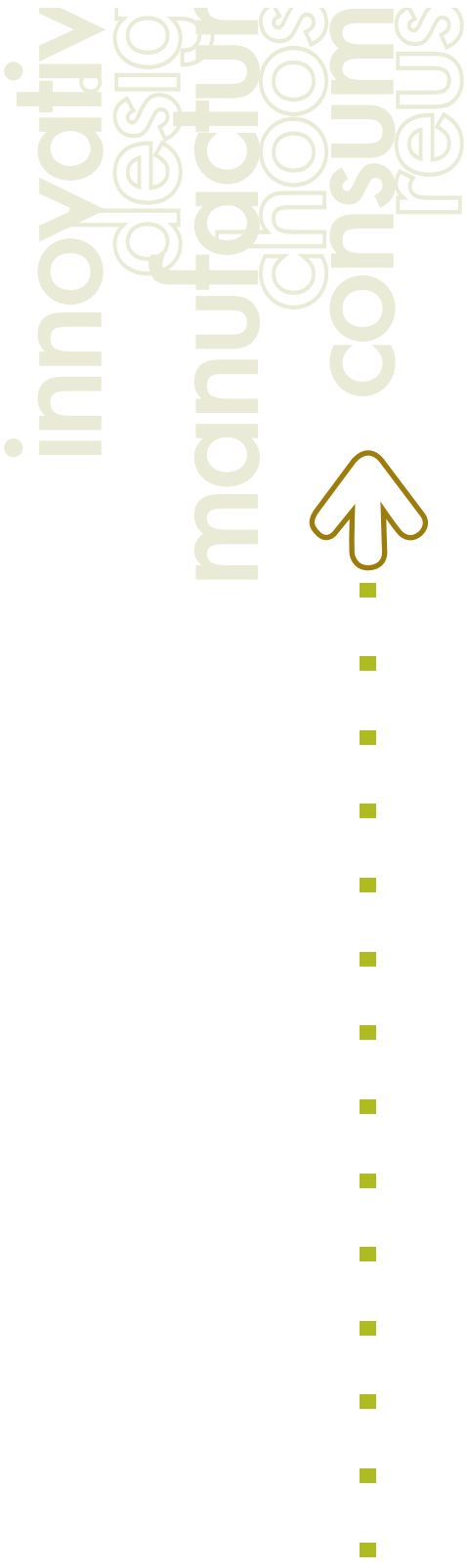
sustainability in action

Towards Zero Waste Strategy

Victoria
The Place To Be



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Statement from the Minister for the Environment

The Bracks Government is committed to shaping a better quality of life by ensuring our society, environment and economy, are developed in a balanced way. Victoria is being increasingly recognised as a world leader in environmental sustainability through policy initiatives such as *Growing Victoria Together*, *Melbourne 2030,* the *Victorian Greenhouse Strategy* and *Our Environment, Our Future: Victoria's Environmental Sustainability Framework*.

Changes are being made to the way we manage greenhouse issues, energy, urban development, water and waste. Significant improvements have occurred. Our water consumption, for example, has dropped 19 per cent; more than 40,000 households are using electricity from renewable sources; and over 50 per cent of waste is now being recycled, compared to 26 per cent 10 years ago.

The *Towards Zero Waste Strategy* is an important adjunct to these achievements. As another key element of the environmental sustainability jigsaw, it issues a call to action for all Victorians to become more mindful and innovative in the way we design, manufacture, choose, consume and discard products and materials. By doing so, we all stand to benefit, through a more sustainable community using its resources more wisely. The 10-year plan has been developed in consultation with business, industry, local government and the community, and focuses on our everyday industry and community waste materials which are not prescribed wastes.

Towards Zero Waste is an integrated approach which engages and involves all sectors of the community. As there is no single magic fix for tackling the waste challenge, coordinated partnerships are required and every Victorian has a role to play.

This document details how we will progress towards becoming a zero waste society within the next decade. In accomplishing the initial targets, we will have moved significantly closer to ensuring Victoria's environment and resources are protected for current and future generations.

John Thwaites MP
Minister for the Environment

Contents

1. Introduction

Growing Victoria Together establishes a framework for a sustainable Victoria which encompasses economic, health, education, social and environmental goals.

Towards Zero Waste establishes the goals and directions for Victoria's solid waste management and resource recovery framework.

Our Environment, Our Future: Victoria's Environmental Sustainability Framework[1] is the Victorian Government's call to all Victorians to take responsibility for reducing their impact on the environment. The government is committed to assisting people to make choices which are better for the environment, as well as the economy and society.

The *Environmental Sustainability Framework* establishes three directions, which Victoria must pursue in moving towards becoming a sustainable state. These are:

- Maintaining and restoring our natural assets
- Using our resources more efficiently
- Reducing our everyday environmental impacts.

The targets and strategies of *Towards Zero Waste* cover all aspects of solid waste management in Victoria, ranging from households to businesses and schools, and are aligned with the objectives of the *Environmental Sustainability Framework*.

A new statutory authority, Sustainability Victoria, will support the delivery of the framework and coordinate the implementation of *Towards Zero Waste*. It will act as a catalyst for change by assisting individuals, businesses, governments and communities to behave in a more environmentally sustainable way, as well as by supporting the development of technologies and processes which will produce change.

Towards Zero Waste, together with *Melbourne 2030*, the *Victorian Greenhouse Strategy and Our Water, Our Future,* help to achieve the environmental sustainability goals of *Growing Victoria Together* and *The Sustainable State*.

Its development was assisted through opinion sought from business, industry, government and community stakeholders, including some 500 representatives who attended consultation forums throughout Victoria during 2003 and 2004. Several research studies were also undertaken. These included an analysis of solid industrial waste; an environmental life cycle assessment of waste and resource recovery options; a triple bottom line assessment; and a community attitudes survey. Further input was provided by an external specialist advisory committee.

Towards Zero Waste provides a compelling case for stemming the increasing tide of waste and its disposal and outlines more productive ways to use the valuable resources currently being dumped in landfills.

This strategy contains a range of initiatives to be implemented in Victoria during the next decade aimed at minimising the amount of waste we generate and maximising opportunities for reusing materials.

It focuses on solid waste arising from municipal and business activities, (ie, waste materials which are non-hazardous and non-prescribed) and provides detailed information about how the municipal, commercial and industrial, and construction and demolition sectors, will help meet the strategy's objectives.

Towards Zero Waste is a call to action for Victorians to become more aware and innovative in the way we design, manufacture, choose, consume and discard products and materials. By doing so, we all stand to benefit from a more sustainable use of resources.

The strategy will be monitored and updated as part of an ongoing consultation and evaluation process. Stakeholders will continue to be engaged during the strategy's implementation and an inclusive progress review will be undertaken in 2009-10.

[1] *Our Environment, Our Future: Victoria's Environmental Sustainability Framework*. State Government of Victoria (April 2005).

2. Towards Zero Waste – The Vision

During the past two decades there has been growing recognition of the environmental impacts of waste, along with community demands for change. The focus on recycling has increased and there is more concern about maintaining high environmental standards at landfills.

While recycling is an important step in sustainability; it has had little impact on the growing trend of waste generation. Without a substantial change in our thinking about resources and waste, in the next decade, we are likely to have an *additional* three million tonnes of solid waste to manage.

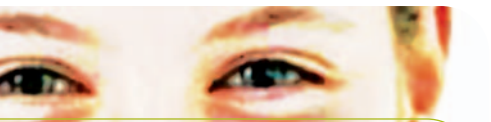
Worldwide, cost pressures and increased use of non-renewable natural resources indicates we need to seriously rethink how to extend and maximise the life of products and materials in the context of a full life cycle approach.

Greater emphasis needs to be given to the *entire* life cycle. This will require some behaviour changes from businesses and communities, as well as innovations in design, manufacturing and the way we manage our waste. These initiatives must be considered within the context of continuing to build a vibrant and growing economy.

The strategy's vision is for Victoria to be well advanced along the pathway of becoming a low waste society by 2014.

A range of important outcomes resulting from the strategy are expected to contribute to this vision. This includes:

- The amount of waste generated will be substantially reduced. There will be less squandering of recoverable materials and our valuable natural resources will be protected. There will be less greenhouse gas emissions, pollution and litter and our environment will be cleaner and healthier for all Victorians. This will be achieved with a net economic benefit to the state.
- There will be significant improvements in the way we design, manufacture, consume and dispose of goods, as well as greater opportunities for designing out wastage. Where this is not possible, recovering and reusing different products and materials will be encouraged.
- Victoria will become a flagship for progress in resource recovery technologies, services and infrastructure. Strategic investment decisions by industry over the next decade will spur the development of efficient facilities to process mixed residual waste for resource recovery.
- Landfills will continue to have a role in Victoria for the foreseeable future, but over time, these sites will mainly become repositories for largely inert materials, from which, resources have been recovered. The strategy will facilitate this transition through an emphasis on processing all waste streams for reuse and recycling by 2014.
- Consumers will make more sustainable purchasing decisions because they will be better informed about the broader effects of their purchasing options.
- Industry and business will be rewarded for innovation in design, manufacture and reuse of materials and products.
- Recycling and efficiency in resource use will be improved. This will be achieved by understanding the full cost implications of waste to the business bottom line, as well as an identification of environmental costs. The development and introduction of innovative solutions and new technologies will be a key element in this quest.



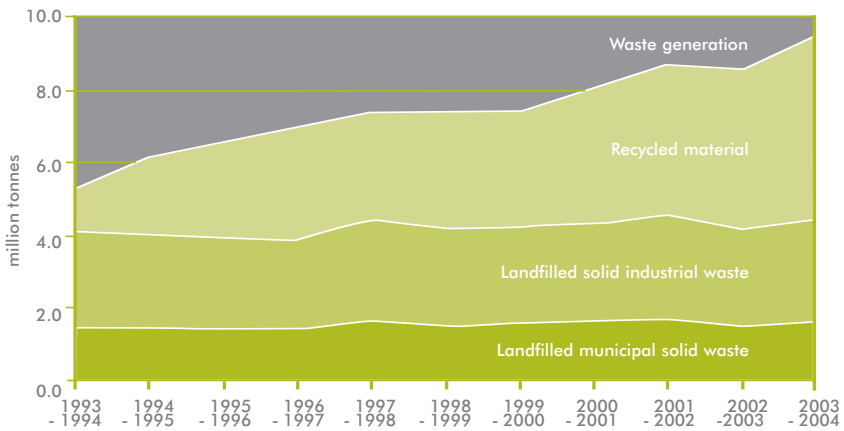
3. The Solid Waste Challenge and the Need for Change

Per capita, Australia is one of the highest waste generating countries in the world and, despite its excellent record for recycling, Victoria ranks as one of the nation's largest contributors of solid waste.

In the past decade, as Victoria's population has grown and consumption of goods and services has increased, our solid waste stream has increased 60 per cent, reaching 9.6 million tonnes in 2003-04 (see Figure 1). This equates to approximately 1900 kg per person[2] in a single year.

Fortunately, growth in recycling has given much of this waste a second life. Between 2003-04, 5.1 million tonnes of material were recovered ie, 53 per cent of the total solid waste stream and more than triple the quantity since 1993. More than 90 per cent of this material was reprocessed locally, reinforcing Victoria's status as a leading Australian recycling state.

Figure 1: Trends in solid waste generation and management – Victoria 1993-94 to 2003-04



Data sources: EPA Victoria landfill levy returns and EcoRecycle Victoria annual industry recycling surveys. Landfill figures prior to 1996-97 are extrapolated from metropolitan data.

[2] Figure generated from the following data sources – EPA Victoria landfill levy returns 2003-04, EcoRecycle Victoria's Annual Survey of Victorian Recycling Industries 2003-04 and ABS Cat No. 3101.0 Australian Demographic Statistics June 2003.

3.1 The Effects of Solid Waste

Why divert waste from landfill?

- Manufacturing products from recycled materials uses less energy than manufacturing from virgin materials. This means more efficient industries and less greenhouse gas.
- Manufacturing products from recycled materials also means less air and water pollution from mining, processing, and manufacture from virgin materials.
- Avoiding waste in the first place makes our businesses more efficient and saves money.
- Diversion of organic wastes from landfill will reduce methane emissions and has the potential to generate soil conditioning, water conservation and renewable energy products.
- Communities value and feel empowered by recycling and being able to purchase recycled products.
- When waste in landfill is not properly managed, it can pollute ground and surface waters, cause greenhouse gas emissions and affect the wellbeing of nearby residents through odour, dust, litter and noise. Even well operated landfills require ongoing risk management.

Solid waste presents some significant sustainability challenges. If changes are not made, solid waste will continue to deplete our resources (including uncontaminated land through disposal of wastes at landfill) and erode Victoria's natural capital. Three important impacts of increased solid waste are:

Greenhouse gas emissions

Methane emissions from the anaerobic decay of organic material in landfill account for some 3-4 per cent of Australia's total greenhouse gases. From 1990 to 2002[3] such emissions increased by 11 per cent. There are additional greenhouse impacts associated with emissions from energy and other resources used to make products. The greenhouse impacts of waste and landfill can be reduced by:

- Capturing and oxidising landfill gas, preferably with energy recovery from the gases. (Note: very high levels of gas recovery and efficient conversion to energy are required to make methane emissions from landfills over their life 'greenhouse neutral' and these levels are not typically achieved from landfills as they are currently managed.)
- Diverting degradable organics from landfill into compost or for other uses, including energy recovery.
- Using recycled, rather than virgin material, in manufacturing.
- Reducing waste and using goods and services produced with fewer materials and less energy.

Implementing the strategy, through addressing the impacts listed above, will result in a net reduction of greenhouse gas emissions equivalent to around 3 million tonnes of carbon dioxide.[4]

[3] National Greenhouse Gas Inventory 2002 Fact Sheet 6, Australian Greenhouse Office, April 2004.

[4] Further Benefit-Cost Analysis of Victoria's *Towards Zero Waste Strategy* – report prepared for EcoRecycle Victoria by The Allen Consulting Group, January 2004.

Litter

Litter is the most visible manifestation of environmental pollution. As well as being a blight on the landscape, it is a waste of many reusable materials. Litter harms marine and wildlife and puts the community's health and safety at risk. It also blocks drains, which in-turn increases the risk of flooding and the resultant damage to buildings and other infrastructure. The social and economic effects are significant. Bushfires caused by discarded cigarettes, along with activities required to clean up our communities, amount to tens of millions of dollars of public funds each year.

Landfills

By sending rubbish to landfill we sacrifice part of the environment to waste management. It degrades the sites where waste is deposited and reduces the value of surrounding land. As well as being widely regarded by the community as undesirable, this approach is a waste of valuable resources which might otherwise be recycled and reused.

When waste in landfill is not properly managed, it pollutes ground and surface waters, causes greenhouse gas emissions and can affect the wellbeing of nearby residents through odour, dust, litter, noise, fire and vermin. The environmental risks posed by landfills not operating to high standards can extend for decades, or sometimes centuries, after the sites have closed. Even well managed landfills will require the management of risks associated with pollution of groundwater and emissions of landfill gases for many decades after closure.

Under the most optimistic waste reduction scenarios, landfills will be required for many years to come. Well managed landfills can be used to rehabilitate former quarries where environmental and social risks can be reduced to meet community standards. This requires taking account of the economic and financial costs of minimising environmental risks, as well as the localised environmental and social costs. It is desirable to have fewer, well located and managed landfills, rather than many smaller ones which would not be commercially viable if they had to meet the standards required to protect the environment and the community. In most areas of Victoria, existing sites provide sufficient capacity for at least the next 10 to 20 years, but in some regions there is a shortage of suitable space. It makes economic and environmental sense to use existing capacity as efficiently as possible through waste reduction strategies.

By international comparison our landfill costs are low, but are expected to increase during the next decade. These cost increases are consistent with other Australian states and OECD countries and occur because of the implementation of best practice standards designed to mitigate future environmental risks.

The strategy assumes increases in waste production; however, increasing landfill costs and growth in recycling will result in a net reduction in the amount of waste going to landfill. This will also help to prolong the life of current landfills – fewer materials are deposited, so the landfills take longer to fill. Victoria is well on the way with 30 million tonnes of waste materials recycled over the last decade, half of this occurring in the last four years alone (see Figure 1).

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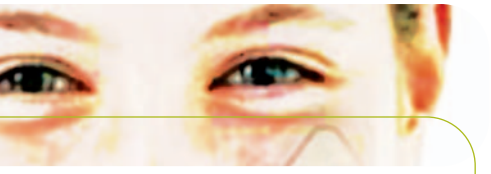


4. The Victorian Waste Management and Resource Recovery Framework

Growing Victoria Together articulates a 10 year vision for Victoria encompassing economic, health, education, social and environmental goals. *Our Environment, Our Future: Victoria's Environmental Sustainability Framework*[5] is the state government's call for all Victorians to take responsibility for reducing their impact on the environment. The government is committed to assisting people in making choices which are better for the environment as well as the economy and society.

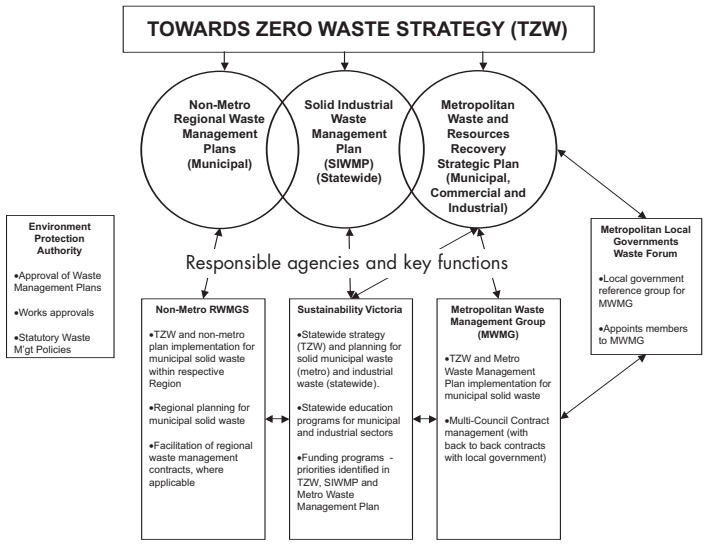
Towards Zero Waste, together with *Melbourne 2030*, the *Victorian Greenhouse Strategy* and *Our Water, Our Future*, helps to achieve the environmental sustainability goals of *Growing Victoria Together, Environmental Sustainability Framework and the Sustainable State*.

Towards Zero Waste provides the direction for Victoria's waste management and resource recovery framework (see Figure 2). Within the framework, actions and initiatives are planned for specific places and/or waste streams, for example:

- Metropolitan Waste and Resources Recovery Strategic Plan for all waste streams in metropolitan Melbourne
- Solid Industrial Waste Management Plan for all solid waste from industry
- Regional Waste Management Plans for non-metropolitan municipal solid waste for regional groupings of councils.

[5] *Our Environment, Our Future: Victoria's Environmental Sustainability Framework*. State Government of Victoria (April 2005).

Figure 2: The Victorian waste management and resource recovery framework



Various state and local agencies have responsibilities and key functions for particular components of the Victorian waste management and resource recovery framework.

State Agencies

Several Victorian Government agencies form the institutional and administrative arrangements for waste management and resource recovery in the state:

- **Department of Sustainability and Environment** – coordinates portfolio and government strategies for environmental sustainability.
- **EPA Victoria** – administers the *Environment Protection Act* 1970 and its instruments, works in partnership with Sustainability Victoria to reduce waste and facilitate the development of product stewardship programs.
- **Sustainability Victoria** – responsible for environmental sustainability, including the planning and management of solid waste throughout Victoria. Sustainability Victoria will lead the implementation of the *Towards Zero Waste Strategy*. This will involve developing many of the strategy's programs, assisting partners and measuring and reporting on progress through annual business plans.

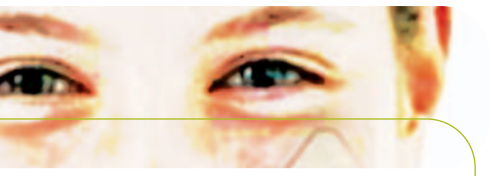
Local Government and Waste Management Groups

Towards Zero Waste sets challenges for driving Victoria to new levels of resource recovery which will take advantage of new generations of waste processing and resource recovery technology. Local governments are key agents in achieving more sustainable outcomes from municipal solid waste. Kerbside collection systems are a cornerstone of systems for diverting important resources from landfill and ensuring these assets are recovered.

Successful waste management and effective resource recovery requires co-ordinated planning and action at local, regional and state levels. Waste Management Groups – Regional Waste Management Groups outside of the metropolitan area and the Metropolitan Waste Management Group – provide the co-ordination and facilitation of waste management and resource recovery services at regional level. Waste Management Groups operate as partnerships between Victoria's 79 municipal councils and the Victorian Government to achieve common goals.

The Metropolitan Waste Management Group implements *Towards Zero Waste* for municipal solid waste in metropolitan Melbourne. This group combines the buying power of 30 metropolitan councils to give it the capacity to facilitate the establishment of advanced waste technologies.

Regional Waste Management Groups provide regional planning for the management of municipal solid waste for their member councils. There are 12 Regional Waste Management Groups covering the 49 non-metropolitan Melbourne local government areas of Victoria.

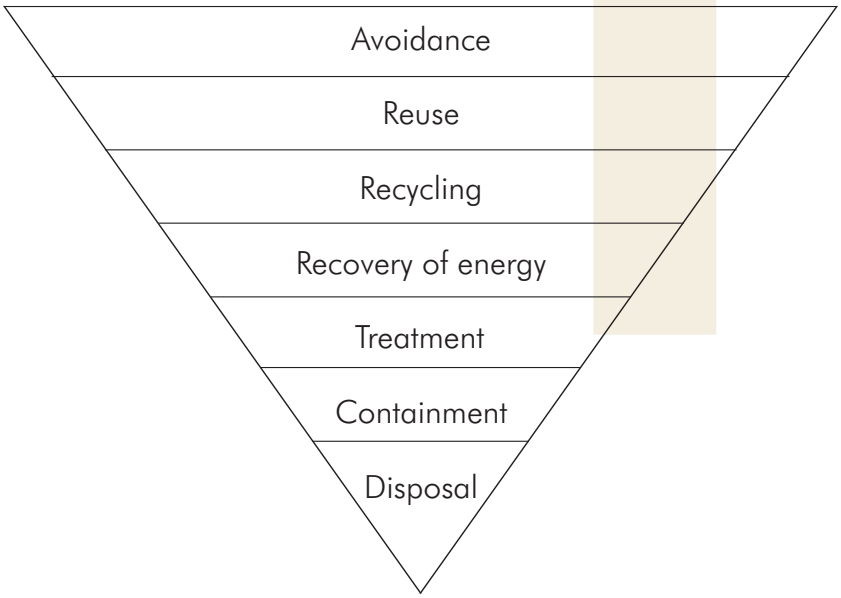


5. The Strategic Approach

Towards Zero Waste has been developed in consultation with government, business, industry and community stakeholders.

The initiatives described in *Towards Zero Waste* are shaped by a set of guiding principles and strategic tools which will deliver significant waste reduction and resource recovery outcomes, as described by the strategy's targets.

Figure 3: The Waste Hierarchy



5.1 Guiding Principles

Towards Zero Waste was developed on the principles the strategy will:

- Be achievable and implemented over the next decade
- Maximise the net benefits to all Victorians, taking account of environmental, economic and social issues
- Not impose unnecessary financial costs on the community, industry or business
- Take into account the views of industry, business, all sectors of government and the general community
- Be a shared responsibility through partnerships with industry, business, all sectors of government and the general community
- Build on existing successful programs
- Take note of national and international trends in policy, industry, environmental management approaches and waste management technology innovations
- Recognise the different challenges in metropolitan, regional and rural areas
- Be consistent with existing federal and Victorian Government policy commitments
- Encourage business development and build sustainable domestic and export markets.

5. 2 Strategic Tools

Several strategic tools have influenced the development of the strategy and form a significant part of the approach to implementation. These include: the waste hierarchy, product stewardship (through sustainability covenants and the National Packaging Covenant), engagement and education, partnerships with industry and government, funding and support, and, regulatory tools.

Primarily, strategic tools are used to provide incentives for improving outcomes. These tools will be used in a flexible and facilitative way during the implementation of the strategy.

The Waste Hierarchy

A key criterion underpinning the strategy is the Victorian waste hierarchy, established under the *Environment Protection Act* 1970. The hierarchy (see Figure 3) provides a framework aimed at minimising resource consumption and the consequent environmental and economic costs associated with resource extraction and harvesting, as well as in the processing, manufacture, transport and disposal of materials.

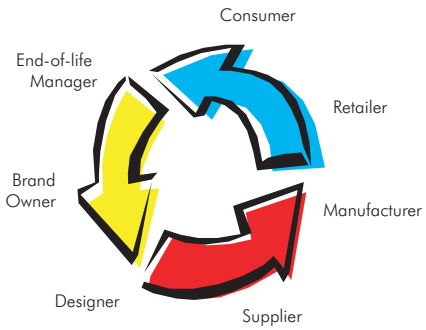
Towards Zero Waste aims to modify practices, technologies and behaviours to produce results as high up the waste hierarchy as possible.

Product Stewardship

The core principle of product stewardship, introduced through amendments to the Victorian *Environment Protection Act* 1970 in 2001, is a shared responsibility by producers, users and government, for the environmental impacts of products throughout their life cycles from design and manufacture, to use and end-of-life management. Product stewardship forms a key link between the community, brand owners and local government.

Consumers can have influence through informed, responsible, purchasing decisions and making use of available recycling options when disposing of products. However, manufacturers, brand owners and retailers are often in a far stronger position than consumers to reduce the environmental impacts of products enabling consumers to make better choices (see Figure 4 below).

Figure 4: Shared Responsibility for the Product Lifecycle



Shared responsibility by manufacturers, brand owners and retailers includes the collection, resource recovery and reuse of products, at the end of their useful life. It also entails designing out significant environmental, toxic and waste impacts, and developing and marketing products which reduce environmental impacts throughout the life of the products. They can do this by:

- Making products which keep consumption and input of materials to a minimum
- Making products which last longer
- Designing products so materials can be continuously cycled through industrial or natural systems – for example, reuse, recycling, remanufacture, biodegradable
- Developing and participating in product take back and recycling initiatives.

Shared responsibility approaches across the product life cycle may be supported by formal agreements between industry and government, such as sustainability covenants and by voluntary industry agreements underpinning regulatory legislation.

Sustainability Covenants

Sustainability covenants were introduced through amendments to the Victorian *Environment Protection Act* 1970 in June 2002. The covenants are flexible, voluntary agreements between EPA Victoria and a covenant partner (which can be a company, industry association, supply chain, or other organisation).

These covenants provide the basis for proactive commitment to increase resource efficiency and reduce the ecological impacts of products and services. There is a legislative safety net ensuring responsibilities are carried equitably among industry waste generators.

The National Packaging Covenant

The National Packaging Covenant (NPC) is an example of shared responsibility for the management of post-consumer waste under a product stewardship model. The NPC will continue to build upon industry's capacity to reduce these impacts by designing products and services which use materials more efficiently. Product life cycle relationships are central to this approach.

A strengthened covenant was made in July 2005, following an extensive process of review and public consultation. The covenant and associated National Environment Protection Measure enables the sustainable management of consumer packaging by:

- Encouraging industry to optimise the use of resources in the design and manufacture of consumer packaging
- Facilitating ongoing improvements in recycling systems both at kerbside and at away from home venues, such as shopping centres, major events and institutions
- Requiring transparent public reporting in relation to the production and recycling of packaging materials.

The covenant sets a target to increase the amount of post-consumer packaging recycled from its current rate of 48 per cent (2003 baseline data) to 65 per cent by 2010. Packaging made from specific materials will make a contribution to the target as follows:

- Paper and Cardboard – 70-80% (currently 64%)
- Glass – 50-60% (currently 35%)
- Steel – 60-65% (currently 44%)
- Aluminium – 70-75% (currently 64%)
- Plastics – 30-35% (currently 20%)

In addition, the covenant has set national targets for:

- No additional packaging waste to landfill above 2003 levels
- An increase in the recycling of materials which are currently recycled at low rates (such as plastics coded 4 to 7 and non-recyclable paper and cardboard) – to increase from 10 per cent (2003 baseline data) to 25 per cent in 2010.

Engagement and Education

Engagement and education are fundamental to achieving behaviour changes which will translate into lasting sustainability practices. The most convincing outcomes arise from programs focusing on strong core messages, with local level engagement and participation, and linked to the provision of supporting infrastructure, particularly at the household level.

Local government has developed many innovative community education programs to promote the 'reduce, reuse, recycle' message to households and the wider community. Most councils have *Waste Wise* education strategies in place or under development, supported by Regional Education Officers. A broader approach to sustainable living, such as Port Phillip City Council's *Sustainable Living at Home Program* and *"Sustainability Street"*[6], have developed active partnerships in learning and behaviour change with local communities.

[6] Developed by environmental educators Vox Bandicoot.

Sustainability Victoria's *Waste Wise Program*, engages people at home, work, school and play, through active involvement to identify and take steps to reduce waste and littering. Community and business members are assisted in identifying their waste streams, devising action learning programs and communicating their plans to maximise success. The program encompasses schools, businesses, government and communities, working in partnership with Waste Management Groups, councils and environmental educators.

Partnerships with Industry and Government

Strategies to reach across the Construction and Demolition (C&D) and Commercial and Industrial (C&I) sectors require the support of leading industry associations and key government agencies, including the Department of Innovation, Industry and Regional Development (DIIRD). Successful examples to date in the C&D sector include consultation and project partnerships with bodies such as the Housing Industry Association (HIA) and the Master Builders Association of Victoria (MBAV). Similar partnerships have been established with the Plastics and Chemicals Industry Association (PACIA) and the Australian Industry Group to work with their members to improve knowledge and the practices of reducing C & I wastes.

These initiatives provide a sound basis for developing more encompassing partnership agreements with these sectors to reduce and recover waste.

Funding and Support

There will be substantial assistance provided through the landfill levy to help manage the transition to improved practices in waste management. The landfill levy is a two-fold incentive. As well as discouraging the disposal of waste to landfill through higher disposal fees, funds from the levy are directed to the development of recycling infrastructure and other initiatives, including education programs.

In addition to funding programs of EPA Victoria, Sustainability Victoria and Waste Management Groups, part of the funds collected through the landfill levy are allocated to the Sustainability Fund. The Sustainability Fund has been established to provide a resource to support projects and initiatives which foster the environmentally sustainable use of our resources and best practices in waste management. It is also designed to help build the capacity of Victorian business, local government, non-government organisations and the broader community to harness opportunities engendered by Victoria's sustainability agenda. The initial distribution from the fund in 2005 provided approximately $7 million for a range of projects and initiatives.

The landfill levy operates at significantly higher rates for industry waste than for municipal waste. This levy is legislated to increase to $15 per tonne for solid industrial waste in larger Victorian centres by July 2007. This will discourage the disposal of waste to landfill as well as providing funds to support innovation, market development, infrastructure and other improvements in efficiencies, for waste avoidance and recycling and broader sustainability initiatives.

Regulatory Tools

Victoria's approach to environment protection and its environmental management systems and practices are underpinned by the provisions of the *Environment Protection Act* 1970 (the Act).

The Act includes statutory powers, instruments and measures to:

- Manage environmental quality
- Establish environmental standards and criteria
- Regulate emissions, discharges and wastes
- Prevent and clean up pollution
- Impose and enforce environmental requirements.

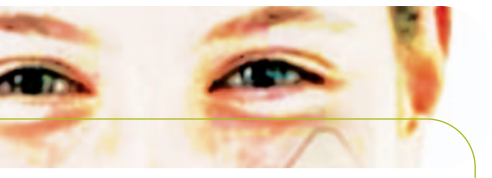
Amendments to the Act in 2002 introduced the waste hierarchy, shared responsibility, product stewardship and other principles of environment protection. The Act also addresses the prevention and control of litter.

Some of the most important instruments for environmental management include state environment protection policies (for example: used packaging materials), waste management policies (for example: the siting, design and management of landfills), regulations, works approvals, licenses, environment improvement plans, sustainability covenants and enforcement tools such as pollution abatement notices.

The Act establishes EPA Victoria and Waste Management Groups (WMGs) and defines the powers, duties and functions of each statutory body. It also provides the financial basis for many of Victoria's waste management initiatives through the landfill levy.

Local government's waste management responsibilities are established under the *Local Government Act* 1989, the *Environment Protection Act* 1970 and other legislation providing direction on issues such as health and planning.

Health, safety and welfare in the workplace are administered by WorkSafe Victoria under the *Occupational Health and Safety Act* 1985.



6. Statewide Objectives and Targets

Towards Zero Waste sets overall targets for waste reduction and resource recovery in Victoria. In addition, *Towards Zero Waste* sets targets and identifies strategies and actions for the three main waste streams:

- Municipal
- Commercial and Industrial
- Construction and Demolition.

The targets contained in *Towards Zero Waste* were developed following systematic research, consultation, modelling and analysis of solid waste streams, trends in solid waste generation, current levels of resource recovery, sectoral waste management, emerging waste technologies, and, spatial analysis. This information is encapsulated in the TZW Waste Model.

The TZW Waste Model is designed to track and project future solid waste flows over the life of the *Towards Zero Waste Strategy* (ie, up until 2014). It also estimates the greenhouse abatement associated with waste reduction and recovery. The foundation of the model is the construction of a waste profile built upon data from EPA landfill levy returns, EcoRecycle surveys (annual *Local Government Data Collection and Annual Survey of Victorian Recycling Industries*) and landfill composition estimates. Future projections have been established under two scenarios:

- **The base/'business as usual' case**: where *Towards Zero Waste* does not exist and there are no new programs or innovations in materials efficiency/solid waste management
- **The strategy case**: the preferred approach for the future management of waste in Victoria – implementing the actions/strategic tools/new programs consistent with *Towards Zero Waste*

The targets have been derived from the strategy case and progress towards their achievement will be measured through comparison with the base case.

The targets are aimed at minimising the amount of waste we generate and maximising opportunities for reusing materials. They will strongly influence the planning processes and activities of Waste Management Groups and local government, and be a leading input into Victorian Government waste initiatives.

Rural and Regional Victoria

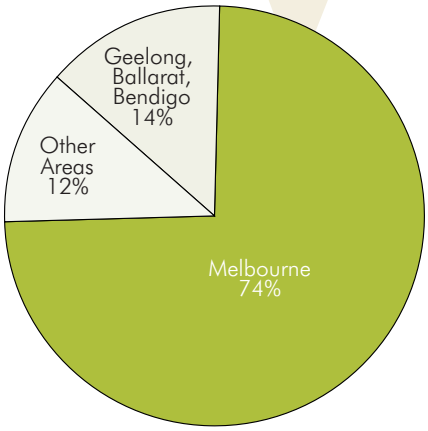
It is recognised that local outcomes vary considerably and will continue to do so in the future due to differences in waste generation patterns, transport logistics, processing and treatment options, and disposal and resource recovery options. Such differences are most apparent between low population density rural areas and the more densely populated urban areas of Melbourne and provincial cities.

In deriving the strategy's targets it is expected urban areas will outperform against the targets, while rural and regional Victoria are expected to sit below the targets in terms of resource recovery parameters. As such, the targets represent aggregated waste reduction and resource recovery outcomes across the whole of Victoria.

The strategy encourages rural councils and Waste Management Groups to establish workable targets which demonstrate continuous improvement and linkage with the *Towards Zero Waste* direction. Rural centres have already demonstrated resourcefulness in achieving local recycling solutions. In particular, local government has lead the way in kerbside and public place recycling and litter prevention, contributing significantly to Victorian householders being among the leaders in recycling across Australia. A range of initiatives will be available to rural and regional Victoria to support the alignment with *Towards Zero Waste* direction, consistent with the strategies, priorities and actions outlined in sections 8 and 9 of this document.

Concentrations of population and industrial activity make Melbourne and other major provincial urban centres a priority for the key initiatives (see Figure 5). This is because the economies of scale and concentration of waste generation make alternative waste technologies more viable than in less densely populated areas.

Figure 5: Estimated Solid Waste to Landfill by Locality, Victoria 2003-04



Data source: EPA Victoria landfill levy returns 2003-04

Infrastructure and Innovation

Beyond geographic considerations, the targets allow flexibility in the infrastructure and systems which may be used to deliver the resource recovery targets. The development of innovative waste management technologies, their accessibility and performance in recovering resources, will be key factors in meeting the strategy's targets.

While the strategy provides this flexibility, it is likely mixed waste processing will play a necessary role in recovering resources from the C&D, C&I and municipal sectors to achieve its targets. This will particularly apply in metropolitan and other larger population centres.

Progress Review 2009-10

The strategy's progress review in 2009-10 will analyse Victoria's progress towards achieving the targets and actions. The review will assess the multitude of approaches and technologies and their respective economic, environmental and social costs.

The assessment as to whether the strategy's targets require adjustment will be a key feature of the review process. Similarly, the review will also assess the suitability and performance of the existing mix of regulations, targets, levies and other regulatory instruments, such as potential landfill prohibitions for key waste types and/or streams.

6.1 Objectives and Targets

These targets represent aggregated outcomes for Victoria as a whole. While some geographic areas will perform above these levels (for example, metropolitan Melbourne) the expectation for others is they will perform below these levels.

Objective 1 – Generating less waste from our activities.

Target 1 – A 1.5 million tonne reduction in the projected quantity of solid waste generated, by 2014.

This target represents a projected decrease in the quantity of solid waste generated as a result of implementing the actions contained in this strategy. Cutting waste by this amount is equivalent to a 12 per cent reduction in the waste expected under the base case – that is, if economic growth averaged 3.5 per cent per annum and no new waste reduction programs were undertaken. This also entails a reduction from 44 to 34 tonnes per million dollars of gross state product (GSP), as shown in Figure 6, below.

It is anticipated the C&I sector will significantly contribute to the achievement of this target with moderate contributions from the municipal sector. Innovation and life cycle design, along with behaviour change of both industry and the community, will be the primary factors driving their contributions.

Objective 2 – Increase the sustainable recovery of materials for recycling and reprocessing.

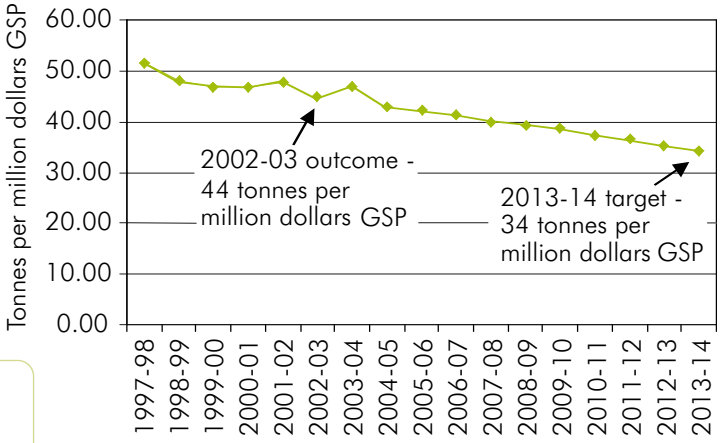
Recycling and reprocessing are well established activities in Victoria. The reprocessing industry recovers more than 30 specific secondary use materials from the waste stream for conversion into new products. Materials are sourced from all sectors (municipal, commercial and industrial, and construction and demolition).

The quantity of materials recycled in Victoria has seen a continuing upward trend over the past decade. During the last 10 years Victorians have recycled 35 million tonnes of waste materials. Today, we are recycling nearly four times more per year than in 1993. In 2003-04, Victorians recycled a record 53 per cent of the total solid waste stream; giving much of our waste a second life.

A particular challenge in the achievement of this objective will be the development of ecologically and economically sustainable systems for the recovery of organic material.

Increasing the recovery of materials through recycling and reprocessing will not only significantly contribute to the Victorian economy in terms of employment and investment, but also generate a host of environmental benefits for the state. Using recycled materials reduces greenhouse gasses, saves water and energy, cuts air pollution and conserves resources and landfill space.

Figure 6: Waste Generated per Million Dollars GSP – Victoria



Facts and Figures 2003-04:

- 393,000 tonnes of recyclables (containers and paper/cardboard) and 167,000 tonnes of green organics were recycled from Victorian households
- Victorians recycled an average of 222 kilograms per household during the year

What were the benefits of this recycling?

- Saving 7,320 mega litres of water – enough to fill 2,928 Olympic-sized swimming pools
- Preventing 237,000 tonnes of greenhouse gases – equivalent to taking 40,000 cars off the road
- Saving 237,000 tonnes of solid waste – enough to fill 259 quarter acre blocks with garbage

Data source: EcoRecycle Victoria's Local Government Data Collection 2003-2004

Target 2 – 75% by weight of solid waste recovered for reuse, recycling and/or energy generation by 2014.

Currently, the most significant materials landfilled, by weight, are: fill materials; food; concrete/brick/asphalt; garden waste; timber and, paper/cardboard. These six classes of materials make up approximately 80 per cent of all landfilled wastes (by weight).

Despite high rates of recovery of concrete/brick/asphalt, paper/cardboard and metals, significant quantities of these materials still remain in the landfilled waste stream. As a result, these and other materials have been identified as priorities for action for their potential to be recovered from landfill and achieve the target (see section 7).

Figure 8: Sectoral Targets

Recovery rate (by weight)	2002-03	2008-09 Progress Target	2014 Target
Municipal Waste	35%	45%	65%
Commercial & Industrial Waste	59%	65%	80%
Construction & Demolition Waste	57%	65%	80%
All solid waste streams	51%	60%	75%

Data source: EPA Victoria landfill levy returns 2002-03, EcoRecycle Victoria's Annual Survey of Victorian Recycling Industries 2002-03 and Nolan ITU, Solid Industrial Waste Plan Data Report (report prepared for EcoRecycle Victoria, 2002)

The following graph (Figure 7) shows the projected trends in solid waste generation resulting from the achievement of the targets, as compared to the base case.

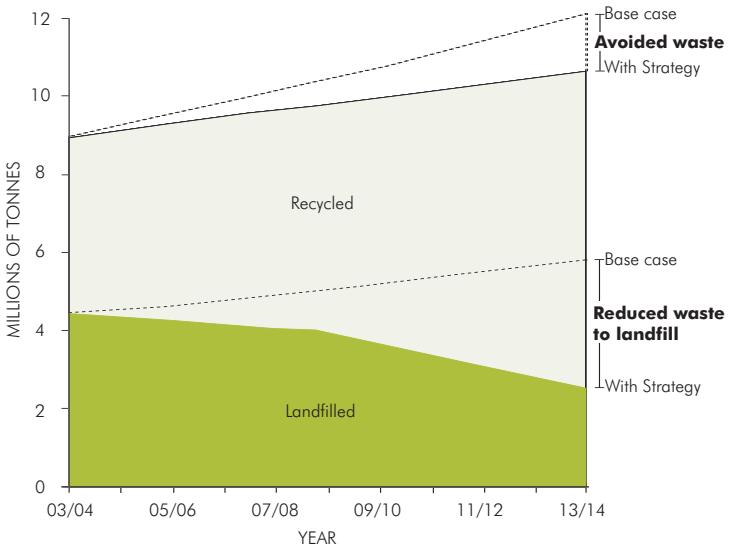
The Municipal, Commercial and Industrial (C&I), and the Construction and Demolition (C&D) sectors are considerably different in their patterns of waste generation and waste management systems. Resource recovery targets have been derived separately for each of these from the TZW Waste Model.

Target 3 – Sectoral targets achieved in accordance with Figure 8 by 2008-09 and 2014.

The targets reflect the outcomes which can be achieved through adoption of cost-effective and available resource efficiency measures. They have been determined by using the TZW Waste Model with scenarios which include the range of actions contained in the strategy.

Material recovery rates are typically higher for C&I and C&D waste than for municipal solid waste. C&I and C&D waste makes up about two thirds of landfill and is largely homogenous making it more easily recycled when systems and infrastructure are in place.

Figure 7: Projected Trends in Solid Waste Generation and Management – Victoria



Objective 3 – A reduction in damage to the environment caused by waste disposal.

Reducing damage to the environment caused by waste disposal is underpinned by the Victorian Waste Hierarchy. Long-term protection of the environment will be most effectively achieved by focusing on waste avoidance in the first instance.

Litter is one of the most visible signs of irresponsible and wasted resource use. Clean (unlittered) environments maximise opportunities for successful public recycling in the short term and demonstrate responsible resource use in the long term. The focus of this target is a movement away from cleaning up litter, to preventing it occurring in the first place. Prevention will reduce costs and improve the amenity of both the natural and built environments.

Historically, there has been a lack of measurement tools to assess change in behaviour related to littering. In 2003, the Victorian Litter Monitoring Protocol (VLMP) was piloted along with the Clean Communities Assessment Tool (CCAT) methodology. The continued use of these tools will enable improvements in littering behaviour to be identified, measured and tracked.

Target 4 – A 25% improvement, from 2003 levels, in littering behaviours by 2014.

This target will be achieved through:

- Implementation of best practice approaches (education, infrastructure and enforcement) with key stakeholders engaged in developing solutions and promoting change. This will occur through building capacity and communications facilitated at a statewide level and applied consistently across Victoria.
- Introduction of improved collection systems for problematic materials such as green waste and e-waste.
- Improved practices in public and private places. For example, industry sectors where waste and litter is not contained, environmentally preferred packaging and collection, packaging and improved disposal away from home.

The National Packaging Covenant and the role of industry will have a major influence in achieving the target by moving the focus beyond individual responsibility for littering behaviours, especially in relation to consumables.

The covenant also addresses the phasing out of plastic bags. The Victorian Government supports the current major retailers' target of 50 per cent reduction in plastic bag use by the end of 2005 and the goal of phasing out plastic bags by all retailers by 2008.

6.2 Benefits and Costs

Independent economic and triple bottom line analysis of the strategy, undertaken by The Allen Consulting Group, indicates the fiscal and environmental benefits will exceed its costs, with up to $500 million worth of benefits expected to flow to Victoria as a result of its initiatives and outcomes (based on moderate modelling scenarios).[7]

It is expected that benefits of the strategy will also flow to jobs in the waste management industry – particularly in reprocessing. In 2003-04, there were more than 1400 people (based on full time equivalence) directly employed in the reprocessing industry.[8] Through the strategies of *Towards Zero Waste*, it is expected many more jobs will be generated in this industry.

Assuming there is a take-up of resource recovery services by Victorian businesses and local governments to deliver the strategy's targets, the assessment has shown an insignificant overall macroeconomic effect. The strategy acknowledges there may be some cost differences between landfill disposal and resource recovery which may be passed on to households and industry and sets out funding support and initiatives to manage these impacts.

Greenhouse gas savings are among the largest projected benefits with more than 3 million tonnes of CO_2-equivalent per year expected by the end of implementation, reaching a cumulative total of nearly 16 million tonnes over the10 year life of the strategy.

[7] Further Benefit-Cost Analysis of Victoria's *Towards Zero Waste Strategy* – report prepared for EcoRecycle Victoria by The Allen Consulting Group, January 2004.

[8] Reported by 45 reprocessing businesses (approximately half of the industry) in EcoRecycle's Annual Survey of Victorian Recycling Industries 2003-04.

These savings will make a significant contribution to the Victorian Government's commitment to managing climate change within the *Victorian Greenhouse Strategy* framework.

Towards Zero Waste aims to achieve this through:

- Diversion of organic wastes from landfill, particularly household garden and food organics, and timber and food wastes from industry. This will reduce methane emissions from landfill and have the potential to generate soil conditioning, water conservation and renewable energy products which will reduce other environmental pressures.
- Reduced energy use through the re-manufacture of metals, plastics, paper and other recovered materials.
- Organic waste processing to reduce methane emissions from putrescible wastes disposed to landfill and recovered resources for recycling, with the potential for energy recovery.
- Reduced wastage of raw materials and products, along with lower associated environmental impacts from their manufacture.

The environmental benefits from reductions in air and water pollution and lowered resource impacts are even greater than the greenhouse gas savings, as shown in Figure 9 below.[9]

These benefits largely arise from:

- Reductions in leachate, other water and airborne pollutants from landfills associated with the breakdown of putrescible wastes, such as garden and food wastes.
- Avoidance of polluting and resource-depleting manufacturing processes through expanded recycling and waste reduction.

Further environmental savings through the use of composts and mulches from recycled organics are yet to be fully captured in the evaluation of the strategy's impacts. Research suggests substantial benefits as a result of water savings, reduced fertiliser and pesticide use, and carbon sequestration in soils.

6.3 Stimulus to Investment and Innovation

Assistance will be provided for infrastructure, the development of new markets, education and other initiatives to help meet the strategy's targets.

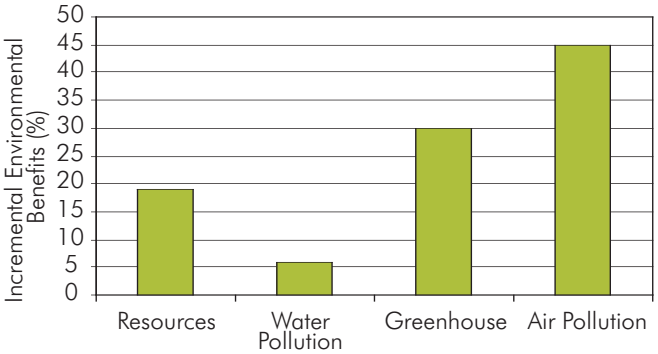
Over $1 billion has been invested in Victoria by the waste management and resource recovery industries in the past decade to enable the processing of recovered materials. The strategy's framework and targets will assist in continuing to build confidence within the waste management industry to invest in areas identified by the Victorian Government as priorities.

In addition to the direct benefits to Victoria of these services, the capacity and expertise developed by Victorian waste management and resource recovery industries can allow them to compete in international markets.

Landfill levy funding will stimulate further capital investment for expanded and innovative technologies to process residual waste. This will help attract private sector investment and boost the development of best practice and infrastructure to manage waste in Victoria. A significant proportion of this capital investment is expected to flow to the development of large-scale reprocessing facilities for recovered organics and residual wastes from both households and industry. The balance, in the next 10 years, will be shared across C&I and C&D processing infrastructure.

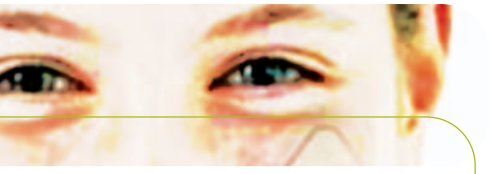
Investment in technology and infrastructure will be monitored, particularly in the progress review to take place in 2009-10. The pace at which systems are adopted will hinge on decisions by local government and other stakeholders on the capacity of new technologies to cost-effectively meet the expectations of their communities. The Victorian Government will actively promote the environmental, social and net economic benefits of these technologies, and provide funding and other support to reduce the short-term economic costs to communities of adopting more sustainable waste management systems.

Figure 9: Incremental Environmental Benefits of Strategy Implementation



Data Source: Allen Consulting Group, 2004

[9] Further Benefit-Cost Analysis of Victoria's *Towards Zero Waste Strategy* – report prepared for EcoRecycle Victoria by The Allen Consulting Group, January 2004.



7. Statewide Priorities

The strategy assigns priority across industry sectors, regions, materials and products, to focus efforts on areas with the greatest need and capacity for improvement. These priorities are reflected throughout the strategy, particularly in the sections addressing individual sectors (see Sections 8 and 9). While they reflect the current situation and knowledge, changing circumstances or new intelligence may be catalysts for a future review.

Priority Areas

Priority will be given to areas with the greatest need and potential to achieve cost effective improvements in the recovery of solid waste during the next 10 years.

These areas are the greater metropolitan Melbourne, Geelong, Ballarat and Bendigo, where about 90 per cent of Victoria's solid waste is generated; and areas with a shortage of landfill capacity (eg, the cities of Latrobe, Seymour and Hamilton).

Support will also be provided to enhance waste management in rural Victoria, including the establishment and/or upgrade of resource recovery and waste transfer facilities.

For each sector, the strategy also lists specific priorities for infrastructure in metropolitan Melbourne, major regional centres and rural areas. The Victorian Government will encourage, and where practicable, provide assistance for the development of these types of infrastructure.

Priority Industry Sectors

Priority sectors have been selected as representing the major generators of waste, particularly the priority materials identified below. They are:

- Construction and demolition
- Food services, food retail and food manufacturing

- Machinery, equipment, automotive and metal product manufacturing
- Timber products and furniture manufacturing
- The CBD office sector, including the Victorian State Government
- Small and medium size enterprises (which account for more than 90 per cent of Victorian businesses and are the source of large and dispersed quantities of waste).

The way the Victorian Government will work with these industries to reduce and recover waste is addressed in section 9 of this document.

Priority Materials and Products

The strategy assigns priority to a range of waste types offering significant capacity for improved resource recovery and/or reduced environmental harm when disposed of.

Priority materials were selected based on:

- Quantities of waste disposed at landfill now and predictions for the future
- The adequacy of current systems for recycling
- Environmental impacts arising from disposal (including toxicity)
- Cost to the community and recycling industry of managing discarded products and opportunities for improved management.

This criteria also applies to priority products. However, there is additional emphasis on shared responsibility across the product life cycle – from producers through to retailers and consumers. Hence, additional considerations in assigning priority products as the basis for product stewardship approaches are:

- The adequacy of current systems not only for recycling, but also in managing environmental impacts from production through to consumption
- Environmental and health impacts (including toxicity) from disposal, as well as production and other stages of the life cycle. Impacts may arise from manufacturing, or through the emission of toxic substances or greenhouse gases leaching from products when disposed to landfill
- Existing federal and state jurisdictional priorities.

Table 1 summarises priority materials and products by the sector which will have the most influence in addressing them through the strategy.

Table 1: Summary of Priority Materials and Products by Sector

	Municipal	Commercial & Industrial	Construction & Demolition
Materials	- Garden organics - Food organics - Paper / cardboard - Timber	- Food organics - Paper / cardboard - Timber	- Timber - Concrete, bricks, asphalt - Fill material - Garden organics
Products	- Electrical and electronic appliances (including televisions and mobile phones) - Computers and peripheral IT equipment - Tyres - Consumer packaging - Paint - Mercury-containing lamps including fluorescent lamps - Treated timber - Batteries - Plastic shopping bags - Motor vehicles	- Electrical and electronic appliances (including televisions and mobile phones) - Computers and peripheral IT equipment - Tyres - Consumer packaging - Paint - Mercury-containing lamps including fluorescent lamps - Batteries - Industrial / transport packaging including film plastics - Office paper - Treated timber - Motor vehicles - Oil and household chemicals and related packaging	- Treated timber - Industrial / transport packaging including film plastics

Achieving Sustainable Management of Organics

A major challenge to the achievement of *Towards Zero Waste* objectives is developing ecologically and economically sustainable management of organic wastes.

Garden and food wastes make up an estimated 30 per cent by weight, or over 1.3 million tonnes per year, of total landfilled waste from all sectors. Timber, which can be managed in ways similar to garden and food organics, contributes another 10 per cent, or 470,000 tonnes per year, to landfill.

In 2002-03, around 230,000 tonnes of food waste, 280,000 tonnes of garden waste and 180,000 of timber were diverted to recycling, with unquantified but large amounts of materials, being managed outside of conventional waste management systems (eg, home composting, firewood, waste used as animal feed).

Organic waste in landfill has significant environmental risks and impacts, which current landfill practices typically fail to fully contain. In particular, the anaerobic decomposition of 'wet' garden and food organics generates the potent greenhouse gas methane, and creates conditions which promote greater decomposition of other 'dry' organics such as paper, cardboard and timber. With few exceptions, current landfill management does not adequately manage landfill gas and landfills remain net producers of greenhouse gases. Decomposition of organics in landfills also generates leachate containing pollutants and organic compounds, which help to mobilise other pollutants such as heavy metals. These pollutants enter ground water or are partially captured and treated.

The organics in the landfilled waste stream are potentially a valuable resource, but markets for products have not been fully developed. Organics can be converted into landscaping, soil conditioning, and fertiliser products and are also a potential source of renewable energy.

Garden and food waste make up an estimated 50-60 per cent by weight of landfilled waste from households and almost 10 per cent of industrial wastes. Major industrial sources of organics are the food manufacturing, food services and retail sectors, and garden maintenance businesses.

Recovering organics from households and small businesses is a challenge and cost-effective collection systems need to be developed. Processing technologies for organic streams containing food waste and residual waste streams containing organics to produce valuable products, need to be developed as part of sustainable organics management programs.

Although around 300,000 tonnes of garden and food organics were recovered into landscaping and soil conditioner products in 2002-03, markets for these products are periodically oversupplied. Effective markets need to be developed for recycled garden and food organics. This will require greater product development and differentiation, as well as increased confidence of markets that products can reliably meet their needs.

The role of energy recovery from wastes containing organics as a means of reducing the negative impacts of this waste and preventing market oversupply of recycled organics products, also needs to be explored and developed. More adequate energy recovery from landfill gas recovery and the integration of landfill gas management with other energy recovery and/or co-generation facilities, will also be a theme of sustainable organics management programs.

innovative
design
manufacture
choose
consume
reuse

8. Municipal Sector

Local government plays a key role in the delivery of waste management and recycling services to the community. It has led the way in kerbside and public place recycling and litter prevention, contributing significantly to Victorian householders being among the leaders in recycling across Australia.

Municipal waste comprises recyclable and non-recyclable materials from households, along with materials generated from activities by local governments such as parks and gardens maintenance. As well as kerbside collected materials, a portion of municipal waste arises from transfer stations, and resource and material recovery facilities.

Achievement of the municipal solid waste targets will be achieved over time in partnership with local government and the community. The targets apply to Victoria as a whole, but it is expected the greatest gains will be made in metropolitan and provincial centres due to economies of scale and concentration of waste generation, making alternative waste technologies more viable than in less densely populated areas.

Victorian households contribute about a quarter of the total waste stream and close to 40 per cent of waste disposed to landfill. Garden and food wastes represent around 50 per cent of the weight of household garbage. Diversion of organic materials to marketable soil conditioning, water conservation and renewable energy would reduce greenhouse emissions and provide environmentally beneficial products. Currently, only about 20 per cent of municipal organics are recovered.

Recycling activity by households has reaped substantial benefits. In addition to preserving resources and landfill capacity, research by RMIT

University in 2003[10] indicated recycling saves Victoria more than 8000 megalitres of water per year – equivalent to the consumption of 22 million people for one day. It also cuts greenhouse gas emissions by the same amount as removing 50,000 cars from the road.

Recent rates of recycling by different sources are shown in Figure 10, below. Although this is encouraging, there is still potential to improve recovery rates from household waste. This includes considerable possibility to improve recycling of non-organic garbage amounting to several hundred thousand tonnes of plastic, paper, cardboard and metal. Overall, industry sources give rise to almost three-quarters of the total waste stream and two-thirds of waste sent to landfill. Despite having one of the highest rates of municipal recovery in Australia, Victoria's municipal recovery rate of 35 per cent is the lowest of the three sectors.

Household recycling services have vastly improved in recent years and this is leading to growth in recovery rates. The costs of further improvements to recycling services are an important and sensitive consideration. While many households are willing to pay more for recycling services[11], local government experiences considerable pressure to reduce rates.

The prevalent community attitude to recycling is that it is an essential service.[12] Equally, there is a need to focus education on waste avoidance if Victoria is to meet the long-term sustainability challenge. Surveys[13] indicate the public is not convinced it can play a strong role in this task. The community looks to industry to provide goods and services which minimise waste and relies on local government as a prime source of advice and assistance on waste management issues.

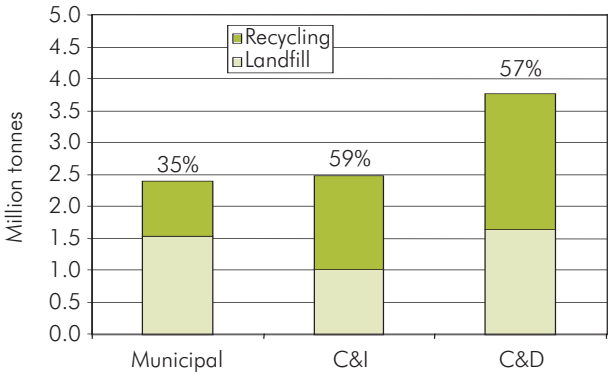
The decisions councils make in contracting waste services have had considerable impact in improving recycling services. This is likely to continue as they progressively make the transition to more advanced systems for processing organics and other waste streams.

Sustainability Victoria's *Guide to Preferred Service Standards for Kerbside Recycling in Victoria*, WorkSafe Victoria's 'no-lift' policy and funding support through the National Packaging Covenant, has driven the transition by many local governments to the commingled collection of recyclables in one bin, with separate bins for green organics and garbage. Such ease of use has an important bearing on householder participation and recycling yields, along with efficient technologies to sort recyclables by material type.

Although contracts and management systems for household waste are traditionally based on single municipalities, they can sometimes be more cost effective where they are facilitated on a regional basis. Longer contract periods than those generally used also offer scope for cost efficiencies, especially for alternative waste management technologies.

The contracting of services is regarded as critical where financial and other forms of government assistance can support councils and Waste Management Groups in planning and implementing efficient, sustainable, municipal waste management services.

Figure 10: Recycling Rates by Sector 2002-03



Data sources: EPA Victoria landfill levy returns 2002-03, EcoRecycle Victoria's Annual Survey of Victorian Recycling Industries 2002-03 and Nolan ITU

[10] Grant T, James KL, Partl H (2003) Life Cycle Assessment of Waste and Resource Recovery Options including Energy from Waste. Prepared by the Centre for Design at RMIT and Nolan-ITU for EcoRecycle Victoria. One person consumes 380 litres of water each day.

[11] 2004 Household Attitudes Survey undertaken by EcoRecycle Victoria.

[12] 2004 Household Attitudes Survey undertaken by EcoRecycle Victoria.

[13] 2004 Household Attitudes Survey undertaken by EcoRecycle Victoria.

8.1 Municipal Solid Waste Target

Target 5 – A 65% recovery rate (by weight) of municipal solid waste for reuse and recycling by 2014. An interim target of 45% is established for 2008-09. (Note: Recovery rate achieved in 2002-03 was 35%).

Victorian households contribute about a quarter of the total waste stream and close to 40 per cent of waste disposed to landfill. Achievement of this target will mean realising opportunities for the recovery of food and garden organics, and dry recyclables from landfill.

8.2 Strategies for Achieving the Municipal Waste Target

A range of strategies, actions and priorities have been identified to achieve the Municipal solid waste target and will guide the development of the implementation program for achieving *Towards Zero Waste*.

Improved Waste Management Systems and Infrastructure

During the lifetime of the strategy, municipal waste management infrastructure will be enhanced in line with the established priority materials and products.

Separate bins for recyclables, organics and garbage will be the preferred system where practicable, though inner urban metropolitan areas may opt for two bin systems.

Single bin household collection systems are not envisaged to have a role in Victoria.[14] In rural areas, waste collection and infrastructure arrangements will be established taking into account local circumstances.

Local government and Waste Management Groups, particularly in Melbourne and provincial cities, will be encouraged and assisted to provide householders with economically efficient and innovative waste management services and expanded recycling and resource recovery services. These may include advanced waste processing systems which treat organic materials or extract usable resources from mixed garbage. Such processing facilities are, in general, more capital intensive than current technologies (eg, open windrow composting or landfill) and have optimal scales of operation requiring the waste collections from a number of councils to be viable. These factors mean long term contracts, involving a number of councils, are required to support private sector investment and development of such facilities.

The Metropolitan Waste and Resources Strategic Plan for Melbourne, to be developed by Sustainability Victoria, will identify opportunities and priorities for the establishment of waste processing facilities for the Melbourne metropolitan area. Regional Waste Management Plans may also identify such opportunities for provincial cities. Both metropolitan and regional Waste Management Groups are responsible for facilitating the establishment of these facilities through public private partnerships involving local government and private sector service providers.

The Victorian Government will work closely with local government, Waste Management Groups and industry to facilitate more effective approaches for contracting of recycling services – eg, through long-term contracts covering larger populations to deliver economies of scale, improved service standards and minimisation of risk.

Action 1 – Sustainability Victoria, Waste Management Groups and local governments will identify opportunities for resource recovery services, as appropriate through relevant planning processes. Waste Management Groups will facilitate contractual arrangements between local governments and the private sector for the provision of these services.

The Victorian Government will work with local government and industry to develop recycling solutions which do not compromise worker or community health and safety.

Local government will be encouraged to extend standard kerbside recycling services to commercial and industrial sectors where viable and practicable to do so. These services should lead to substantial gains in resource recovery from small to medium enterprises within local communities. Councils will not be expected to subsidise the recycling of commercial waste.

Local government will be asked to review planning processes to ensure recycling is supported in the design of new residential buildings and infrastructure, and during the construction phase, waste minimisation and litter prevention planning will become a standard requirement for obtaining permits.

[14] SKM Economics (2003) Materials Efficiency Strategy and Solid Industrial Waste Management Plan Options Assessment. Prepared for EcoRecycle Victoria.

Landfill levy funding will be used to support the development of processing infrastructure to replace landfill as the preference for waste disposal. Investment will be encouraged for operations and technologies suited to different materials, sources and geographic locations, and which are of sufficient scale to attract the necessary viable investment.

Sustainability Victoria and EPA Victoria will work with Waste Management Groups to implement government policy which minimises the development and use of landfills.

Municipal Infrastructure Priorities for Melbourne and Major Regional Centres

Priorities include:

- Infrastructure to process garden and food organics into soil and mulch products; potentially with energy recovery.
- Infrastructure for processing of waste where environmental risks in landfill can be reduced, or where additional resource value can be practicably captured (eg, where significant levels of food and garden organics, and/or hard recyclables remain in the waste stream).
- Expanded capacity for the recovery of other priority materials and products eg, timber.
- Expanded capacity for drop off and load consolidation for recycling through transfer stations and resource recovery facilities.
- Recycling infrastructure in line with Sustainability Victoria's *Recycling in Public Places Program*.

Municipal Infrastructure Priorities for Rural Areas

Priorities include:

- Waste reduction and recovery initiatives which will significantly reduce the need for new landfills, particularly in areas where existing major landfills are approaching closure, such as the city of Latrobe, Seymour and Hamilton.
- Expanded capacity for the recovery of (other) priority materials and products, eg, timber.
- Improved siting, design, operation and rehabilitation of landfills (in accordance with Victoria's Waste Management Policy – Siting, Design and Management of Landfills) and new transfer station and resource recovery facilities (in accordance with Sustainability Victoria's Guide to Best Practice at Resource Recovery and Waste Transfer Facilities) to replace smaller landfills which do not meet modern environmental standards.
- Infrastructure at landfills and resource recovery facilities serving populations of more than 5000 people, to enable the drop off of metals, timber, construction and demolition waste, cardboard and paper, commingled containers, oil and chemical containers, silage wrap, plastic mulches, etc.
- Infrastructure for dropping off recyclables (ie, containers and paper/cardboard) at landfills and resource recovery facilities serving populations between 500 and 5000 people.
- Infrastructure at resource recovery facilities to enable compacting and baling of materials to achieve greater transport efficiencies.

Product Stewardship

Product stewardship agreements will be established with industry and local government to reduce end-of-life waste for priority products from priority household wastes, enhancing take back options, recycling and resource recovery options, sustainable packaging and addressing litter. These agreements will underpin Victorian Government assistance towards market development, infrastructure and other needs, for priority products.

Where appropriate, co-regulatory arrangements will be developed to ensure Commonwealth/state regulatory consistency and domestic producers and importers are included to ensure a level playing field.

Action 2 – Sustainability Victoria will facilitate the establishment of product stewardship arrangements supported by appropriate tools such as regulatory underpinning legislation or sustainability covenants for TVs, computers, IT equipment, other electrical and electronic products, tyres, consumer packaging (including plastic bags), paint and mercury containing lamps.

Action 3 – Sustainability Victoria will facilitate the establishment of product stewardship arrangements supported by appropriate tools such as regulatory underpinning legislation or sustainability covenants for batteries (domestic and portable equipment), motor vehicles and treated timber.

Action 4 – Sustainability Victoria, with industry participation, will facilitate the establishment of product stewardship arrangements for responsible disposal of domestic chemicals and related packaging, to increase removal from kerbside collection and landfill during the life of this strategy. Domestic chemicals include motor and farm oil and other chemical products.

Strengthening Markets for Recycled Products

Local government will play a key role in strengthening existing markets for recycled products through a range of initiatives. Local government purchasing of recycled and other environmentally preferred products will be encouraged through Sustainability Victoria's partnership with ECO-Buy. ECO-Buy will seek to expand the commitment and participation of Victorian local government in its initiatives.

Action 5 – Local government, the Municipal Association of Victoria and other bodies including Sustainability Victoria, will establish benchmarks and targets for recycled-content purchasing (based on ECO-Buy data).

Recycling industry assistance will be linked to market development activities identified through product stewardship agreements and priority materials. Markets for composts and mulches made from recycled organic products will be developed closely with industry.

Action 6 – Sustainability Victoria and Waste Management Groups will work closely with industry over the next three years to:

- Ensure recycled organic products are of a consistently high standard and matched to market demands (fit-for-purpose)
- Enhance and develop markets for recycled organic products.

Biological treatments of organic wastes, including those which recover energy, will be preferred over thermal approaches, but if markets fail to grow sufficiently, greater priority will be given to energy from waste technologies, landfill gas capture, and/or composting of organics prior to land filling (to reduce greenhouse gas emissions from landfills).

Community Engagement and Education

Local government will be encouraged to promote recycling and broader sustainability messages through community engagement and education programs. Programs will focus on ensuring infrastructure and systems work together to make it as easy as possible for people to participate. Local government is regarded as the key source of information and guidance to the community on managing waste. The education programs will continue to support and develop local government's key role with the community to further improve recycling rates in the household and to extend this into other spheres of living. New emphasis to encourage sustainable consumption will focus on purchasing and waste reduction actions which achieve lasting change.

Local government will be encouraged to work collaboratively with Sustainability Victoria, EPA Victoria, water authorities and environmental educators, to build capacity in sustainable production and consumption, waste reduction and recovery, customised to reach the community including the education sector.

Sustainability Victoria will work to build and share knowledge about litter between all stakeholders and the broader community, coordinated through the Victorian Litter Action Alliance. Programs will be favoured which incorporate each of the vital elements of education, infrastructure, incentives, communication, partnerships and enforcement.

Sustainability Victoria will continue to work with local government and Waste Management Groups in developing and delivering successful outcomes such as the *Waste Wise Program*.

Away from Home Recycling

Sustainability Victoria's *Recycling in Public Places Program*, as part of the 'Away From Home' recycling initiatives of the National Packaging Covenant, will make recycling visible in major sporting and commercial venues, events, gathering points and tourist spots, as well as all Victorian municipalities. This will be supported by advice in program planning and implementation, with emphasis on consistency of infrastructure and communications across Victoria. Funding, to pilot and support the introduction of public recycling infrastructure and communications, will be a priority in the early years of the strategy.

Action 7 – Through the *Recycling in Public Places Program*, Sustainability Victoria will provide increased assistance to local governments, Waste Management Groups, land managers, major events and venue managers, to provide efficient and accessible recycling services away from home.

Regulation and Enforcement

Processing of municipal waste for resource recovery prior to disposal to landfill is expected to play a significant role in achieving the strategy's targets. The development of viable alternative waste management technologies, their accessibility and performance in recovering resources, will be key factors in the analysis of the practicability and likelihood of meeting the targets.

Action 8 – EPA Victoria will investigate the practicability of landfill bans for municipal waste types and/or streams. The implementation of any such ban, where considered necessary, would need to be in place with sufficient lead-time to assist in meeting the strategy's objectives for 2014.

During these investigations, EPA Victoria will undertake broad consultation with relevant stakeholders with regard to:

- Environmental risk
- Practicability of avoidance, reuse and recycling
- Existing and potential secondary markets
- Technical, logistical and financial considerations
- The potential to meet the strategy's objectives by 2014.

Local government, (as well as other government instrumentalities) will continue to enforce penalties on littering and dumping under the litter provisions of the Environment Protection Act 1970 and local laws. A key approach will entail building capacity within local government to develop, disseminate and train local officers in best practice litter enforcement.

Local government, Waste Management Groups and EPA Victoria, will continue their efforts on the strategic planning and management of unlicensed landfill sites.

Victoria's regulatory framework for waste will maintain monitoring standards and expectations for the operation of landfills, as well as specific recycling operations including composting.

EPA Victoria will persist in promoting continuous improvement in the siting, design, operation and rehabilitation of landfills, through the implementation of best practice measures. Financial assurance will be required for all licensed landfills.

The Metropolitan Waste and Resources Strategic Plan for Melbourne and Regional Waste Management Plans for outside of the metropolitan area will provide strategic guidance on landfills to meet Victoria's future needs for safe and secure residual waste disposal, in accordance with environment protection requirements and land use planning provisions.

Raising the Standards of Waste Management

Through WorkSafe Victoria, the Victorian Government is responsible for ensuring the adoption of safe practices in the workplace, including the municipal sector.

Established accreditation programs for waste sorters and processors have provided an effective means of improving performance within the municipal sector and the ongoing development and review of these programs will be maintained throughout the life of the strategy.

Funding and support

There will be assistance for local government through the landfill levy to help manage the increases in cost to households arising from the strategy. The scale of this assistance will reflect the significant environmental benefits flowing from the diversion of household organics from landfill and from the treatment of mixed municipal waste prior to disposal to landfill.

Victorian Government support will be provided for assisting the establishment of efficient and innovative systems and infrastructure to receive, sort and process waste, particularly organics and mixed waste. Support for these approaches will be closely tied to product quality, the development of sustainable markets and the reduction of environmental risks from landfills. This in turn will help drive efficient services for households and local government as markets and technologies mature.

Support will be provided for locally targeted education programs which foster sustainable consumption, recycling behaviours and enhanced litter management.

Support will also be provided to industry partnerships to develop systems and schemes for priority product take back.

The Victorian Government will also build on the National Packaging Covenant framework, to ensure industry works with local government to manage the costs and impacts of consumer packaging.

Measuring Performance

Action 9 – Sustainability Victoria will work with EPA Victoria, Waste Management Groups, local government and the waste management industry to improve the quality of municipal data collection, management and reporting, throughout the life of the strategy.

This will support local government and Waste Management Groups in monitoring progress towards targets and the effectiveness of local strategies. GIS modelling will be increasingly used as a means of analysing data.

Action 10 – Sustainability Victoria will develop materials efficiency measures to gauge the performance of the Victorian economy in relation to sustainability by 2006-07.

Action 11 – EPA Victoria and Sustainability Victoria will evaluate and encourage the uptake of broad sustainability indicators such as the Ecological Footprint to build community understanding of resource efficiency.

8.3 Costs and Benefits

Environmental Benefits

In 2001, RMIT University indicated that recycling saves Victoria over 8000 megalitres of water per year – equivalent to the amount of water consumed by 22 million people in one day.[15]

Greenhouse emissions rank highly among the projected environmental savings. Most overall greenhouse savings will occur thanks to better household recycling of organics and other materials, residual waste processing and waste reduction. Modelling indicates greenhouse benefits arising from the strategy will reach more than 3 million tonnes CO_2 equivalent per year by the final year of its implementation.

Within the framework of Victoria's Greenhouse Strategy, which is estimated to deliver annual greenhouse savings of between 5 and 8.3 million tonnes CO_2 - equivalent within 10 years, municipal waste is clearly expected to play a leading role in the state's progress of managing climate change.

Further environmental benefits include improvements in reduced air and water pollution and lowered resource impacts. These mainly arise through:

- Preventing putrescible wastes such as green organics, paper and timber from entering landfills, thus avoiding the emission of air and water-borne pollutants including leachate as materials breakdown.
- The manufacture of products such as metals, paper/cardboard, plastics and glass from recycled materials, requiring less energy, water and other resources than their equivalent production from virgin materials.
- Reduced wastage of raw materials and products, along with lower associated environmental impacts from their manufacture and disposal.

Analysis by The Allen Consulting Group shows the municipal sector is expected to deliver the strategy's greatest environmental gains, as described above.[16] Taking into account the economic costs of implementation and ascribing financial values to environmental benefits, there is an estimated net benefit from the municipal sector alone valued at over $400 million for the period of the strategy, or $256 per household.

Costs to Households of Implementing the Strategy

While the strategy does not impose any mandatory or regulatory requirements on local governments on how they dispose of their waste, current trends and policies of councils are to deliver resource efficiency outcomes consistent with *Towards Zero Waste*.

Currently, kerbside waste services (garbage, recycling, garden organics and hard waste) represent around 4 per cent of total local government expenditure.[17]

[15] One person consumes 380 litres of water each day. Grant T, James KL, Lundie S, Sonneveld K (2001) Stage 2 Report for Life Cycle Assessment for Paper and Packaging Waste Management Scenarios in Victoria. Centre for Design at RMIT, Melbourne; EcoRecycle Victoria, Local Government Data Collection 2002-03;Water Smart, Victorian Government, 21st Century Melbourne: a WaterSmart City, Strategy Directions Report (May 2002, p 69) - http://www.watersmart.vic.gov.au/

[16] Further Benefit-Cost Analysis of Victoria's Towards Zero Waste Strategy – report prepared for EcoRecycle Victoria by The Allen Consulting Group, January 2004.

[17] MAV estimates, as cited in Local Government Data Collection 2002-03.

The impacts of implementing the strategy have been modelled through several studies.[18] Some cost increases will occur as councils make the transition to more extensive systems of household recycling. For example, for bin-based garden organics services, the overall impacts on households are not likely to be significant over the period of the strategy.[19] In addition, local government has some flexibility to manage these costs for their community.

Some of the anticipated costs are associated with a transition to mixed waste treatment systems. This would be expected to be implemented in the latter stages of the strategy and only when facilities with appropriate technologies and end markets have been developed. Some local governments may be able to achieve the strategy's targets through the use of source separated recycling services.

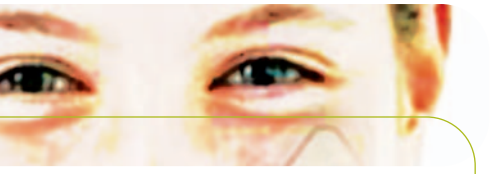
Opportunities for further resource recovery gains lie in the processing of residual wastes (or garbage) through alternative waste treatment technologies, particularly in metropolitan Melbourne. The gap between these technologies and landfill is currently around $50 per tonne. On average, each household in metro Melbourne generates 535kg per annum.[20] Accordingly, the costs of moving to alternative waste treatment technologies would be, on average, $27 per household per year, or just over 50 cents a week. The transition to such technologies would not be immediate, and would be expected to occur progressively over the life of the strategy as new plant is contracted for and commissioned, with likely lead times of between 3-4 years.

The strategy's progress review, undertaken in consultation with local government in 2009-10, will consider the performance and efficiency of these emerging technologies, including their impacts on costs to households. This will be considered as the review assesses the appropriateness of the strategy's targets, including those established for municipal waste recovery.

[18] SKM Economics (2003) Materials Efficiency Strategy and Solid Industrial Waste Management Plan Options Assessment. Prepared for EcoRecycle Victoria. The Allen Consulting Group (2004) Further Benefit-Cost Analysis of Victoria's Towards Zero Waste Strategy, Report to EcoRecycle Victoria. The Allen Consulting Group (2003) Benefit-Cost Analysis of Victoria's Towards Zero Waste Strategy, Report to EcoRecycle Victoria.

[19] Bill, A and Harding, A (2003) Research on incomes of Victorian households for EcoRecycle Victoria, National Centre for Social and Economic Modelling, University of Canberra.

[20] EcoRecycle Local Government Data Collection Survey 2002-03.



9. Business Sector

9.1 Commercial and Industrial Waste Target

Commercial and Industrial (C&I) waste is generated by large scale manufacturing, service-based businesses, small to medium enterprises (SMEs) and the government sector.

The C&I sector accounted for 2.8 million tonnes, or about a third of Victoria's solid waste in 2002-03. Sixty per cent of this is recycled annually. This high recovery rate reflects industry's production of large, homogenous streams of materials, such as metals, which have been traditionally recycled. Large quantities of resources still end up in the garbage stream, demonstrating that some systems and infrastructure in this sector are inadequate.

The business sector has the greatest potential to benefit financially from avoiding the production of waste and is often the greatest control over the means to achieve this. Despite this, the financial gains of reducing waste are often overlooked in business. Accounting systems often do little more than identify the costs of waste disposal. Businesses which have examined their waste streams have found disposal commonly represents as little as 10 per cent of the total waste costs. Adding in the broader costs of foregone raw materials, energy and labour, can provide a powerful stimulus for reducing waste and investing in improved resource efficiency.

The reasons for these wasteful outcomes include the lack of regular and consistent recycling services for small to medium industries, while, for some business leaders, perceived costs and recycling are not seen as a pressing issue.

Clearly, waste services for the C&I sector are not coordinated in the same way as municipal services. Its recovery occurs through private contractors, municipal facilities and from small businesses through council-managed kerbside collections or commercial bin services.

Despite these challenges, there is a range of potential initiatives to increase resource recovery from this sector. A number of facilities are currently being built or upgraded in Melbourne and regional centres which will improve the cost and efficiency of resource recovery. There are also opportunities to build upon existing contracts for municipal waste through the addition of suitable C&I materials, particularly from those small to medium enterprises which can make use of municipal collection systems.

Manufacturers and their supply chains – there are a number of existing government programs to encourage industry to reduce its waste, energy and emissions with good results. Companies which upgrade to environmentally preferable technologies and systems, often do this with a strong payback. Other dividends can follow including lower overheads, better productivity and preferential entry into some markets.

As most waste and inefficiency is locked in at the design phase of a product and is generated in the supply chain, companies which engage designers and suppliers can significantly reduce life cycle impacts and the costs of production.

The government sector itself also needs to continue to reduce its waste and improve its recycling record. In recognition of this, the Victorian Government has introduced Environmental Management Systems (EMS) to all its departments. This requires public servants to develop environment improvement plans, set waste reduction targets, comply with a Green Purchasing Policy and report annually on their environmental performance. Such practices demonstrate the Victorian Government is committed to moving with business and the community on the journey to sustainability.

Target 6 – An 80% recovery (by weight) of C&I solid waste for reuse and recycling by 2014. An interim target of 65% is established for 2008-09. (Note: C&I recovery of 59% was achieved for 2002-03.)

As with other *Towards Zero Waste* targets, these targets have been determined through analysis of the TZW Waste Model and other relevant information about the Commercial and Industry waste streams. The targets reflect the outcomes which can be achieved through adoption of cost-effective and available resource efficiency measures. They have been determined by using the TZW Waste Model with scenarios that include the range of actions contained in the strategy.

Towards Zero Waste does not impose any mandatory or regulatory requirements on Victorian businesses. Delivery of the strategy's actions which focus on commercial, industrial, construction and demolition waste streams, aim to provide businesses with options for reduced waste generation (eg, through cleaner production initiatives) and for cost-competitive waste disposal involving increased resource recovery.

Applications of cleaner production techniques by Victorian businesses have resulted in significant cost savings in addition to the environmental benefits of resource efficiency. Examples include a major food processing business which has reduced its waste disposal to landfill from 2600 tonnes per annum in 2002, to 650 tonnes per annum in 2005, with a reduction in annual waste management costs from $257,400 (2002) to $64,340 (2005).

An analysis of the contribution of waste management costs to total manufacturing costs has concluded waste disposal costs are a minor component of total waste management costs, which in themselves, are only a very minor component of total manufacturing costs. While implementation of the strategy will aim to deliver cost-competitive options to landfill disposal, the apparent absence of significant sensitivity to waste disposal costs will provide some tolerance to minor cost variations.

9.2 Construction and Demolition Waste Target

Construction and Demolition (C&D) wastes emanate from large building projects to residential renovations.

In 2002-03 the C&D sector accounted for 3.75 million tonnes of waste, representing about 40 per cent of all solid waste generated in Victoria. Around half of this was recycled, including about 900,000 tonnes of concrete processed into aggregate. Other recycled materials included rock, sand, metals, timber, asphalt and plasterboard. Recycling these materials helps to preserve quarry resources and landfill space, as well as reducing emissions from processing virgin resources.

C&D recycling rates have improved significantly in recent years, with

some projects achieving rates greater than 90 per cent. This is the result of leadership by major companies in establishing infrastructure to enable the recovery of large homogeneous waste streams. For example, asphalt and concrete recycling have become established practice across the industry.

Through Sustainability Victoria's *Waste Wise Program* and other initiatives, the Victorian Government has provided tools and assistance to encourage recycling from building sites. Providing information, referrals and resources can be an effective means of encouraging recycling behaviours. Engagement with councils is also important in raising the profile of waste minimisation and litter prevention at the planning stage when issuing permits to builders and renovators.

Substantial further increases in levels of recycling remain possible, especially from small to medium sites. A key challenge is persuading deadline-constrained builders and contractors to separate materials on site. An alternative solution becoming more prevalent is the use of mixed waste services supported by efficient sorting facilities.

The C&D sector is already achieving high levels of recycling, so stipulated targets for recovery appear less demanding than for the municipal sector. However, there is a need to ensure the continuation of large material flows arising from the C&D sector. A key challenge is to achieve better results from the vast number of smaller C&D projects operating across Victoria.

Other C&D related issues to be addressed include the role of planning and design to minimise waste, litter and storm-water pollution from construction, as well as ensuring buildings have adequate space and systems to facilitate efficient waste and recycling collections.

Target 7 – A recovery rate of 80% (by weight) of C&D solid waste for reuse and recycling by 2014. An interim target of 65% is established for 2008-09. (Note: C&D recovery of 57% was achieved for 2002-03.)

As with other *Towards Zero Waste* targets, these targets have been determined through analysis of the TZW Waste Model and other relevant information about the construction and demolition waste streams. The targets reflect the outcomes which can be achieved through the adoption of cost-effective and available resource efficiency measures. They have been determined by using the TZW Waste Model with scenarios that include the range of actions contained in the strategy.

9.3 Strategies for Achieving the Commercial and Industrial Waste Targets and Construction and Demolition Waste Targets

Improved Waste Management Systems and Infrastructure

Landfill levy funding will be used to support the development of processing infrastructure to replace landfill as the preferred option for waste disposal.

Investment will be encouraged for a range of operations and technologies suited to different materials, sources and geographic locations, and at a sufficient scale to attract the necessary viable investment.

Action 12 – Sustainability Victoria and WorkSafe Victoria will work with the C&I and C&D sectors during the life of this strategy to develop systems and infrastructure which do not compromise worker or community health and safety.

Planning processes will be reviewed to ensure recycling is supported in the design of new buildings and infrastructure and that during the construction phase, waste minimisation and litter prevention planning become a standard requirement for obtaining permits. The Victorian Government will also engage in broader collaboration with industry to improve the design of new and renovated buildings for waste minimisation and recycling during their period of occupancy.

C&I Infrastructure Priorities for Melbourne and Major Regional Centres

The processing of C&I waste for resource recovery prior to disposal to landfill is expected to play a significant role in achieving the strategy's targets for C&I waste and the associated environmental gains. Priorities are as follows:

- Infrastructure to process mixed C&I waste streams which have not been separated at source
- Infrastructure to process food organics into soil amendment and mulch products, and/or potential for energy recovery

- Infrastructure for processing the garbage stream where environmental risks in landfill can be reduced and/or where additional resource value can be practicably captured (eg, where significant levels of food organics, and/or hard recyclables remain in the garbage stream
- Expanded capacity for the recovery of other priority materials and products eg, timber
- Expanded capacity for drop off by SMEs and load consolidation for recycling through transfer stations and resource recovery facilities.

Municipal waste transfer and resource recovery facilities are likely to play a role in accepting some industrial waste streams, as well as dedicated C&I recovery facilities.

C&D Infrastructure Priorities for Melbourne and Regional Centres

The following are the priorities for infrastructure for recovering resources from the C&D sector. Municipal resource recovery and waste transfer facilities are likely to play a role in accepting some C&D waste streams, as well as dedicated C&D recovery facilities. Priorities are as follows:

- Infrastructure to process mixed C&D waste streams
- Expanded capacity for the processing of priority materials (including timber into mulch products and/or potential for energy recovery) and priority products
- Expanded capacity for drop off by SMEs and load consolidation for recycling through transfer stations and resource recovery facilities
- Where viable, infrastructure for stock-piling fill materials for appropriate re-use.

C&I Infrastructure Priorities for Rural Areas

In rural areas, C&I waste collection and infrastructure arrangements will be established taking into account local circumstances. The priorities are:

- Waste reduction and resource recovery initiatives to significantly reduce the need for new landfills, particularly in areas where existing major landfills are approaching closure, such as the city of Latrobe, Seymour and Hamilton
- Infrastructure to process food organics
- Expanded capacity for the recovery of (other) priority materials and products eg, timber and construction material packaging
- Infrastructure at landfills and resource recovery facilities serving populations of greater than 5000 to enable provision for drop off of a range of materials including metals, timber, construction and demolition waste, cardboard and paper, commingled containers (oil and chemical containers), low toxicity domestic chemical products and packaging such as oil, paint, car batteries and aerosols, silage wrap and plastic mulches
- Infrastructure for dropping off recyclables (ie, paper/cardboard, steel) at landfills and resource recovery facilities serving populations between 500 and 5000 people.

C&D Infrastructure Priorities for Rural Areas

In rural areas, C&D waste collection and infrastructure arrangements will be established taking into account local circumstances. Priorities are:

- Waste reduction and resource recovery initiatives to significantly reduce the need for new landfills, particularly in areas where existing major landfills are approaching closure, such as the city of Latrobe, Seymour and Hamilton
- Infrastructure to process C&D streams
- Expanded capacity for the processing of priority materials (including timber into mulch products and/or potential for energy recovery) and priority products
- Improved siting, design, operation and rehabilitation of landfills and new resource recovery facilities to replace smaller landfills which do not meet modern environmental standards
- Infrastructure at landfills and resource recovery facilities serving populations of greater than 5000, to enable provision for drop off of a range of materials including construction and demolition waste
- Infrastructure for dropping off recyclables at landfills and resource recovery facilities serving populations between 500 and 5000 people
- Infrastructure at resource recovery facilities to enable compacting and baling of materials to achieve greater transport efficiencies
- Where viable, infrastructure for stockpiling fill materials for appropriate reuse.

Product Stewardship

Product stewardship arrangements will be established to reduce end-of-life waste from priority C&I and C&D wastes, improve resource use and waste avoidance through design, enhance recovery and address litter. Agreements will underpin Victorian Government assistance towards market development, infrastructure development and other needs for priority products. Where appropriate, agreements will be established in conjunction with the Commonwealth and other states to promote national consistency including both domestic producers and importers to ensure a level playing field exists.

Action 13 – Sustainability Victoria will facilitate the establishment of product stewardship arrangements, including participation from industry, supported by appropriate tools such as regulatory underpinning legislation or sustainability covenants, for TVs, computers, IT equipment and other electrical and electronic products, tyres, consumer packaging (including plastic bags), paint and mercury containing lamps.

Action 14 – Sustainability Victoria will facilitate the establishment of product stewardship arrangements, supported by appropriate tools such as regulatory underpinning legislation or sustainability covenants, for batteries (domestic and portable equipment), motor vehicles, treated timber office paper and industrial/transport packaging.

Strengthening Markets for Recycled Products

Strong markets exist for many materials collected from C&I and C&D waste streams such as timber, plastics and cardboard. As recovery programs develop and new material challenges arise from product take-back initiatives and the collection of commercial food waste, market gaps are expected to develop. The strengthening and development of these markets for recycled products is critical to achieving target recovery rates.

Action 15 – Where identified needs exist, Sustainability Victoria will help to develop markets for recovered C&I and C&D materials through grants, partnerships and other initiatives, over the life of the strategy.

Industry assistance will be linked to market development activities identified through product stewardship agreements and priority materials.

Action 16 – Sustainability Victoria will work closely with industry to enhance markets for recycled organic (mulches, composts and other solid conditioner/fertiliser products, including horticulture and viticulture, domestic / commercial / public space landscaping and land rehabilitation) and renewable energy products derived from processing clean organic and residual materials streams containing organics.

This will involve ensuring recycled organic products are of a consistently high standard and matched to market demands. If markets for recycled organics composts and soil enhancement products fail to grow sufficiently, greater priority will be given to energy from waste technologies, treatment of residual materials containing organics prior to land filling, and/or more effective landfill gas capture (to reduce greenhouse gas emissions from landfills). Biological treatment of organic and residual wastes will be preferred over thermal approaches.

Sustainability Victoria has identified the following priorities for its organics program:

- The development and implementation of a detailed market growth and promotions strategy
- The provision of an incentive program for the processing of organic material using controlled environment technology
- The establishment of demonstration and field trials of compost in a variety of industries.

Action 17 – Sustainability Victoria will further investigate, and where appropriate, promote resource management options which recover energy from residual and clean organics wastes from the C&I and C&D sectors where no higher resource value recovery is viable.

Sustainability Victoria will help to develop markets for recovered C&D materials through grants, partnerships and other initiatives. Industry assistance will be linked to market development activities identified through product stewardship agreements and priority materials.

Business Engagement and Awareness Raising

Government programs will focus on building capacity within priority waste-generating industry sectors to measure and reduce waste, and continue to encourage businesses by highlighting recycling opportunities and the benefits of recycling and waste avoidance.

Action 18 – The Victorian Government will develop closer coordination of government business assistance programs for industry, including a focus on lean manufacturing, cleaner production and waste recovery.

Victorian Government departments and agencies will lead by example in waste reduction, recycling and environmental purchasing. Waste reduction initiatives will be linked with other strategies for workflow efficiencies, including the use of innovative electronic records management systems.

Action 19 – Sustainability Victoria, through its *Waste Wise Program*, will continue to work with the business sector to assist it with avoiding, reusing and recycling waste, as well as recognising the potential financial benefits of materials efficiency.

Action 20 – The Victorian Government will work with the waste collection and disposal industry to encourage practical and commercially driven services to foster waste avoidance and resource recovery. A voluntary agreement may be sought with the waste collection and disposal industry encompassing:

- Assistance to clients (from large manufacturers to SMEs etc) regarding waste avoidance and resource recovery
- Standards for recycling systems
- Pricing systems which encourage clients to reduce waste and to recycle (eg, pay by weight)
- Collection and reporting of waste data.

The potential outcomes of this approach include greater efficiencies and incentives for the uptake of recycling services by the C&I and C&D sectors.

Action 21 – The Victorian Litter Action Alliance, local government and the Department of Primary Industries will work with the business sector to build awareness within industry to address litter. Targeted industry groups include the hospitality, building, agriculture and farming sectors.

Action 22 – The Victorian Government will encourage local government to provide recycling services to C&I sectors, particularly those small to medium enterprises within their communities, where appropriate and viable, but will not be expected to subsidise the recycling of commercial waste.

Action 23 – The Victorian Government will ask local government to review planning processes to ensure recycling is supported in the design of new commercial and industrial buildings and infrastructure, and that during the construction phase, waste minimisation and litter prevention planning become a standard requirement for obtaining permits.

Action 24 – The Victorian Government, in partnership with industry, will over the life of the strategy, enhance C&I and C&D waste management infrastructure in line with established priority materials and products (see Section 7).

Some C&I waste streams are better suited to bulk sorting or processing, rather than separation at source. Processing of mixed industry waste streams is supported where waste can be effectively sorted for relatively low costs and where careful planning can lead to the collection of fairly homogenous wastes. The sorting of mixed construction and demolition wastes is already achieving good recovery rates. These approaches are especially valid for the many C&I sites lacking space for multiple bins.

Action 25 – Priorities for expanded C&I and C&D waste management infrastructure will be integrated into EPA Victoria, Sustainability Victoria and Waste Management Group initiatives, to implement government policy to minimise the use and development of landfills.

Regulation and Enforcement

The development of viable alternative waste management technologies, their accessibility and performance in recovering resources, will be key factors in the analysis of the practicability and likelihood of meeting the strategy's targets.

The processing of C&D waste for resource recovery prior to disposal to landfill is expected to play a significant role in achieving the strategy's targets for C&D waste and the associated environmental gains.

Action 26 – EPA Victoria will investigate potential landfill bans for C&D waste types and/or streams.

Action 27 – EPA Victoria will investigate the practicability of landfill bans for C&I waste types and/or streams.

During these investigations, EPA Victoria will undertake broad consultation with relevant stakeholders, with regard to:

- Environmental risk
- Practicability of avoidance, reuse and recycling
- Existing and potential secondary markets
- Technical, logistical and financial considerations
- The potential to meet the strategy's objectives by 2014.

Victoria's regulatory framework for waste will continue to monitor standards and expectations for the operation of landfills, as well as specific recycling operations including composting.

EPA Victoria will continue promoting continuous improvement in the siting, design, operation and rehabilitation of landfills through the implementation of best practice measures. Financial assurance will be required for all licensed landfills.

Raising the Standards of Waste Management

Through WorkSafe Victoria, the Victorian Government is responsible for ensuring the adoption of safe practices in the workplace, including the C&I and C&D sectors.

Action 28 – Establishing accreditation programs for waste sorters and processors has been an effective means of improving performance across other areas including the municipal sector. The Victorian Government will adapt similar programs for the C&I and C&D waste collection and reprocessing sector.

Funding and Support

There will be substantial assistance through the landfill levy to assist the strategy's objectives for the business sector. Victorian Government support will be provided:

- To assist the establishment of efficient, innovative systems and infrastructure to receive, sort and process waste streams including organics and mixed C&I and C&D wastes. Support for this approach will be closely tied to the expansion of sustainable markets for recycled materials and the reduction of environmental risks from landfills. This in turn will help drive efficient services for industry as markets and technologies mature.
- To build capacity within the C&I and C&D sectors to measure and reduce waste and to continue to encourage businesses by highlighting recycling opportunities and the benefits of recycling.
- To make recycling more efficient and accessible to industry through close collaboration with the waste management industry.

Measuring Performance

The Victorian Government will maintain the development of environmental accounting tools and systems for uptake by commerce and industry. This will be supported by pilot trials, collaboration with accounting industry leaders on the efficacy of current accounting standards, and training in environmental accounting expanded throughout accountancy curricula.

Businesses will be encouraged to use broad sustainability indicators such as the Ecological Footprint. EPA Victoria will help implement these practical tools across commerce and industry through ongoing evaluation and communications initiatives.

Sustainability Victoria and EPA Victoria will seek to work closely with the waste management industry to capture improved data on C&I and C&D waste generation, recycling and disposal. This will help focus government assistance on the industry sectors where the need and current impacts are greatest. The waste management industry will also benefit through the long-term planning of infrastructure and services. GIS modelling will increasingly be used as a means of analysing data.

9.4 Costs and Benefits

Environmental benefits

The C&D sector accounts for the largest share of materials recycled in Victoria by far, reaching 2.1 million tonnes for 2002-03. However, a lack of available life cycle data regarding the environmental benefits of recycling C&D materials, means these benefits could not be costed in financial terms.[21]

Modelling indicates the C&I sector will contribute significant environmental benefits over the period of the strategy. Analysis by The Allen Consulting Group shows that, taking into account the economic costs of implementation and ascribing financial values to the environmental benefits, the projected net benefit from this sector alone is valued at more than $160 million over the life of the strategy.

The value of underlying greenhouse and other environmental savings are estimated to be more than eight times the cost of implementation. Significantly, the modelled benefits do not factor in additional financial savings which are expected to flow to businesses as a result of improved resource recovery.

It is likely enhanced waste reduction and recycling within the business sector will lead to significant environmental gains through:

- Greenhouse savings from recycling, the benefits of which markedly depend on the end uses into which C&D materials are recycled. There may be some economic benefit derived from any carbon credits generated.
- Diverting putrescible wastes such as food organics and timber from landfill avoiding the emission of air and water-borne pollutants including methane (with 21 times the greenhouse potential of carbon dioxide) and leachate as materials break down. As well as more conventional forms of resource recovery such as soil conditioners and mulches, there is also the potential for energy from waste to offset more greenhouse intensive sources of electricity.
- The manufacture of products such as metals, paper/cardboard, plastics and glass from recycled materials, requiring less energy, water and other resources than their equivalent production from virgin materials.
- Reduced wastage of raw materials and products, along with lower associated environmental impacts from their manufacture and disposal.

[21] Allen Consulting Group (2004) Further Benefit-Cost Analysis of Victoria's Towards Zero Waste Strategy, Report to EcoRecycle Victoria.

Costs to the C&I Sector of Implementing the Strategy

While the strategy calls for changes in waste management practices, the strategy's actions which focus on commercial, industrial, construction and demolition waste streams aim to provide businesses with options for reduced waste generation (eg, through cleaner production initiatives) and for cost-competitive waste disposal involving increased resource recovery. There is no mandatory or regulatory control requiring resource recovery in place of waste disposal.

Where businesses choose resource recovery options, the overall cost impact on businesses is not expected to be significant. Recent industry surveys indicate waste management does not represent a significant cost to business. This is borne out by a survey undertaken of the food processing sector in Victoria in 2000, which found waste disposal costs (including solid, liquid and prescribed wastes) fell within a range of 0.1 per cent to 2.2 per cent of total manufacturing costs.

Modelling undertaken as part of the strategy's development indicates likely savings in the cost of disposing of some waste streams. In some instances there may be higher costs for mixed waste streams unless source separation can take place on site.[22]

Higher disposal costs may occur as the C&I sector makes the transition to better standards of waste management. This will entail expansion in recycling, as well as the processing of residual wastes prior to disposal to landfill. Waste avoidance, system innovation and engaging supply chains, offers the possibility of offsetting such costs.

An early priority will be the recovery of timber, food and green organics from the C&I sector. While competitive sorting facilities for some C&I waste streams are already being developed in Victoria, the processing of more complex mixed garbage streams for resource recovery, potentially including energy, remains a challenge.

The strategy's progress review will consider the performance and efficiency of these emerging technologies, including their cost impacts. The comprehensive processing of residual C&I waste streams will only be implemented in the latter stages of the strategy and when facilities with appropriate technologies have been developed.

This will be considered as the review assesses the appropriateness of the strategy's targets and timelines, including those established for C&I waste recovery.

Costs to the C&D Sector of Implementing the Strategy

The dominance of the C&D sector in recycling in Victoria illustrates the competitiveness of current recycling services, even relative to low current landfill disposal rates for solid inert materials.

Of all the sectors, the C&D industry generally has the smallest gap to bridge between costs of disposal to landfill and the costs of recycling. The cost of recycling C&D waste is often close to, or less than disposal to landfill. In many cases there are savings to be made, particularly in managing large, homogenous C&D waste streams.

Gate fees are expected to progressively increase over the period of the strategy, while more efficient sorting and processing technologies will emerge through the efforts of the private sector and Victorian Government funding incentives. As these drivers continue, it is expected the strategy will lead to cost savings for most of the C&D sector in metropolitan Melbourne and provincial cities.

[22] Allen Consulting Group (2004) Further Benefit-Cost Analysis of Victoria's Towards Zero Waste Strategy, Report to EcoRecycle Victoria.

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10. Working in Partnership

10.1 Strategic Partners

The Victorian Government

The Victorian Government, and specifically the Department of Sustainability and Environment (DSE), has an important role in bringing together a wide range of partners to ensure successful implementation of the *Towards Zero Waste Strategy*. DSE coordinates portfolio and government strategies for environmental sustainability.

Sustainability Victoria

Sustainability Victoria is the state government agency responsible for environmental sustainability, including the planning and management of solid waste throughout Victoria. Sustainability Victoria will lead the implementation of the *Towards Zero Waste Strategy*. This will involve developing many of the strategy's programs, assisting partners and measuring and reporting on progress through annual business plans.

Environment Protection Authority Victoria

EPA Victoria administers the *Environment Protection Act* 1970 and its instruments, including policies, works approvals, licences, environment improvement plans, sustainability covenants and enforcement tools. EPA Victoria and Sustainability Victoria work in partnership to reduce waste and facilitate the development of product stewardship programs. EPA Victoria will facilitate, and where necessary, use regulatory powers to protect beneficial uses of the environment and ensure resources are used efficiently. EPA Victoria closely monitors prescribed industrial wastes because of their potential adverse impacts on health and the environment. (Liquid and trade wastes are considered separately from solid non-prescribed wastes).

Local Government

Local government plays a pivotal role in providing waste and recycling services to households; often leading the way in kerbside and public place recycling and litter prevention. Councils spend about $258 million a year on waste management, of which, approximately $170 million goes to the delivery of kerbside waste services, recycling and garden organics services. Their role in major waste contracts is recognised as an important catalyst for the development of infrastructure and systems needed for improved resource recovery. The strategy acknowledges the role councils have in community engagement and education. Thanks to localised initiatives, Victorian households are among the leaders in recycling across Australia.

The *Towards Zero Waste Strategy* will provide support to local government through funding incentives, the continuing development of best practice standards, and support for localised programs.

Department of Innovation, Industry and Regional Development

DIIRD is the Victorian Government's lead agency for economic and regional development, responsible for building an innovative state. DIIRD is a key partner in addressing waste management challenges, particularly in the C&I sector.

Waste Management Groups

Victoria's Waste Management Groups (WMGs) carry primary responsibility for planning for the management of municipal solid waste. Each group produces a regional plan to coordinate and direct the activities of its member councils. As part of the *Towards Zero Waste Strategy*, these plans will be updated for consistency with the strategy's objectives.

WMGs will share responsibility for facilitating and implementing many of the strategy's programs, especially the planning for enhanced infrastructure needs and local level community engagement programs. Sustainability Victoria will assist WMGs and local government to plan towards system transition and provide incentives towards adopting preferred systems.

10.2 Essential Partners

Community

The wider community has demonstrated that when provided with good reasons and systems, they will support change. Recycling in households is a well supported, everyday activity. Extending recycling into the workplace and public places requires community, business and government leadership, clear communications of the benefits, supported by sound infrastructure to maximise participation.

Moving to sustainable consumption and lifestyle change to reduce materials usage is a greater challenge. The wider community will rely on industry and governments to develop products and packaging frameworks with lower environmental impacts.

Community leadership will require support and assistance to make changes at the local locality, workplace or school level. Community leaders across all sectors will be crucial in leading and promoting changes to existing thinking and practice. Environmental champions are located in every sector and the *Towards Zero Waste Strategy* will provide a basis for translating the broader goals and targets to individual and group actions.

Waste Management Industry

The waste management industry covers collection, sorting, reprocessing and disposal activities. Operators within this industry sector vary greatly in size and scope, yet all are responding to moves towards more sustainable management of waste with new technologies and methods being developed continuously for managing discarded materials and recovering resources from waste materials.

Collection and sorting services along with landfill operators, have contributed greatly to the growth of kerbside recycling and materials recovery. Ongoing investment in plant, infrastructure and triple bottom line reporting, have all been a part of this contribution. As part of a much larger industry sector, these players have continued and sometimes driven the move toward quality assurance, financial and environmental management systems. Collectors, sorters and landfill operators are well placed to make a strong contribution to the goals set in the *Toward Zero Waste Strategy*. The reprocessing industry is of key importance to the recovery of materials from the Victorian waste stream. The reprocessing industry is well established in Victoria, with 51 per cent of waste generated in Victoria now being recycled.

Victoria's waste management industry is vital to the achievement of the targets set in the *Towards Zero Waste Strategy*.

Business Community

The business community is an important partner across every aspect of the strategy, influencing the design of products in the market, the availability of services, end-of-life product management and the purchasing and recycling behaviour in offices and service areas such as retail.

In response to business sector feedback, the strategy emphasises that product stewardship approaches will operate fairly across markets, engaging whole supply chains and addressing imports. A legislative safety net assures responsibilities are carried equitably among industry waste generators.

The *Towards Zero Waste Strategy* will continue to provide strong support for product stewardship across the entire life cycle. Its effectiveness in reducing waste will be important in evaluating the need for landfill prohibitions over the period of its implementation.

Manufacturers

The manufacturing sector is crucial to Victoria's economy, influencing the efficiency with which resources are used and the fate of generated wastes. The strategy's outcomes and implementation programs will support greater efficiencies in this sector, as well as in the recovery of manufacturing waste into commodities for reuse. The partnership with the manufacturing sector, especially those manufacturers influencing key supply chains, is critical for success. Major companies and key associations such as the AIG and PACIA will be engaged to more broadly realise and communicate the benefits of the strategy to business and manufacturers.


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11. Measuring Performance

Sustainability Victoria will prepare an annual assessment of progress in achieving the strategy's targets. Results will be communicated to all stakeholders via internet and other channels. The assessment will draw upon a range of Victorian Government and industry sources, including annual surveys of the recycling industry and local government, landfill data collected by EPA Victoria, and information collected from the waste management industry and other sectors.

During 2009-10, Sustainability Victoria will undertake a formal progress review, in consultation with stakeholders, to assess progress in achieving the strategy's targets. This will provide opportunity to monitor achievements to date, adjust programs and activities, and review the appropriateness of the targets.

The review will include an analysis of how technologies including alternative waste processing have developed to confirm ongoing directions for the processing of residual waste streams from households and industry. The review will also provide important input into EPA's assessment of the feasibility of potential landfill bans for particular waste types and/or streams.

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12. Glossary

Anaerobic digestion: A process of biologically degrading organic materials in the absence of oxygen, yielding methane gas (which may be combusted to produce energy) and stabilised organic residues (which may be used as a soil additive).

Best practice facilities: Facilities with high levels of environmental management consistent with EPA and Sustainability Victoria Best Practice Environmental Management guidelines. In the case of materials processing facilities, best practice also implies high levels of product quality management.

Best practice landfill management: Adoption of measures established in *Best Practice Environmental Management – Siting, Design, Operation and Rehabilitation of Landfills* (EPA.) This document gives direction through required outcomes and suggested measures on the main aspects of landfill management.

Biosolids: Nutrient rich organic materials derived from wastewater solids (sewage sludge) which have been stabilised through processing.

Composting: A process of biologically degrading organic materials in the presence of oxygen, yielding carbon dioxide, heat and stabilised organic residues, which may be used as a soil additive.

Clean Community Assessment Tool (CCAT): A tool used to provide a measure of cleanliness in relation to litter. A score is derived from equally weighted criteria (context, facilities and attitudes and perceptions), which gives a measure of cleanliness. The score is on a 5 point scale where '0' reflects not clean and '5' represents very clean. In 2003, approximately 300 sites were assessed for littering and a CCAT score of 3.7 was reported for Victoria.

Eco-buy: Formerly the Local Government Buy Recycled Alliance. A partnership of local governments committed to purchasing policies and practices which promote the use of recycled products across operations and services. It is a joint initiative of Sustainability Victoria and the Municipal Association of Victoria (MAV), with the Department of Sustainability and Environment joining the partnership in 2002, to broaden the program to cover green purchasing.

Eco-design: An approach to sustainable production and consumption which addresses the link between a product and the environment, recognising the critical influence of the design of a product on its life cycle impacts.

Ecological footprint: The impacts of human consumption on the Earth's ecosystem, expressed in terms of the area of land used to supply these resources.

End-of-life waste: eg, end-of-life vehicles. Products such as cars, which have reached the end of their useful life and become wastes. This term is often used in the context of product stewardship responsibilities of manufacturers and brand-owners for wastes discarded by consumers.

Energy from waste: Processing technologies which use waste as a feedstock for generating energy used for heat or for generating electricity.

Environmental accounting: A discipline for measuring environmental costs which may be applied to the areas of management accounting, financial accounting and national accounting. The reference to environmental accounting in the draft strategy relates to its application for internal organisational decisions, or management accounting.

Environmental management system (EMS): A business tool for systematically measuring and improving environmental performance.

Fill material: Soil (being clay, silt and sand), gravel and rock, all being naturally occurring materials, having chemical contamination levels below that specified in Table 2 of *EPA publication 448*. Materials exceeding the minima set in Table 2 must be classified as either low-level contaminated soil or contaminated soil.

Food organics: Food wastes from households or industry including food processing waste, out-of-date or off-specification food, meat, fruit and vegetable scraps. Excludes liquid wastes.

Garden organics: Organics derived from garden sources eg, grass clippings, tree prunings.

Gasification: Advanced thermal technology which converts organic material into combustible gases by partial oxidation under the application of heat, leaving an inert residue.

Greenhouse gas (emissions): Gases such as carbon dioxide and methane which trap heat in the Earth's atmosphere, with impacts on weather and climate.

Landfill: A site for the disposal of waste.

Landfill levy: A levy applied at differential rates for municipal, commercial and industrial and prescribed wastes disposed of at licensed landfills in Victoria. Landfill levies are used solely for the purposes of environment protection and fostering environmentally sustainable use of resources and best practice in waste management. They fund the activities of Waste Management Groups, Sustainability Victoria and EPA Victoria, in helping to establish waste management infrastructure, industry waste reduction programs, education programs, regulatory controls and enforcement regimes. Levies also provide an incentive to minimise the generation of waste, and send a signal to industry that the government supports efforts to develop alternatives to disposal to landfill.

Landfill prohibition: The banning of a certain material or product type from disposal to landfills. The waste management policy (*Siting, Design and Management of Landfills*) allows for the EPA to ban a material from landfill where a higher waste management option is available.

Life cycle assessment (LCA): An objective process to evaluate the environmental burdens associated with a product, process, or activity, by identifying energy and materials used and wastes released to the environment, and to evaluate and implement opportunities to affect environmental improvements.

Life cycle of a product: All stages of a product's development, from raw materials, to manufacturing, through to consumption and ultimate disposal.

Materials efficiency: 'Achieving more with less' by supplying products and services, using fewer resources, and generating less waste to maintain quality of life.

Municipal solid waste (MSW): Solid waste generated from municipal and residential activities, and including waste collected by, or on behalf of, a municipal council. As used in this document, MSW does not include waste delivered to municipal disposal sites by commercial operators or waste from municipal demolition projects.

National Packaging Covenant (NPC): A self regulatory agreement between industries involved in the packaging chain and all spheres of government.

Organics: Plant or animal matter originating from domestic or industrial sources, eg, grass clippings, tree prunings, food waste.

Prescribed waste and prescribed industrial waste: Those wastes listed in the *Environment Protection (Prescribed Waste) Regulations* 1998 and being subject to requirements under the *Industrial Waste Management Policy (Prescribed Industrial Waste)* 2000. EPA Victoria closely regulates these wastes because of their potential adverse impacts on human health and the environment. Prescribed wastes carry special handling, storage, transport and often licensing requirements, and attract substantially higher disposal levies than non-prescribed solid wastes.

Processing (of waste materials): Best practice activities which recover resource value from wastes and prevent harmful emissions from residual materials. Processing may include sorting of mixed waste streams for recycling; aerobic or anaerobic treatment to produce organic soil enhancement materials; anaerobic or thermal treatment to recover energy; or on-site separation of materials for recycling to a standard such that residual materials contain no significant resource value.

Product stewardship: A concept of shared responsibility by all sectors involved in the manufacture, distribution, use and disposal of goods and services.

Pyrolysis: Advanced thermal technology involving the thermal decomposition of organic compounds in the complete absence of oxygen and under pressure and at elevated temperature.

Recyclables: While this term strictly applies to all materials which may be recycled, the term is generally used in the strategy and supporting documents in reference to the recyclable containers and paper/cardboard component of kerbside waste, ie, not including garden organics.

Recycling: A term which may be used to cover a wide range of activities, including collection, sorting, reprocessing and manufacture into new products.

Regions: See Waste Management Groups.

Residual waste: Waste remaining after any source separation of recyclable materials including green waste.

Resource recovery: The process of obtaining matter or energy from discarded materials.

Re-use: The second-highest option in the waste hierarchy – recovering value from a discarded resource without processing or remanufacture, eg, garments sold though opportunity shops strictly represent a form of re-use, rather than recycling.

Sectors, industry sectors: Groupings of industries used to generalise patterns in waste generation and disposal, eg, construction and demolition, food services, food retail and food manufacturing, small and medium enterprises.

Solid industrial waste (SIW): Solid waste generated from commercial, industrial or trade activities, including waste from factories, offices, schools, universities, state and federal government operations and commercial construction and demolition work. Excludes MSW, wastes prescribed under the *Environment Protection Act* 1970 and quarantine wastes.

Solid waste: Non-hazardous, non-prescribed, solid waste materials ranging from municipal garbage to industrial waste.

Source separation: The practice of segregating materials into discrete materials streams prior to collection by or delivery to processing facilities.

State environment protection policies (SEPPs): Statutory instruments under the *Environment Protection Act* 1970 which identify beneficial uses of the environment which are to be protected, establish environmental indicators and objectives and define attainment programs to implement the policies.

Sustainability covenant: Under Section 49 of the *Environment Protection Act* 1970, a sustainability covenant is an agreement which a person or body undertakes to increase the resource use, efficiency and/or reduce, ecological impacts of activities, products, services and production processes. Parties can voluntarily enter into such agreements with EPA, or could be required to, if they are declared by Governor in Council, on the recommendation of EPA Victoria, to have potential for significant impact on the environment.

Sustainable consumption, sustainable resource use: A change to society's historical patterns of consumption and behaviour which enable consumers to satisfy their needs with better performing products or services which use fewer resources, cause less pollution and contribute to social progress worldwide.

Transfer station: A facility allowing the drop off and consolidation of garbage and a wide range of recyclable materials. Transfer stations have become an integral part of municipal waste management, playing an important role in materials recovery and improving transportation economics associated with municipal waste disposal.

Triple bottom line (TBL): Referring to the ideal that organisations are responsible for social and environmental as well as financial outcomes.

Victorian Litter Action Alliance (VLAA): Victoria's peak body for litter management. Formed in April 2000, the alliance was created to coordinate efforts made on behalf of state and local government agencies and the voluntary and private sectors to reduce litter in the Victorian environment to acceptable levels.

Waste avoidance: At the top of the waste hierarchy, avoidance works on the principle the greatest gains result from efficiency-centred actions which remove or reduce the need to consume materials in the first place, but deliver the same outcome.

Waste generation: Generation of unwanted materials including recyclables, as well as garbage, ie, waste generation = materials recycled + waste to landfill.

Waste hierarchy, waste management hierarchy: A concept promoting waste avoidance ahead of recycling and disposal, often referred to in community education campaigns as 'reduce reuse recycle.' The waste hierarchy is recognised in the *Environment Protection Act* 1970, promoting management of wastes in the order of preference: avoidance, reuse, recycling, recovery of energy, treatment, containment, and disposal.

Waste Management Group (WMG): A statutory authority established under the *Environment Protection Act* 1970, responsible for planning for municipal solid waste. WMGs cover all of the state of Victoria.

Waste management industry: A term variously applied to collectors, sorters and processors of waste/resources. The term may also be used to include landfill operators.

Waste Management Policy (WMP): A statutory instrument under the Environment Protection Act 1970 which provides the basis for the management of waste and can cover generation, use, transport, storage, treatment, handling, recovery, recycling, reuse and disposal of waste.

Waste reduction: See waste avoidance.

Waste stream: A classification used to describe waste materials which are either of a particular type (eg, 'timber waste stream') or produced a particular source (eg, 'C&I waste stream')

13. Acronyms

C&D	Construction and Demolition
C&I	Commercial and Industrial
CO_2	Carbon dioxide
DIIRD	Department of Innovation, Industry and Regional Development
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EoL	End-of-Life
EPA	Environment Protection Authority Victoria
LCA	Life Cycle Assessment
MAV	Municipal Association of Victoria
NPC	National Packaging Covenant
SME	Small to Medium Enterprise
t	Tonnes
TBL	Triple Bottom Line
VLAA	Victorian Litter Action Alliance
VLGA	Victorian Local Governance Association
WMG	Waste Management Group
WMP	Waste Management Policy

14. Further Reading

The references written for, or by EcoRecycle Victoria, are available from EcoRecycle Victoria's website at www.ecorecycle.vic.gov.au, or after 1 October 2005, from Sustainability Victoria's website at www.sustainability.vic.gov.au

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15. Appendix 1 – Summary of Targets and Actions

Statewide Targets

Target 1 – A 1.5 million tonne reduction in the projected quantity of solid waste generated, by 2014.

Target 2 – 75% by weight of solid waste recovered for reuse, recycling and/or energy generation, by 2014.

Target 3 – Sectoral targets achieved in accordance with Figure 8, by 2008-09 and 2014.

Target 4 – A 25% improvement in littering behaviours, by 2014.

Municipal Sector Target

Target 5 – A 65% recovery rate (by weight) of municipal solid waste for reuse, recycling or energy generation by 2014. An interim target of 45% is established for 2008-09. (Note: Recovery rate achieved in 2002-03 was 35%).

Business Sector Targets

Target 6 – An 80% recovery (by weight) of C&I solid waste for reuse, recycling or energy generation by 2014. An interim target of 65% is established for 2008-09. (Note: C&I recovery of 59% was achieved for 2002-03).

Target 7 – A recovery rate of 80% (by weight) of C&D solid waste for reuse, recycling or energy generation by 2014. An interim target of 65% is established for 2008-09. (Note: C&D recovery of 57% was achieved for 2002-03).

Summary of Actions

Action

1 Sustainability Victoria, Waste Management Groups and local governments will identify opportunities for resource recovery services, as appropriate through relevant planning processes. Waste Management Groups will facilitate contractual arrangements between local governments and the private sector for the provision of these services.

2 & 13 Sustainability Victoria will facilitate the establishment of product stewardship arrangements, supported by appropriate tools such as regulatory underpinning legislation or sustainability covenants, for TVs, computers, IT equipment and other electrical and electronic products, tyres, consumer packaging (including plastic bags), paint and mercury containing lamps.

3 & 14 Sustainability Victoria will facilitate the establishment of product stewardship arrangements, supported by appropriate tools such as regulatory underpinning legislation or sustainability covenants, for batteries (domestic, car, and portable equipment), motor vehicles and treated timber.

4 Sustainability Victoria, with industry participation, will facilitate the establishment of product stewardship arrangements for responsible disposal of domestic chemicals and related packaging, to increase removal from kerbside collection and landfill during the life of this strategy. Domestic chemicals include motor and farm oil and other domestic chemical products.

5 Local government, the Municipal Association of Victoria, and other bodies including Sustainability Victoria, will establish benchmarks and targets for recycled-content purchasing (based on ECO-Buy data).

6 Sustainability Victoria and Waste Management Groups will work closely with industry over the next three years to:

- ensure recycled organic products are of a consistently high standard and matched to market demands (fit-for-purpose)
- enhance and develop markets for recycled organic products.

7 Through the *Recycling in Public Places program*, Sustainability Victoria will provide increased assistance to local governments, Waste Management Groups, land managers, major events and venue managers, to provide efficient and accessible recycling services away from home.

8 EPA Victoria will investigate the practicability of landfill bans for municipal waste types and/or streams.

9 Sustainability Victoria will work with EPA Victoria, Waste Management Groups, local government and the waste management industry to improve the quality of municipal data collection, management and reporting throughout the life of the strategy.

10 Sustainability Victoria will develop materials efficiency measures to gauge the performance of the Victorian economy in relation to sustainability by 2006-07.

11 EPA Victoria will evaluate and encourage the uptake of broad sustainability indicators such as the Ecological Footprint to build community understanding of resource efficiency.

12 Sustainability Victoria and WorkSafe Victoria will work with the C&I and C&D sectors during the life of this strategy to develop systems and infrastructure which do not compromise worker or community health and safety.

15 Where identified needs exist, Sustainability Victoria will help to develop markets for recovered C&I and C&D materials through grants, partnerships and other initiatives over the life of the strategy.

16 Sustainability Victoria will work closely with industry to enhance markets for recycled organic (mulches, composts and other solid conditioner/fertiliser products, including horticulture and viticulture, domestic / commercial / public space landscaping and land rehabilitation) and renewable energy products derived from processing clean organic and residual materials streams containing organics.

17 Sustainability Victoria will further investigate, and where appropriate, promote resource management options which recover energy from residual and clean organics wastes from the C&I and C&D sectors, where no higher resource value recovery is viable.

18 The Victorian Government will develop closer coordination of government business assistance programs for industry, including a focus on lean manufacturing, cleaner production and waste recovery.

19 Sustainability Victoria, through its *Waste Wise Program*, will continue to work with the business sector to assist it with avoiding, reusing and recycling waste, as well as recognising the potential financial benefits of materials efficiency.

20 The Victorian Government will work with the waste collection and disposal industry to encourage practical and commercially driven services to foster waste avoidance and resource recovery. A voluntary agreement may be sought with the waste collection and disposal industry encompassing:

- Assistance to clients (from large manufacturers to SMEs etc) regarding waste avoidance and resource recovery
- Standards for recycling systems
- Pricing systems which encourage clients to reduce waste and to recycle (eg, pay by weight)
- Collection and reporting of waste data.

21 The Victorian Litter Action Alliance, local government and the Department of Primary Industries will work with the business sector to build awareness within industry to address litter. Targeted industry groups include the hospitality, building, agriculture and farming sectors.

22 The Victorian Government will encourage local government to provide recycling services to C&I sectors, particularly those small to medium enterprises within their communities, where appropriate and viable, but will not be expected to subsidise the recycling of commercial waste.

23 The Victorian Government will ask local government to review planning processes to ensure recycling is supported in the design of new commercial and industrial buildings and infrastructure, and that during the construction phase, waste minimisation and litter prevention planning become a standard requirement for obtaining permits.

24 The Victorian Government, in partnership with industry will, over the life of the strategy, enhance C&I and C&D waste management infrastructure in line with established priority materials and products (see Section 7).

25 Priorities for expanded C&I and C&D waste management infrastructure will be integrated into EPA Victoria, Sustainability Victoria and WMG initiatives to implement government policy to minimise the use and development of landfills.

26 EPA Victoria will investigate potential landfill ban for C&D waste types and/or streams.

27 EPA Victoria will investigate the practicability of landfill bans for C&I waste types and/or streams.

28 Establishing accreditation programs for waste sorters and processors has been an effective means of improving performance across other areas including the municipal sector. The Victorian Government will adapt similar programs for the C&I and C&D waste collection and reprocessing sector.