nexus between sustainable household consumption and travel was beyond the Inquiry's broad terms of reference. Nevertheless, some of the public transport issues identified by the Institute of Transport Studies, Monash University include the following:

- despite over $1 billion of funding every year for public transport in Melbourne alone, most residents do not have access to much public transport. For example, two-thirds of residents live within walking distance of buses alone, and the average frequency of a bus in the peak period is every 40 minutes. The average bus service in Melbourne finishes before 7 o'clock at night and at weekends only one in five buses are running;

- significant investment in public transport is required. Improvements to basic service levels of buses seem to be the most cost-effective way forward;

- on Melbourne's fringe, because of low-density housing and dispersed demands, even buses will be a very expensive solution to provide a basic service; and

[76] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 621

[77] Professor G Currie, Chair of Public Transport, Institute of Transport Studies, Monash University, transcript of evidence, 6 December 2004, p. 673

[78] Department of Sustainability and Environment, submission, no. 70, p. 10

- there is also a need to manage the capacity of the public transport system, for example to maximise the capacity for longer distance journeys.[79]

The Committee also received submissions illustrating some innovative approaches being taken by local government to sustainable travel. For example the Greater Shepparton City Council's Cycle Instead program, which over a two month period decreased the number of car trips by 170,000 and increased the number of cycling trips by 95,000. The council was voted Best Regional Council by Bicycle Victoria in 2002. The City of Darebin promotes public transport use by its staff. It also requires Green Travel plans to be developed by large organisations applying for planning permits where there is an issue regarding car parking and traffic management.

The state government has established a target through its Metropolitan Transport Plan that 20 per cent of trips will be by public transport by 2020. Public transport only accounted for 6 per cent of (personal travel) trips in 1999. The Department of Infrastructure provided three examples of how sustainable transport is being integrated with land use planning through:

- transport input to the Sustainable Neighbourhood Code (Clause 56 of the Victorian Planning Provisions, VPP) recommended the inclusion of integrated transport and mobility networks which emphasises planning for pedestrians, cycling and access to public transport within proximity to key activity destinations and residential locations. The outcome of this recommendation is unclear. The Committee understands that the Department of Sustainability and Environment has lead responsibility for the Sustainable Neighbourhoods Project, the purpose of which is to update the residential subdivision provisions in Clause 56 of the VPP. The provisions will promote the Neighbourhood Principles that represent characteristics of liveable neighbourhoods as set out in the planning policy *Melbourne 2030*. The Sustainable Neighbourhood project was due for completion in 2004 however formal consultation on the draft provisions is expected to occur in June and July 2005;

- new Victorian Planning Provision for bicycle facilities (Clause 52.34 of the VPP). DoI has worked with DSE in developing provisions for bicycle facilities in the VPP. The provision 'is to' provide secure and accessible bicycle parking spaces and associated shower and change facilities in new residential and commercial developments. The Committee was unable to ascertain the status of this provision from the advice provided in the DoI submission; and

- participation in Smart Growth Committees. DoI is actively supporting the planning of designated growth area (Hume, Wyndham,

[79]Professor G Currie, Chair of Public Transport, Institute of Transport Studies, Monash University, transcript of evidence, 6 December 2004, , pp. 671-673

> Whittlesea, Casey/Cardinia, Caroline Springs/Melton) through representation on the Smart Growth Committees and Technical Working Groups. Details of the outcome of this initiative were not provided.[80]

The Committee was interested to learn of DoI's TravelSmart program. The program utilises customised marketing campaigns to encourage people to change their travel habits away from single person car trips to more sustainable modes of travel such as walking, public transport, cycling and car pooling. TravelSmart has been piloted in Elwood, Port Phillip, Dandenong and Moreland with mixed success. However there have been more promising outcomes around the Alamein train line where travel by public transport, cycling and walking increased significantly (around 25 per cent) and car trips fell by 10 per cent compared with a control group.[81] The Committee was advised that the field of travel behaviour change is a relatively new one and more difficult than traditional marketing as people are being asked to change their behaviour and explore new alternatives.[82] The TravelSmart program is expensive, costing approximately $100 per household to deliver. Mr Philip Harbutt, Manager, Integrated Transport Projects, DOI argued that:

> This is a perception I would not agree with in terms of it being an expensive program. For the outcomes you get from it, it is in fact a very effective and efficient way of buying that type of travel behaviour change … when you compare it to putting in place new public transport systems.[83]

However the Committee disagrees with this assessment as the TravelSmart program is being rolled out in areas that are already well serviced by public transport. TravelSmart will only be effective in areas that have alternatives to private car travel and where a significant component of that is public transport.

The Committee also believes that there is scope for further approaches to be investigated by DOI to encourage people to use modes of transport other than the private car or to choose more fuel efficient cars. Witnesses suggested providing preferential parking spaces for smaller cars, as is the case in California, near major retail centres and public buildings. Car registration fees can be structured to promote fuel efficiency and parking availability reduced where alternative modes of transport are readily accessible.

[80] Department of Infrastructure, submission no. 81, p. 10

[81] Ibid, p. 12

[82] Associate Professor G Rose, Director, Institute of Transport Studies, Monash University, transcript of evidence, 6 December 2004, p. 670

[83] Mr P Harbutt, Manager, Integrated Transport Projects, DOI, transcript of evidence, 22 November 2004, p. 613

## Energy retailers and the Sustainable Energy Authority Victoria

The Committee notes that as is the case with water retailers and household water consumption, it is currently not in the financial interests of energy retailers in Victoria to promote energy saving. The Energy Supply Association of Australia stated that:

> ... you have to be conscious that the energy supply industry is just that; it is the supply side of this equation. In the absence of any intervention or reason to prefer efficiency over further sales, this industry is about selling energy, and it will continue to do so, but it is also a mature enough industry to say to the community, 'You can actually avoid some of the cost increases and the relatively unproductive investment we will otherwise have to make if you modify your behaviours'. But the industry is not currently in a position to deploy every possible measure it could to influence those behaviours in just the standard operation of the market.[84]

The Committee was interested to learn from an International Energy Agency briefing that energy utilities in California are financially awarded for not only selling energy, but for selling energy efficiency services which has made the utilities strongly supportive of energy efficiency measures.[85] The IEA also advised that in Denmark a small surcharge has been applied to fund energy efficiency measures. The surcharge is less expensive than supply side measures (i.e., new infrastructure). Similarly in the United Kingdom, under the Energy Efficiency Commitment (EEC), electricity suppliers are required to meet mandatory energy saving targets that are paid for by a levy on power sales.[86] At least 50 per cent of the levy must be expended on refitting low-income housing. By the end of the second year of the program, the largest energy savings had been made with the installation of insulation (58 per cent), followed by lighting (22 per cent) and appliances (12 per cent).[87] A review of the program showed that energy suppliers would readily meet 2005 Energy Efficiency Committee targets.

The Committee believes that energy retailers in Victoria require incentives to promote energy saving and energy management advice. There are a number of successful and cost effective regulatory models that have been used overseas to create such incentives. Accordingly, the Committee recommends that:

**Recommendation 9.11**

[84] Mr B Page, Chief Executive Officer, Energy Supply Association of Australia, transcript of evidence, 23 November 2004, p. 633

[85] International Energy Authority, meeting, Paris, 8 February 2005

[86] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 616

[87] A review of the Energy Efficiency Commitment to the end of the second year: A report for the Secretary of State for Environment, Food and Rural Affairs, July 2004

**The Victorian Government introduce a framework that provides incentives for energy retailers to promote energy saving and energy management advice.**

The Committee received conflicting evidence regarding the role of SEAV in promoting renewable energy and energy efficiency to households. The Committee was advised that the SEAV has moved away from active community extension work and its presence in regional Victoria has diminished with, for example, the closure of the Ballarat SEAV office and its replacement with an 'information outlet'. In contrast the Department of Infrastructure argued that: *'It is pretty hard to beat SEAV as far as low-level on-the-ground, at-the-end-of-the-telephone advice that a small user can actually obtain'*.[88] The Committee believes that the SEAV (Sustainability Victoria from October 2005) has a central role in delivering programs that directly educate the community about renewable energy and energy efficiency, rather than delegating that role to non-governmental organisations.

## Energy services industry and increased skills, knowledge and training

Energy services are commercial services that lead to improved energy efficiency and greater use of renewable energy in the built environment. The energy services industry includes energy performance contractors, energy management consultants, energy auditors, energy efficient equipment manufacturers and suppliers. Mr Philip Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania stated that:

> … you need an industry that is capable of not only supplying you with good [energy efficient and renewable energy] equipment, but installing it, servicing it, guaranteeing its performance over time, particularly when they are relatively new technologies or unfamiliar to the customer, and providing financing of those technologies … The energy services sector is at a very embryonic stage in this country and needs a lot of market-building initiatives ….[89]

The fledgling nature of the energy services industry in Victoria impacts on the implementation of the 5 star energy rating standards for housing as well as energy consumption in the commercial and industrial sectors. The focus of this Inquiry has been on the residential sector. There are a number of government and industry initiatives that have been directed, in part, at improving the capacity of the energy services and building industries, as set out on later in this chapter. However As Mr Harrington explained:

> … We are aware of the targeted programs with groups like the Housing Institute Australia and Master Builders Australia. Programs that are designed by them for

[88] Mr P Clements, Manager, Retail Markets, Department of Infrastructure, 22 November 2004, p. 610

[89] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, pp. 620 and 622

> delivery by them to their members have probably had the best success so far in Australia; however, my concern is that [this] has not led in the last 10 years to anything like a closing of the gap between where we are now and where, say Europe is. I think there is a need for some external influences to come and shake the market up a bit basically, and to demonstrate that much better is possible.[90]

The evidence the Committee received indicates that there are significant shortcomings in the training and current skills sets of the building industry. For example, Mr Chris Reardon from the Institute for Sustainable Futures, University of Technology (Sydney) advised that the main barrier to the implementation of environmentally sustainable housing is a lack of skills in the building and construction industries and that TAFEs and universities currently have very scant coverage of sustainability or ESD in their curricula on the built environment.[91] The Victorian Department of Education and Training's evidence supports this finding. DET advised that: *'Considerable capacity building will be needed to promote the environmental skills and knowledge among teachers and administrators within the vocational education and training system'*.[92] Master Builders Australia also commented on the status of industry knowledge: *'… our builders … are at the beginning of the cycle of working out how they actually deliver sustainability to the communities'*.[93]

Witnesses explained that the decentralised nature of the building industry in Australia makes it an inherently difficult sector in which to promote energy services and sustainability principles. Ninety five per cent of Master Builders Australia builders employ five people or less and furthermore the industry is ageing with 40 per cent of builders being 45 years old or over who 'do not easily identify with new solutions to building'.[94] However the Committee understands that this situation is not unique to Australia. An OECD report – *Environmentally Sustainable Buildings: Challenges and Policies* – concluded that the construction industry is characterised by the dominance of a large number of small-scale builders (firms employing fewer than 10 persons).[95]

Problems associated with a lack of accreditation and standards regarding the installation of energy appliances and related fittings such as insulation, were also identified as barriers to making households more energy efficient. Moreland Energy Foundation stated that:

> … the way heating and cooling appliances are fitted leaves much to be desired. With so many houses getting central heating it is a real concern that there are no standards in place for fitting systems and the companies which do the installation do

[90] Ibid, p. 627

[91] Mr C Reardon, Institute for Sustainable Futures, University of Technology (Sydney), meeting, 27 October 2004, p. 553. Refer also to Mr R Leeson, Acting Director, Sustainability and Innovation, City of Melbourne, transcript of evidence, 9 August 2004, p. 175

[92] Department of Education and Training, submission no. 79, p. 4

[93] Mr D Wilson, National Director (Training), Master Builders Australia, meeting, 27 October 2004, p. 522

[94] Ibid, pp. 523-524

[95] Organisation for Economic Cooperation and Development, 2003, Environmentally Sustainable Buildings: Challenges and Policies, p. 54

> not need any particular accreditation or training. Hence the high number of complaints we received from households who are paying big energy bills but are still cold – only to find they are heating the side laneway or that the location of the thermostat is throwing their system into disarray.[96]

The Committee is concerned that the lack of training of sustainable design professionals and the absence of accreditation and performance standards for the installation of energy appliances and related fittings are major barriers to the implementation of the Victorian Government's 5 star energy rating for houses and sustainable housing design, in general. Although consumers also have a role in requesting sustainable design, the Committee believes that most consumers are heavily reliant on the professional advice provided by builders, designers, planners, architects, plumbers and electricians. Accordingly, the Committee recommends that:

**Recommendation 9.12**

**The State Government conduct an audit of the coverage and adequacy of training on environmentally sustainable design in Victorian TAFE, university and industry courses on the built environment. The audit should also investigate the status of sustainable design skills in the planning, design and building sectors; best practice in other jurisdictions; and contain recommendations on how to address the current shortcomings in the training curriculum.**

**Recommendation 9.13**

**The Department of Sustainability and Environment, Sustainability Victoria, in cooperation with the housing and building industries, develop accreditation and performance standards for the installation of energy appliances and related fittings such as insulation, to ensure consumers are protected.**

**Increased skills, knowledge and training**

**Your Home project:** The Your Home project is an initiative of the Australian Greenhouse Office in cooperation with a number of commonwealth and state agencies, local government, the building and design industries, product manufacturers and community groups. The project was developed in response to calls from the building and construction industry for training materials on environmentally sustainable housing design. As the AGO explained to the Committee: *'[The building and construction industry] were very aware that very few of their members had done any training in*

*sustainability issues, and were struggling with the concept'*.[97] The AGO regards consumer demand as an important driver for the industry and

[96] Moreland Energy Foundation, submission no. 56

[97] Mr S Berry, Chair, Steering Committee, Your Home Project, Australian Greenhouse Office, Department of the Environment and Heritage, meeting, 27 October 2004, p. 552

therefore different materials have been developed for various audiences including consumers.

The main technical manual contains approximately 70 fact sheets on sustainability issues such as passive design (homes that do not require mechanical heating or cooling), water use, materials use, energy use and site impacts. It also contains case studies on new buildings and renovations, various climatic conditions and case studies on inner-suburban to rural settings. A survey of 1,000 HIA Members conducted in March and April 2005 found that three quarters of respondents were not aware of the Your Home project materials and 80 per cent did not possess any of the materials.[98] The Committee believes that the Your Home guide is a comprehensive and valuable resource for promoting environmentally sustainable housing design, however further work needs to be done to promote its use.

**GreenPlumbers:** The GreenPlumbers program has been discussed earlier in the report. GreenPlumbers was developed by the Master Plumbers' and Mechanical Services Association of Australia with seed funding from the AGO and input from various stakeholders.[99] The series of workshops have been designed to enhance plumbers' skills and knowledge about the environmental considerations of their work placing plumbers in a better position to advise and inform consumers on topics such as: the benefits of energy efficiency; water conservation or the most appropriate and cost effective appliances to suit individual needs.

**GreenSmart:** The Housing Industry Association, in partnership with the AGO and Environment Australia has developed the GreenSmart program which is a two-day environmental awareness construction course. The course draws on the Your Home materials and was developed in response to increasing Government benchmarks for sustainable housing developments. Approximately 1,500 people, from an HIA national membership base of 30,000, have attended the course (as at October 2004) which entitles them to market themselves as a GreenSmart professional.[100] The Committee was advised that HIA and the Victorian Government have made a commitment to build a GreenSmart village in each of the nominated growth Corridors under the Melbourne 2030 policy.[101]

The Master Builders Association has also developed a new program called **New Generation Builder** to accredit and audit builder's delivery of sustainable design.

[98] Personal communication, Mr Chris Reardon, Institute for Sustainable Futures, University of Technology (Sydney), 17 May 2005

[99] Source: www.greenplumbers.com.au/, accessed 15 May 2005

[100] Mr W Gersbach, Executive Director, Planning and Environment, Housing Industry Association, meeting, 27 October 2004, p. 533

[101] Ibid, p. 534

The availability of energy efficient products is also an important limitation not only in Victoria but Australia wide for households. For instance Mr Harrington explained that:

> When I do a static comparison of the types of technologies that are mainstream in the residential sector in Australia compared to those that are mainstream elsewhere, we compare very poorly. Very high efficiency technologies are generally not available in this country or are available at very high costs relative to normal technologies.[102]

Mr Harrington provided the example of window glazing to illustrate this point.[103] Glazed windows on the market in Tasmania have a u-value or warmth insulation value of 2.9, compared with very low-energy glazing in Austria of 0.4 u-value. In Denmark the government has an incentive program to encourage people to remove old double glazed windows (which are difficult to access in Australia) and replace them with modern coated triple-glazed windows. In Europe and North America, increasingly the market has demanded high efficiency double or triple glazing because it is required in the building standards. Mr Harrington advised that, contrary to the situation in Australia, single glazed glass in California and France costs a lot more than double glazing because it is no longer manufactured and needs to be custom made.

The European Union has introduced a proposal for an end-use energy efficiency and energy services directive, with a final decision expected in June 2005. The proposal contains a savings target (1 per cent per annum) for Member States to measure energy efficiency improvements and creating sufficient market demand for energy services.[104] There is also a 1.5 per cent energy savings target per annum for the public sector and an obligation for Member States to ensure that certain energy distributors and/or retail supply companies offer energy services to their customers. The Committee notes that the European Union has been proactive at regulating for energy efficiency targets and an energy services industry which is expected to benefit domestic consumers through informative energy metering and billing and cheaper prices for lighting, heating and cooling, for example. This approach is a major contrast to the approach in Australia where regulation is used to eliminate worst practice.

The SEAV advised the Committee that it is conducting a number of capacity building initiatives including the accreditation and training of home energy raters and GreenPlumbers to install solar hot water systems.[105] The SEAV is also preparing a directory of sustainable energy technologies and service providers. A Victorian Energy Efficiency Strategy that will in part develop a strong energy services industry is due for release later in 2005. The

[102] Mr P Harrington, Deputy Secretary (Infrastructure), Department of Infrastructure, Energy and Resources, Tasmania, transcript of evidence, 22 November 2004, p. 619

[103] Ibid, pp. 616-624

[104] European Commission, 2003, Explanatory Memorandum, Proposal for a Directive of the European Parliament and of the Council on energy end-use efficiency and energy services

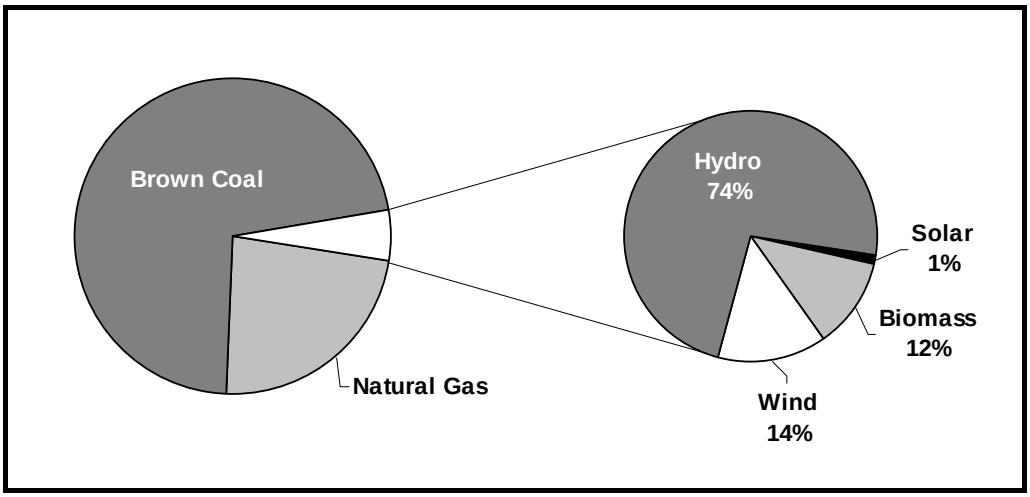
[105] Sustainable Energy Authority Victoria, submission no. 72, p. 14

Committee notes that many European governments have a far more active role in fostering the energy services sector than is the case in Victoria, through for instance, mandatory energy saving targets for energy retailers funded by a levy on power sales, developing relationships with industry (both manufacturers and retailers of equipment) to roll out high performance energy efficient technologies, large scale housing demonstration projects and commitments to purchase minimum amounts of new technology. The Committee believes that the state government should have a proactive role in developing an energy services industry in Victoria and looks forward to the release of the strategy.

## Renewable energy

The Sustainable Energy Authority Victoria (SEAV) defines renewable energy as clean energy that can be replenished or replaced from natural sources and produces little greenhouse pollution.[106] Renewable energy delivers sustainable outcomes by producing less greenhouse pollution and by increasing the diversity and therefore the security of supply. Types of renewable energy include solar, wind and hydro power. Wind energy is the most cost effective renewable energy resource at present[107] but generates a small fraction of Victoria's electricity supply.

### Figure 32: Victorian Electricity Generating Capacity by Fuel Source (2004)




Source: Sustainable Energy Authority Victoria, Annual Report 2003-2004, p.15

Renewable energy accounts for 3 to 4 per cent of Victoria's electricity consumption. The state government has a target of increasing this to 10 per cent by 2010. A Victorian Renewable Energy Strategy is due for release in 2005. Some local governments such as Mornington Peninsula Shire are

[106] Ibid, submission no. 72, p. 6

[107] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 584

exploring renewable energy sources such as geothermal and wave energy, but the Committee found that such Councils are the exception.

## Mandatory renewable energy target

The most important driver for the renewable energy industry in Australia at present is the federal government's Mandatory Renewable Energy Target (MRET) mechanism. Under the federal legislation, electricity retailers and other large electricity buyers are legally required to source an additional 2 per cent of their electricity from renewable or specified waste-product energy sources by 2010.[108] This equates to 9,500 gigawatt hours of renewable electricity per annum by 2010. The target of 9,500 gigawatt hours is scheduled to remain in place until 2020. The target was introduced in 2001 to accelerate the uptake of renewable energy in grid-based power applications, and provide an ongoing base for commercially competitive renewable energy.[109]

However the capacity of the current MRET will be fully utilised by 2006-07 and a revision of the target was not set out in the federal government's White Paper on Energy (May 2004). Victoria's submission to the review of the strategy conducted in 2003 called for a doubling of the target by 2010.[110] A number of witnesses expressed their disappointment regarding the federal government's decision.[111] Mr Alan Pears explained to the Committee the problems associated with the current MRET:

> Most of the commonwealth programs such as the photovoltaics rebate scheme and indeed the mandatory renewable energy target, now that the target has proved to be too low, are really boom and bust issues. The renewable energy industry will run out of capacity with the MRET by 2006-07. All of the activity going on that is being driven by MRET at the moment will basically stall within the next couple of years unless a larger MRET target is introduced … From what we can see there is nothing to stop a state government introducing MRET requirements of electricity retailers operating in Victorian to essentially, for example, have to submit renewable energy certificates sourced from Victorian renewables and even specific types of renewables.[112]

The Committee understands that state and territory ministers have made a commitment to establish an inter-jurisdictional working group to recommend ways to increase the current MRET from the current level and time frame. Some states have already taken further action on this issue with New South Wales introducing a Greenhouse Gas Abatement Scheme in 2003 which imposes mandatory greenhouse gas benchmarks on all NSW electricity

[108] Mandatory Renewable Energy Target Review Panel, September 2003, Renewable Opportunities, A Review of the Operation of the Renewable Energy (Electricity) Act 2000, p. 2

[109] Ibid, p. 2

[110] Mr I Krbaleski, Manager, Greenhouse Challenge for Energy, Department of Infrastructure, transcript of evidence, 22 November 2004, p. 607

[111] For example refer to Mr P Kennedy, Central Victorian Greenhouse Alliance, transcript of evidence, 27 July 2004, p. 169; Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, transcript of evidence, 27 September 2004, p. 290

[112] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

retailers and other parties, to reduce the emission of greenhouse gases from the consumption of electricity in the state. In Queensland, there is a requirement for a minimum amount of electricity to be generated from gas.

MRET are recognised internationally as a progressive and effective mechanism for driving the renewable energy industry. The Committee was advised that the Victorian Government is in a position to establish its own MRET. The Committee believes that such a proposal has significant merit. The Victorian Government has already made a commitment to 10 per cent of electricity being generated from renewable sources by 2010. The Committee believes that this target should be consolidated into an MRET framework before the industry begins to stall in 2006-07. The Committee also believes that longer term targets need to be established, as is the case overseas.

**Recommendation 9.14**

**The Victorian Government, take a lead by achieving a mandatory renewable energy target of 10 per cent by 2010. Targets for the medium (20 years) and long term (50 years) should also be established.**

## Government support

Witnesses advised the Committee that the renewable energy industry requires government support. As Mr Alan Pears explained:

> [The renewable energy industry] is competing with an industry that has had 70 years of government support, and it is a very difficult market to be in. It is also a market where there are many distortions and barriers to new entrants.[113]

Similarly the CEO of the Energy Supply Association of Australia argued that:

> ... I do not believe, short of government intervention, markets will automatically and [on a] large scale pick up renewable energy. This is simply because the competitive markets at the moment do not accord a substantial value for greenhouse friendliness, so it is another area where there are a range of voluntary and mandatory measures, but to further the uptake in residential circumstances is probably something that requires either a regulatory or a financial incentive program to further enhance that uptake.[114]

There are a number of federal and state government programs that promote the uptake of renewable energy by households including Green Power (discussed in detail below), solar hot water rebates, photovoltaic rebates for households and community-use facilities and support funding for applications of medium-scale proven renewable energy technologies in Victoria (such as energy generated from farm waste or mini-hydro projects). The Committee was told that the need is not for programs that test the

[113] Ibid, p. 579

[114] Mr B Page, Chief Executive Officer, Energy Supply Association of Australia, transcript of evidence, 23 November 2005, p. 631

workability of renewable energy technologies, such as the $75 million Federal Solar Cities[115] trial, but rather government programs are needed that address the main barrier to the uptake of renewable energy – the cost compared with cheap coal-fired electricity.[116] Mr Hugh Saddler, Managing Director of Energy Strategies advised the Committee that Australia is well behind countries such as Japan and Germany with their large scale renewable energy subsidy programs and that far greater greenhouse gas abatement would be achieved if the federal government focussed on subsidies for solar hot water heaters and retrofits.[117]

**Renewable Energy in Germany**

The Committee was advised that most electricity in Germany is produced from coal.[118] The German target for renewable energy (as a percentage of electricity use) is 20 per cent by 2020. In 2004, renewable energy sources accounted for 3 per cent of primary energy and nearly 10 per cent of

electricity production. The *Renewable Energy Sources Act* (EEG) became effective in April 2000 and its purpose is *'… to facilitate the sustainable development of energy supply in the interest of managing global warming and protecting the environment and … to double the share of renewable energy sources in total energy consumption by the year 2010…'*. The *Renewable Energy Sources Act* guarantees priority purchases and a minimum compensation for electricity from renewables fed into the grid (relating to the generation costs). The minimum compensation is guaranteed for 20 years and provides planning and legal security for investors. These costs are borne by consumers but are relatively low.

The Institute for Ecological Economy Research advised that the EEG has become a successful and internationally renown tool for promoting renewable energy and has been introduced in other countries including Spain, Austria and China. The act has been subsequently amended to

establish the target of 20 percent of electricity in 2020 being generated by renewable sources. The Committee was also interested to learn that residents can receive 0.55 euros per kilowatt hour of energy generated from solar panels installed on their homes, which helps finance the installation of the panels.

[115] According to the Department of Prime Minister and Cabinet Fact Sheet on Solar Cities, Solar Cities trials will provide a living model of how solar energy, energy efficiency and responsive market signals can deliver economic and environmental benefits in an integrated package. Source: www.dpmc.gov.au/publications/energt_future/factsheets/factsheet_4.htm, accessed May 2005. The SEAV highlighted the need to '… demonstrate the renewable energy technologies and make sure they're commercially viable'. Source: Ms R Bissett, Functional Leader Communities, Sustainable Energy Authority Victoria, transcript of evidence, 5 July 2004, p. 49

[116] Mr H Saddler, Managing Director, Energy Strategies, meeting, 27 October 2004, p. 516

[117] Ibid, p. 516

[118] This section is based on meetings the Committee had in Berlin and Freiburg (Germany) in February 2005 with the Federal Environment Agency, Institute for Ecological Economy Research and Environment Agency, City of Freiburg

Witnesses identified the need for government action on a number of renewable energy issues. There is currently a lack of information on the performance of household renewable energy technologies, including those that qualify for government rebates. As Mr Alan Pears explained:

> At the moment if someone says, 'How much does a solar hot water service in Melbourne really save?', we do not have good data to tell them. Likewise, we do not have lots of good data to tell people how well solar cells work either.[119]

The Committee believes that such basic information should be readily available to consumers to allow them to make informed decisions about the financial costs and environmental benefits of purchasing and installing renewable technologies, particularly those technologies that attract government rebates. Accordingly the Committee recommends that:

**Recommendation 9.15**

**Sustainability Victoria produce information for consumers on the financial and environmental performance of household renewable energy technologies including solar hot water heaters and photovoltaic systems.**

The cost of renewable energy to households compared with conventional electricity is recognised as a major barrier, with prices not reflecting environmental externalities. However in rural and regional Victoria where access to electricity and natural gas in some areas is limited or non-existent, the cost discrepancies are less prominent and there are opportunities for the application of renewable energy. The Central Victorian Greenhouse Alliance stated that there are extensive opportunities for energy creation in the central Victorian region including the potential for the production of briquettes from biomass waste, solar and wind power.[120] The alliance also noted that the potential of renewable energy in the region has not been thoroughly explored and the group would welcome state government involvement.

[119] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 579

[120] Mr P Kennedy, Central Victorian Greenhouse Alliance, transcript of evidence, 27 July 2004, p. 168

**Recommendation 9.16**

**Sustainability Victoria support community groups such as the Central Victorian Greenhouse Alliance, in producing a plan for the development of renewable energy technologies and energy sources in rural and regional settings with priority given to those regions that do not have access to the electricity grid and natural gas.**

## Green Power and community power

Green Power is electricity generated from renewable energy sources such as solar, wind, biomass and hydro power.[121] When consumers elect to purchase Green Power from their electricity supplier, the supplier is required to purchase the equivalent amount of energy from renewable sources on the consumers behalf and feed it into the national electricity grid. Over 90 per cent of electricity generated in Victoria is coal-fired power which is greenhouse gas intensive.[122] The electricity supplied to the house of Green Power consumers remains the same but the purchase directly reduces the greenhouse gas emissions from coal-fired power stations.[123]

Green Power is a national government accredited product denoted by a large 'tick' symbol (Figure 33). According to the Sustainable Energy Authority Victoria, an accredited Green Power product is one where the generation source:

- results in greenhouse gas emission reductions;
- has nett environmental benefits;
- is based primarily[124] on a renewable energy source.[125]

### Figure 33: Green Power Logo

Source: GreenPower www.greenpower.com.au

[121] Source: www.seav.vic.gov.au/renewable_energy/green_power.asp, accessed May 2005
[122] Ibid
[123] Ibid
[124] Primarily means that more than half of the electricity output can be attributed to a renewable source and only the renewable part can be counted as Green Power. This is to allow for co-firing of generators, where the renewable fuel makes a significant contribution to the power output (i.e., more than 50 per cent). Ibid
[125] Ibid

As part of the Green Power program, all accredited generators and electricity suppliers are audited every year and the reports are made publicly available.[126]

The Green Power program was originally established in New South Wales in 1997 as an incentive to the development of more renewable energy products within the state.[127] It was expanded nationally in 2000 and includes all state and territory governments except Tasmania and the Northern Territory. The national body that governs the program is the National Green Power Accreditation Steering Group which accredits energy retailers and renewable energy generators. Ms Emily Firth, Acting Program Manager, Green Power, NSW Department of Energy, Utilities and Sustainability advised the Committee that one of the strengths of the Australian program is that there is a single 'trusted' entity that is responsible for accreditation which is not the case with some green energy programs overseas.[128] There are around 12 energy retailers in Australia participating in the program with 250 renewable energy generators (fifty six of which are in Victoria).[129]

Green Power is currently the most efficient and affordable way of accessing renewable household energy. As Mr Alan Pears advised the Committee:

> One of the other advantages of Green Power, which many people do not realise, is that it is in many ways a better investment than on-site renewables such as solar hot water and photovoltaics, as people do them at the moment, because when people buy their technologies most of them sign away their renewable energy certificates to the supplier in exchange for a discount. Those renewable energy certificates are then sold to an electricity retailer as part of the mandatory renewable energy target. This means that when you put on solar hot water or solar cells, all the electricity that is generated is actually part of the mandatory target; whereas certified green power schemes are additional to the mandatory renewable energy target because the renewable certificates are quarantined. So in that sense Green Power has a lot of value that is not well understood.[130]

Although Green Power has been available since 1997 in New South Wales and 2000 elsewhere in Australia, the take up rate has been low. Only 1.4 per cent of households nationally purchase Green Power, which is very low, according to Ms Firth when surveys indicate that 75-80 per cent of consumers claim they are willing to pay a premium for green electricity.[131] A survey conducted in February 2005 of Victorians found that 54 per cent of the 300 people surveyed were willing to pay extra for electricity from

[126] Source: www.greenpower.gov.au Green Power Fact Sheet: Background Information, accessed May 2005

[127] Ms E Firth, Acting Program Manager, Green Power, NSW Department of Energy, Utilities and Sustainability, meeting, 26 October 2004, p. 480

[128] Ibid, p. 480

[129] Ibid, p. 480 and Thwaites, J (Minister for the Environment), 2005, 'New campaign to boost 'green powered' households', media release, 9 March

[130] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 578

[131] Ms E Firth, Acting Program Manager, Green Power, NSW Department of Energy, Utilities and Sustainability, meeting, 26 October 2004, p. 482.

renewable sources with only a quarter willing to pay between $4 and $5 per week (the average estimated additional cost of Green Power).[132] In February 2005 only two percent[133] of Victorians were purchasing Green Power (approximately 40,000 households).[134] It is unclear what percentage of Green Power these customers were purchasing.

Witnesses identified a number of barriers to the up take of Green Power including:

- people do not understand the abstract concept of purchasing Green Power that is fed into the national electricity grid. They also lack confidence that the proportion of Green Power purchased is ultimately fed into the grid by electricity suppliers;[135]
- the sale of non certified products has further confused people;[136]
- the Green Power product has not been promoted strongly[137] furthermore it is not in the interests of energy suppliers to promote Green Power. The recent survey of Victorians found that 50 per cent of people do not know how to buy Green Power;[138]
- the additional cost is a deterrent.[139] Green Power costs more than conventional electricity because according to the official website 'renewable energy technology is still not widely used. As the renewable energy industry develops costs will continue to decline';[140]
- it can be difficult to apply for Green Power, particularly if changing energy suppliers;[141] and

[132] Source: www.greenpower.gov.au Green Power Fact Sheet: Newspoll results, accessed May 2005 and Thwaites, J (Minister for the Environment), 2005, 'New campaign to boost 'green powered' households', media release, 9 March

[133] Thwaites, J (Minister for the Environment), 2005, 'New campaign to boost 'green powered' households', media release, 9 March

[134] Source: www.greenpower.gov.au Green Power Fact Sheet: Background Information, accessed May 2005

[135] Ms R Bissett, Functional Leader Communities, Sustainable Energy Authority Victoria, transcript of evidence, 5 July 2004, pp. 52-53; Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 583; Mr J Krbaleski, Manager, Greenhouse Challenge for Energy, Department of Infrastructure, transcript of evidence, 22 November 2004, p. 609

[136] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 583

[137] Ibid and Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, transcript of evidence, 27 September 2004, p. 290

[138] Source: www.greenpower.gov.au Green Power Fact Sheet: Newspoll results, accessed May 2005

[139] Ms E Firth, Acting Program Manager, Green Power, NSW Department of Energy, Utilities and Sustainability, meeting, 26 October 2004, p. 482 and Ms S Brown, Sustainability Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 649

[140] Source: www.greenpower.gov.au. Green Power Fact Sheet: Background Information, accessed May 2005. AGL residential customers can purchase up to 100 per cent of their electricity as Green Power at no additional cost.

[141] Ms K Noble, Building Green Campaigner, Australian Conservation Foundation, transcript of evidence, 23 November 2004, p. 649

- there have also been queries, according to the Department of Sustainability and environment, about the composition of Green Power and merits of energy supplied from sources such as forestry biomass.[142]

The Victorian Government in conjunction with two energy retailers conducted an advertising campaign on Green Power called *The Power of Every One*. The campaign which cost $1.45 million ($1.25 million of State Government funding and $200,000 from energy retailers) and is being run between March and June 2005, encourages households to purchase Green Power.[143] The target of the state government is to raise the percentage of households purchasing Green Power to 5 per cent by the end of 2005. The state government will increase its purchase of Green Power from 5 to 10 per cent of electricity consumption by 2006.

The Committee was advised that some local governments are also purchasing Green Power as part of their commitment to renewable energy. For example, the City of Moreland purchases 100 per cent Green Power for its six largest Council sites.[144] Some local governments have also established community power schemes. The City of Darebin, in partnership with the Moreland Energy Foundation and Cities of Melbourne and Yarra have established Australia's first aggregated electricity purchasing project for households. The project offers Green Power to local residents at cheaper rates than conventional electricity.[145] Mornington Peninsula Shire purchases Green Power for its street lighting.[146]

The Committee believes that the pricing signals to consumers regarding renewable energy are flawed as people purchasing conventional greenhouse gas intensive electricity are rewarded with cheaper prices than those electing to purchase Green Power. The Committee believes in principle that people should not have to pay a premium for purchasing Green Power. Accordingly the Committee recommends that:

**Recommendation 9.17**

**A pricing model be developed that provides incentives for the uptake of Green Power rather than conventional electricity from fossil fuels.**

The Committee also believes that Green Power needs to be promoted on an ongoing basis by government. As discussed above, consumers are often distrustful of information provided by industry, including energy suppliers. Therefore the government, through Sustainability Victoria, should take a

[142] Mr I Porter, Executive Director, Sustainability Strategies, Department of Sustainability and Environment, briefing, 17 May 2004, p. 6

[143] Mr M Dess, Manager, Greenhouse Policy, Department of Sustainability and Environment, transcript of evidence, 26 April 2005, p. 718

[144] Ms N Krause, Team Leader, Moreland City Council, transcript of evidence, 23 August 2004, p. 222

[145] Ms L Hynes, General Manager, Environment and Amenity, City of Darebin, transcript of evidence, 27 September 2004, p. 289

[146] Mornington Peninsula Shire, submission no. 35

lead role in promoting the product along with energy suppliers. The promotional campaign should extend beyond June 2005.

The Committee believes that information on how to subscribe to Green Power should be provided on residential electricity bills and consumers who opt to purchase Green Power should also receive recognition of this on their energy bill (beyond the changed tariff). The bill should advise consumers of the greenhouse gas emissions saved through their purchase of Green Power. Accordingly the Committee recommends that:

**Recommendation 9.18**

**Sustainability Victoria design and implement an ongoing promotional campaign for Green Power that includes meaningful performance indicators.**

**Recommendation 9.19**

**Electricity bills should contain information on how to purchase Green Power.**

Finally, the Committee believes that more ambitious and longer term targets should be established for the purchase of Green Power by the state government. In order to retain credibility on issues such as renewable energy it is important for the government to demonstrate to the community that it is taking a lead, particularly if it is encouraging the community to pay a premium for Green Power. The government also has an important role to play in stimulating the renewable energy sector through its purchasing power. Therefore the Committee recommends that:

**Recommendation 9.20**

**By 2010, the State Government should increase its purchase of Green Power to 25 per cent.**

## Pricing, informative billing and interval metering

The wholesale market price of electricity fluctuates throughout the day and sometimes spikes significantly in summer with increased demand. Mr Alan Pears advised the Committee that there are massive price distortions in the energy market, for example in New South Wales the price at peak demand is estimated to be $3.80 per kilowatt hour, when consumers pay 0.14 cents.[147] Consumers to some extent are buffered from such price fluctuations, instead paying peak and off peak (usually between 7 am to 11 pm) prices for energy. The Department of Infrastructure stated in its written submission that there is potential for wholesale costs to be better managed with consumers varying their electricity usage patterns through a

[147] Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 581

combination of interval metering and 'time of use' tariffs[148] - otherwise known as peak load shifting.

The Victorian Essential Services Commission announced in July 2004 its decision to mandate the progressive installation of interval meters across Victoria to residential, industrial and commercial electricity users. Interval meters measure household energy consumption every half hour and are expected, according to the Department of Infrastructure, to assist energy consumers and retailers in understanding energy usage and manage and lower their energy costs.[149]

The roll out of the interval meters is expected to take some time. For residential and small business consumers with separate off-peak electric hot water or space heating, meters will be changed over between 2006 and 2011.[150] DOI advised that priority has been given to customers who have both peak and off-peak supply as these customers are expected to 'produce the greatest demand-shifting benefits'[151] presumably to both consumers and energy retailers. For residential and small business consumers without separate off-peak supply, worn-out or damaged meters would be replaced with the new types on a new for old basis. All new homes and small businesses will be fitted out with the new meter from 2006.

However, there are two primary issues that witnesses advised need to be addressed regarding household energy pricing and billing. Some electricity and gas providers, such as SPI Electricity Pty Ltd (formerly TXU) and AGL South,[152] have declining block tariffs that discourage energy conservation. Moreland Energy Foundation recommended that the government should regulate to prevent retailers from offering declining block tariffs.[153] As with the case of household water, the Committee believes that energy tariffs should send the correct signals to consumers, accordingly it recommends that:

**Recommendation 9.21**

**The Victorian Government introduce a pricing framework that promotes energy conservation and discourages energy retailers from offering declining block tariffs to consumers.**

Witnesses advised the Committee that residential consumers would benefit from more informative energy bills.[154] Greenhouse gas emissions

[148] Department of Infrastructure, submission no. 81, p. 13

[149] Ibid, p. 13

[150] Ibid, p. 13

[151] Mr P Clements, Manager, Retail Markets, Department of Infrastructure, transcript of evidence, 22 November 2004, p. 610

[152] Refer to Victoria Government Gazette, Nos. S 221-223, Friday 29 October 2004

[153] Moreland Energy Foundation, submission no. 56

[154] For example, refer to Ms N Krause, Team Leader, Moreland City Council, transcript of evidence, p. 222; Mr A Pears, Policy Adviser, Business Council for Sustainable Energy, transcript of evidence, 8 November 2004, p. 581; and Ms R Ollivier, Chief Executive Officer, Alternative Technology Association, transcript of evidence, 6 December 2004, p. 679

information is already provided on bills in Victoria, however, information that allows consumers to compare their consumption with a similar sized household is not provided. The Committee believes that such benchmarking would allow consumers to readily determine whether they are an energy efficient household. The merits of such information in the case of household water consumption is outlined in chapter 8 and the Committee believes that it is equally relevant to energy bills. Accordingly, the Committee recommends that:

**Recommendation 9.22**

**Electricity retailers introduce customer accounts that provide a comparison of the customer's average daily usage with that of an energy efficient customer of a similar size household and location.**

Parliament House
30 May 2005

# Appendix 1

## List of Submissions

Alan Parker Design

Mr Keith Altmann

Australian and New Zealand Solar Energy Society

Banyule City Council

Barwon Water

Bayside City Council

Mr John and Mrs Vivienne Benton

Bioenergy Australia

Central Highlands Region Water Authority

Centre for Education and Research in Environmental Strategies

CitiPower Pty & Powercor Australian Ltd

City of Glen Eira

City of Greater Bendigo

City of Greater Dandenong

City of Melbourne

City of Port Phillip

City of Stonnington

City of Yarra

Classic Residences

The Coalition for Peoples Transport

Construction Material Processors Association Inc

Department of Education and Training

Department of Infrastructure

Department of Sustainability and Environment

EcoRecycle Victoria

Energy Smart Design

Environment Victoria

Environmental Protection Authority Victoria

ExxonMobil Australia Pty Ltd

Mr Andrew Fleming

Glenelg Hopkins Catchment Management Authority

Global Renewables

Goulburn Broken Catchment Management Authority

Greenway Hirst Page Pty Ltd

Hanson Landfill Services

Integrating Sustainability

Least Waste

Mr Craig Lester

Loddon Shire Council

MADEC Ltd

Melbourne Water

Michael M Yeates and Associates Pty Ltd

Mildura Rural City Council

Mr Michael Mobbs & Professor Dimity Reed

Monash University, Mr Paul Koltun, School of Geography and Environment Science

Monash University, Associate Professor Frank Fisher, Graduate School of Environmental Science

Moorabool Shire Council

Moreland City Council

Moreland Energy Foundation Ltd

Mornington Peninsula Shire

Mortlake Ahead

Moyne Shire Council

Municipal Association of Victoria

Museum Victoria

North Central Catchment Management Authority

Nullumbik Shire Council

The Organic House

Ovens Landcare Network

Planning Institute of Australia, Victoria Division

Portland Water Supply Engineers

Mr David Reid

RMIT University, Associate Professor Ian Thomas, School of Social Science and Planning

SITA Environmental Solutions Pty Ltd

Southern Grampians Shire Council

Surf Coast Shire

Sustainable Energy Authority Victoria

Sustainable Gardening Australia Inc

Sustainable Melbourne Fund

Mrs Hilary Turner

Mr Paul Tvermoes

Victorian Association for Environmental Education

Victorian Auditor-General's Office

Victorian Water Industry Association Inc

VicUrban

Vox Bandicoot Pty Ltd

Waste Management Association of Australia

Wellington Shire Council

Woodend Sustainable Living Community Park

Yarra Valley Water Ltd

3 confidential submissions

# Appendix 2

## List of Witnesses

## Briefings

## Melbourne 17 May 2004

| | |
|---|---|
| Mr John Collins | General Manager, Strategic Policy and Projects |
| Ms Ian Porter | Executive Director, Sustainability Strategies |
| Ms Tess Williams | Director, Communication Strategies and Stakeholder Relations |
| Ms Kirsten Larsen | Policy Officer, Sustainability Strategies |
| | **Department of Sustainability and Environment** |

## Melbourne 11 July 2004

| | |
|---|---|
| Mr Jan Bergquist | Chairman |
| Ms Ingrid Oikari | Principal Administrative Officer |
| | **Swedish Environmental Objectives Council** |
| Mr Amena Yauvoli | Senior Policy Advisor |
| | **South Pacific Environment Program** |

Mr Alisdair Morrison, MSP Environment and Rural Development Committee
**Scottish Parliament**

## Public Hearings

## Melbourne 5 July 2004

| | |
|---|---|
| Mr Ian Coles | Chief Executive Officer |
| Ms Jenny Pickles | Manager, Strategy and Performance |
| | **EcoRecycle Victoria** |
| Mr Mick Bourke | Chairman |
| Dr Emily Phillips | Manager, Neighbourhood Environment Improvement Program, |
| | **Environment Protection Authority** |
| Mr Wayne Wescott | Chief Executive Officer |
| Ms Maria Simonelli | Manager and Campaign Director |
| | **International Council for Local Environmental Initiatives** |
| Mr Daniel Voronoff | Director, Sustainable Living |
| Ms Jenny Henty | Director, Sustainable Production and Consumption |
| | **Environment Victoria** |

| | |
|---|---|
| Ms Katrina Woolfe | Functional Leader, Best Practice and Standards |
| Ms Rosemary Bissett | Functional Leader, Communities |
| | **Sustainable Energy Authority Victoria** |
| Mr Peter Lyon | Senior Policy Advisor, Environment |
| Ms Nina Rogers | Local Government Natural Resource Management Facilitator |
| | **Municipal Association of Victoria** |
| Mr John Novotny | Manager |
| | **Therma-Wall Industries** |
| Mr Andrew Rowe | Chief Executive Officer |
| Mr Jared Osborne | Policy and Administration Officer |
| | **Victorian Local Governance Association** |

## Melbourne 6 July 2004

| | |
|---|---|
| Ms Helen Lewis | Director, Centre for Design |
| | **RMIT** |
| Ms Esther Abram | Chief Executive Officer |
| | **Moreland Energy Foundation Limited** |
| Professor Ian Rae | Technical Director |
| | **Australian Academy of Technical Sciences and Engineering** |
| Dr Enzo Palombo | Research Academic |
| Ms Louise Dunn | Research Academic |
| | Environment and Biotechnology Centre |
| | **Swinburne University of Technology** |

## Bendigo 27 July 2004

| | |
|---|---|
| Mr Brian Gould | Executive Manager, Economic Development |
| Mr Philip DeAraugo | Project Officer, Strategic Planning |
| Mr John Pollock | Ecologically Sustainable Development Project Officer |
| | **City of Greater Bendigo** |
| Mr Barry Whelan | Manager, Environmental Services |
| | **Macedon Ranges Shire Council** |
| Mr Peter Chudek | Executive Officer |
| Ms Kerrie Fennell | Regional Education Officer |
| | **Calder Regional Waste Management Group** |
| Mr Geoff Michell | Chief Executive |
| Ms Denise Pendleton | Executive Manager, Customer Service and |

| | |
|---|---|
| | Administration<br>**Coliban Water** |
| Mr Henning Rasmussen | Director<br>**Energy Smart Design** |
| Dr Maureen Rogers | Research Fellow<br>Centre for Sustainable Regional Communities<br>**LaTrobe University, Bendigo** |
| Mr Peter Kennedy | **Central Victorian Greenhouse Alliance** |

## Melbourne 9 August 2004

| | |
|---|---|
| Ms Robyn Leeson | Acting Director, Sustainability and Innovation<br>**City of Melbourne** |
| Mr Steven Ray | Executive Director |
| Ms Lalitha Ramachandran | Manager, Programs and Research<br>**Environs Australia Projects** |
| Mr Rob Palmer | Manager, Infrastructure and Environment |
| Ms Emily Chapple | Environmental Project Officer<br>**City of Port Phillip** |
| Ms Tanya Ha | Campaign Development Manager<br>**Planet Ark** |

## Melbourne 23 August 2004

| | |
|---|---|
| Mr John Nolan | President, Victorian Branch |
| Ms Patricia Armstrong | Chair of the Waste Educators Working Group |
| Mr Joe Lunardello | Local Government Representative<br>**Waste Management Association of Australia** |
| Dr Harry Blutstein | Consultant<br>**Integrating Sustainability** |
| Ms Nancy Krause | Ecologically Sustainable Development Team Leader |
| Mr Michael Smit | Manager, Sustainable Development |
| Ms Cate Collins | Ecologically Sustainable Development Engineer<br>**Moreland City Council** |
| Mr Mark Harvey | Chief Executive Officer |
| Ms Kym Nixon | Senior Project Officer<br>**Victorian Water Industry Association** |
| Mr Alan Parker | **Alan Parker Design** |

## Melbourne 13 September 2004

| | |
|---|---|
| Mr Noel Blencowe | Governance Team Leader |
| Mr Eric Bottomley | Sustainability Project Team Leader |
| Ms Cinnamon Evans | Education Team Leader |
| Mr Joe Hurley | Manager, Water Project |
| Ms Judy Glick | Energy Education Coordinator |
| | **Centre for Education and Research in Environmental Strategies** |

The Committee inspected the CERES facility and Origin Energy Eco House

## Melbourne 27 September 2004

| | |
|---|---|
| Mr Rupert Posner | Deputy Director<br>Communications and Stakeholder Relations<br>**Department of Sustainability and Environment** |
| Ms Meagan Parker | President |
| Ms Teresa Day | Education and Development Officer<br>**Victorian Association for Environmental Education** |
| Mr Jim Grant | CEO |
| Ms Pat Armstrong | Deputy CEO<br>**Gould Group** |
| Councillor Rae Perry | Mayor |
| Ms Libby Hynes | General Manager of Environment and Amenity |
| Ms Emma Hopkins | Sustainability Education Officer |
| Mr Alex Tzikas | Community Power Officer<br>**City of Darebin** |

The Committee inspected the Reservoir Civic Centre

## Ballarat 28 September 2004

| | |
|---|---|
| Ms Melanie Emmett | Environment Policy Officer |
| Mr Hedley Thomson | Manager, Corporate Strategy<br>**City of Ballarat** |
| Mr Phillip Clingin | Executive Officer |
| Ms Rosemary Angus | Education Officer<br>**Highlands Regional Waste Management Group** |
| Mr Bruno Bomitali | Site Services Manager<br>**Masterfoods** |
| Mr Stuart McCallum | Secretary<br>**Friends of Bannockburn Bush** |

| | |
|---|---|
| Mr Neil Brennan | Chief Executive Officer<br>**Central Highlands Water** |
| Councillor Paul Hooper | Mayor |
| Mr Bill Braithwaite | Chief Executive Officer<br>**Rural City of Ararat** |
| Mr Dennis Olmstead | Manager |
| Ms Raylene Reese | Administrator<br>National Centre for Sustainability<br>**University of Ballarat** |
| Prof. Julian Lowe | Director<br>Centre for Regional Innovation and Competitiveness<br>**University of Ballarat** |

## Anglesea 29 September 2004

| | |
|---|---|
| Mr Geoff Brown | Facilitator |
| Mr Neville Wight | NEIP Community Leadership Group |
| Ms Tiffany Gunning | NEIP Community Leadership Group |
| Ms Kaylene McGregor | NEIP Community Leadership Group |
| Ms Caroline Hawkins | NEIP Community Leadership Group<br>**Anglesea Neighbourhood Environment Improvement Plan (NEIP)** |
| Mr Craig McKiernan | Environment Coordinator |
| Ms Sharon Rawlings | Community Planning Coordinator<br>**Surf Coast Shire** |
| Mr Enzo Bruscella | Executive Officer |
| Ms Simone Groves | Regional Education Officer<br>**Barwon Regional Waste Management Group** |
| Mr Tony Robinson | Regional Manager, Geelong |
| Dr Emily Phillips | Manager, Neighbourhood Environment Improvement Program<br>**Environment Protection Authority** |
| Mr Carl Bicknell | Acting Executive Manager Strategy and Technology |
| Mr Rowan Mackenzie | Senior Strategic Planner<br>**Barwon Water** |
| Mr Nick McCristal | Natural Resource Management Team Leader<br>**Corangamite Catchment Management Authority** |
| Mr Phillip Cooke | Manager |
| Mr Brendan Foran | Community Relations Officer<br>**Alcoa Anglesea Power Station** |

## Melbourne 11 October 2004

| | |
|---|---|
| Mr Craig Cinquegrana | Manager, Infrastructure Strategy |
| Ms Wendy McAlpine | Infrastructure Planning Officer |
| Mr Rolf Freeman | Sustainable Energy Fund Officer |
| Mr Jim Houlahan | Building Projects Team Leader |
| | **Mornington Peninsula Shire** |
| Mr David Maltby | Executive Officer |
| | **Mornington Peninsula Regional Waste Management Group** |
| Councillor Ken Beadle | Councillor |
| Mr Michael Dodd | Environmental Policy Officer |
| | **Bayside City Council** |
| Mr Gary Spivak | Housing Development Officer |
| Ms Natasha Palich | Sustainable Design Officer |
| | **City of Port Phillip** |
| Mr John Clark | Senior Architect |
| | **Williams Boag Pty Ltd Architects** |
| Mr Garry Kerans | Director |
| | **Integrated EcoVillages Pty Ltd** |

Site inspection of the Inkerman Oasis development

## Melbourne 8 November 2004

| | |
|---|---|
| Dr Ian Mc Phail | Commissioner for Environmental Sustainability |
| Ms Kelly Heffer | Senior Program Officer |
| | **Office of the Commissioner for Environmental Sustainability** |
| Mr John Nolan | Director (Melbourne) |
| Mr Hannes Partl | Director (Sydney) |
| | **Nolan ITU** |
| Mr Alan Pears | Policy Adviser |
| | **Business Council for Sustainable Energy** |
| Mr Tony Kelly | Managing Director |
| Mr Ray Beaton | Manager |
| | Business Strategy |
| | **Yarra Valley Water** |

Site inspection of a Therma-Wall property at Clyde North

## Melbourne 22 November 2004

| | |
|---|---|
| Dr Zoe Sofoulis | Senior Researcher<br>Centre for Cultural Research<br>**University of Western Sydney** |
| Mr Phillip Harbutt | Manager, Integrated Transport Projects |
| Mr Peter Clements | Manager, Retail Markets |
| Mr John Krbaleski | Manager, Greenhouse Challenge for Energy<br>**Department of Infrastructure** |
| Mr Philip Harrington | Deputy Secretary (Infrastructure)<br>**Department of Infrastructure, Energy and Resources, Tasmania** |

## Melbourne 23 November 2004

| | |
|---|---|
| Mr Brad Page | Chief Executive Officer |
| Mr Killian Wentrup | Environment Policy Analyst<br>**Energy Supply Association of Australia** |
| Prof. John Langford | Director, Melbourne Water Research Centre<br>**University of Melbourne** |
| Ms Suzie Brown | Sustainability Campaigner |
| Ms Kate Noble | Building Green Campaigner<br>**Australian Conservation Foundation** |
| Mr Dasarath Jayasuriya | Manager, Resources Strategy |
| Mr Howard Rose | Group Manager, Pricing and Regulation |
| Mr Chris Chesterfield | Manager, Development Planning<br>**Melbourne Water** |

## Melbourne 6 December 2004

| | |
|---|---|
| Mr Peter Lyon | Manager, Sustainable Futures |
| Mr Steve Malcolm | Project Manager, Education and Behaviour Strategies |
| Ms Robyn Rattray-Wood | Greenhouse Education Coordinator<br>**Department of Sustainability and Environment** |
| Prof. Graham Currie | Chair of Public Transport |
| Associate Prof. Geoffrey Rose | Director, Institute of Transport Studies<br>**Monash University** |
| Ms Rachel Ollivier | Chief Executive Officer |
| Mr Kane Thornton | Energy Policy Officer<br>**Alternative Technology Association** |

| | |
|---|---|
| Ms Liza Dale-Hallett | Senior Curator, Sustainable Futures |
| Dr Robin Hirst | Director, Collections, Research and Exhibitions |
| | **Museum Victoria** |
| Mr Jeff Norton | Director, Policy Services |
| Mr Robert Enker | Manager, Sustainability Policy |
| | **Building Commission** |

## Melbourne 26 April 2005

| | |
|---|---|
| Mr Ian Porter | Executive Director, Sustainability Policy |
| Mr Peter Lyon | Manager, Sustainable Futures |
| Mr Mark Dess | Manager, Greenhouse Policy |
| Ms Sarah Stephen | Team Leader, Climate Change Strategies |
| | **Department of Sustainability and Environment** |

# Interstate Briefings

## Newcastle 25 October 2004

| | |
|---|---|
| Ms Chanti Richardson | Business Development and Marketing |
| Ms Kristy McIntyre | Project Manager, REFIT |
| Mr Paul Britton | Electrical Services Coordinator |
| Mr Allan Hill | Waste Services Manager |
| Ms Michelle Nickerson | Waste Education Officer |
| Mr Roland Payne | Environmental Protection Officer |
| | **Newcastle City Council** |
| Mr Keith Powell | Marketing and Business Development |
| | **Hunter Water** |

## Sydney 26 October 2004

| | |
|---|---|
| Mr Geoff Young | Manager, Community Education Unit |
| | **Department of Environment and Conservation** |
| Mr Stephen Waite | Education Program Manager |
| | **Sydney Catchment Authority** |
| Mr John Nieuwland | Manager, Water Conservation and Recycling |
| Ms Carla Hankins | Manager, Streamwatch |
| | **Sydney Water** |
| Ms Susan Koreman | Group Program Manager, Energy Efficiency |
| Ms Emily Firth | Acting Program Manager, Green Power |
| | **Department of Energy, Utilities and Sustainability** |
| Ms Maree McCaskill | Chief Executive Officer |
| Mr Bruce Powell | General Manager |
| | **Beverage Industry Environment Council** |

| | |
|---|---|
| Mr Les Robinson | Consultant<br>**Enabling Change** |
| Mr Adam Davis | Manager, Environmental Health and Protection<br>**Hornsby Shire Council** |

## Canberra 27 October 2004

| | |
|---|---|
| Ms Di Jay | Chief Executive Officer<br>**Planning Institute of Australia** |
| Mr Hugh Saddler | Managing Director<br>**Energy Strategies** |
| Mr Denis Wilson<br>Mr Neil Evans | National Director – Training<br>National Technical and Regulatory Director<br>**Master Builders Australia** |
| Mr Wayne Gersbach | Executive Director - Planning and Environment<br>**Housing Industry Association** |
| Mr James Shevlin<br>Ms Bronwyn Pollock<br>Dr Tony Marker | Head, International and Strategies Branch<br>Manager, Community Partnerships Team<br>Manager, Buildings, Government Efficiency and Transport Team,<br>Energy Efficiency and Community Branch<br>**Australian Greenhouse Office**<br>**Department of the Environment and Heritage** |
| Mr Stephen Berry | Chair, Steering Committee, Your Home Project<br>**Australian Greenhouse Office**<br>**Department of the Environment and Heritage** |
| Mr Chris Reardon | Institute for Sustainable Futures<br>**University of Technology Sydney** |

# Overseas Briefings

## Copenhagen 28 January 2005

| | |
|---|---|
| Prof. John Thøgersen | Department of Marketing<br>**Aarhus School of Business** |
| Mr Matthew Peek<br>Ms Sue Jorgenson | Ambassador<br>First Secretary<br>**Australian Embassy** |

## Copenhagen 31 January 2005

| | |
|---|---|
| Mr Anders Hasselager | Programme Manager |
| Mr Jens Lausten | Danish Energy Authority |
| | **Ministry of Economic and Business Affairs** |
| Mr Michael Iven | Demand Side Manager |
| | **Industry Association for Grid and Supply Obligation Companies** |
| Mr Thomas Scott Lund | Information Officer |
| | **Energi E2** |

The Committee inspected the Avedøre 2 Power Station

## Copenhagen 1 February 2005

| | |
|---|---|
| Mr Lars Fogh Mortensen | Program Analyst, Sustainable Consumption |
| Ms Teresa Ruch Olsen | Project Manager, Public Relations |
| Mr Bartosz Zambrzycki | Project Manager, Waste |
| Mr Pawel Kazmierczyk | Project Manager, Material Flows |
| | **European Environment Agency** |
| Ms Lene Bjerg Kristensen | Waste Department |
| | **City of Copenhagen** |
| Mr Nis Christensen | Deputy Head of the Strategic Division |
| | **Danish Environmental Protection Agency** |

## Berlin 2 February 2005

| | |
|---|---|
| Ms Anneliese Looss | Branch Head |
| Mr Christian Loewe | Desk Officer, Product Assessment and Ecolabelling |
| Mr Hermann Keßler | Head, Hazardous Waste Management |
| Mr Christoph Erdmenger | Renewable Energy |
| Mr Christoph Mordziol | Desk Officer, Rational Energy Use |
| | **Federal Environment Agency** |
| Ms Ulrike Dolzeal | Branch Head, Delegations, Protocol, Translation Service |
| | **Federal Ministry for Education and Research** |
| Mr Gerd Scholl | Economist, Ecological Product Policy |
| Mr Bernd Hirschl | Coordinator, Sustainable Energy and Climate Protection |
| | **Institute for Ecological Economy Research** |

## Berlin 3 February 2005

| | |
|---|---|
| Mr John Langtry | Charge d'Affaires |
| Ms Alison Carrington | Second Secretary |

| | |
|---|---|
| Ms Miriam Kueller | Senior Research and Projects Officer<br>**Australian Embassy** |

## Freiburg 4 February 2005

| | |
|---|---|
| Mr Gino van Begin | Regional Director for Europe |
| Ms Stefanie Lay | Information Coordinator |
| Mr Holger Robrecht | Director for Sustainability Management |
| Mr Konrad Otto Zimmermann | Secretary-General (Canada)<br>**Local Governments for Sustainability (ICLEI)** |
| Mr Ralf Zähringer | Deputy Head |
| Mr Walter Aussenhofer | Office for Energy Issues |
| Mrs Kirsten Kiefer | Desk Officer<br>**Environment Agency, City of Freiburg** |
| Mr Roland Veith | Project Leader, Vauban Estate<br>**City of Freiburg** |

The Committee inspected Vauban Estate

## Paris 7 February 2005

| | |
|---|---|
| Mr Lorents Lorensten | Director |
| Mr Kenneth Ruffing | Deputy Director, Sustainable Materials and Waste, National Policies Division |
| Mr Henrik Harjula | Principal Administrator Management, Sustainable Materials and Waste, National Policies Division |
| Ms Ysé Serret | Administrator, Sustainable Household Consumption National Policies Division<br>**Organisation for Economic Co-operation and Development Environment Directorate** |

## Paris 8 February 2005

| | |
|---|---|
| Mr Alan Meier | Senior Energy Analyst, Energy Efficiency and Environment Division |
| Mr Paul Waide | Senior Policy Analyst, Energy Efficiency and Environment Division |
| Ms Jan Tronningsdal | Sustainable Energy Expert |
| Mr Jonathan Cooney | Country Studies Division |
| Ms Lily Alisse | Project Manager, Energy Technology Collaboration Division |
| Mr Ming Yang | Energy and Environment Economist, Energy Efficiency and Environment Division<br>**International Energy Agency** |
| Mr Bob Pegler | Minister-Counsellor, Industry, Tourism and Resources<br>**Australian Delegation to the OECD** |

| | |
|---|---|
| Mr Patrick Deronzier | Head of Resources and Local Services Bureau<br>Directorate for Economic Studies and Environmental Evaluation |
| Mr Emmanuel Caicedo | Adviser, Environmental Taxation Bureau |
| Mr Sebastien Merceron | Adviser, Greenhouse Effects Bureau |
| | **Ministry for Ecology and Sustainable Development** |

## Paris 9 February 2005

| | |
|---|---|
| Mr Fritz Balkau | Head, Production and Consumption Branch |
| Mr Guido Sonnemann | Program Officer (Life Cycle Initiative, Waste) |
| Ms Adriana Zacarias Farah | Program Officer (Household Consumption, Marrakech Process) |
| Ms Isabella Marras | Programme Officer (Youth, Procurement) |
| | **Division of Technology, Industry and Economics** |
| | **United Nations Environment Program** |

| | |
|---|---|
| Ms Jane Madden | Minister<br>Permanent Delegate of Australia to United Nations Educational, Scientific and Cultural Organization |
| | **Australian Embassy** |

| | |
|---|---|
| Mr Christophe Frering | Project Manager |
| | **Energie-Cités** |

| | |
|---|---|
| Mr Betrand Marcincal | Secretary |
| | **France-Australia Friendship Group** |

## Brussels 10 February 2005

| | |
|---|---|
| Mr Thomas Verheye | Principal Administrator, Climate Change, Ozone and Energy Unit |
| Mr Paul Speight | Administrator, Waste Prevention and Recycling Strategy |
| | **European Commission, Environment Directorate-General** |

| | |
|---|---|
| Ms Sao Goncalves | Administrator, Committee for Environment, Public Health and Food Safety |
| | **European Parliament** |

| | |
|---|---|
| Mr Peter Grey | Ambassador to the European Union, Belgium and Luxembourg |
| Ms Jan Hutton | First Secretary |
| Ms Catherine Dobbin | Third Secretary |
| | **Australian Embassy** |

| | |
|---|---|
| Mr Henri Meiresonne | Chief Executive Officer |
| Mr Steven Boussemaere | Group Project Manager |
| | **Fostplus** |

## Brussels 11 February 2005

| | |
|---|---|
| Mr Tony Long | Director |
| Ms Eva Royo Gelabert | Senior European Water Policy Officer |
| Mr Jean-Philippe Denruyter | Climate Change and Energy Officer |
| | **WWF European Policy Office** |
| Ms Hilke Evenpoel | Water Policy Officer |
| | **WWF Belgium** |
| Mr Jean-Pierre Hannequart | Director General, Brussels Institute for Management of the Environment |
| Ms Sophie Marguliew | Project Manager |
| | **Association of Cities and Regions for Recycling** |

# Appendix 3

## Seminars and Conferences

Australian Water Association, “Fostering Sustainable Behaviour”, 31 May 2004

Melbourne Water and Municipal Association of Victoria, “Sustainable Water Use, Local Government Forum”, 30 June 2004

EcoRecycle, “Technology Towards Zero Waste Forum”, 11 August 2004

Waste Management Association, Victorian Branch, “Making Waste Education Work for You”, 18 August 2004

Municipal Association of Victoria, Clearwater and ECO–Buy, “Who Cares About the Environment?”, 30 September 2004

RMIT, Smart Water Fund and Museum Victoria, “Water Futures: Re-imagining the Suburb”, 19 October 2004

Department of Environment and Heritage, Australian Greenhouse Office, “Re-inventing the Private Car: Changing Personal Mobility in the 21st century”, 18 November 2004