Victorian Organics Resource Recovery Strategy

September 2015

Sustainability Victoria

VICTORIA State Government

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Victorian Organics Resource Recovery Strategy

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A vibrant, functioning recycled organics market that will ensure that the environment, human and animal health and amenity impacts of organic waste are eliminated. Organics resources will be contributing to climate change adaptation and mitigation by improving the quality of our soil and providing an energy source to local infrastructure.

What is organic waste?

Organic waste refers to any material that is derived from a natural and biodegradable substance. It can be solid material such as timber and woody garden waste, food or liquid waste such as grease trap waste or dairy effluent.

It includes avoidable and unavoidable food waste from households, supermarkets, manufacturing or restaurants and encompasses agricultural waste and effluent waste.

Organic waste can be categorised as either biowaste, biosolid or biomass.

Biowaste – Biodegradable waste derived from household kerbside systems and commercial and industrial (C&I) sectors which is either recovered or sent to landfill through the existing waste management system.

Biosolid – This waste is the residual of sewage treatment and is the result of organic waste disposed of through waste water infrastructure facilities.

Biomass – Includes both biowaste and biosolids but incorporates all remaining organic materials from animal wastes and bedding, forest residues and timber waste, food and agricultural wastes and can be converted into beneficial products such as fuel, power or soil conditioners.

Foreword

In 2011-12, Victorian households, businesses and industry generated more than 2 million tonnes of organic waste, with almost half of that ending up in landfill.

This waste will be responsible for more than 1.2 million tonnes of CO_2-e greenhouse gas over its lifetime of approximately 30[1] years.

The Andrews Labor Government recognises the need to take action on this important issue, which results in increased methane levels in the atmosphere, contributing to climate change, and poses significant risks around land, water and air contamination.

We know Victorians are willing to step up and take action to protect the environment. We are Australia's best recyclers and our willingness to embrace new kerbside collection and drop-off services has increased the amount of garden organics recovered from 21kg to 71kg per person[2] since 2000-2001.

More materials can now be recycled and new markets have developed, leading to better outcomes for the community and the environment as well as the economy. Communities and businesses have made it clear they want more opportunities to keep organic waste out of landfill and turn it into useful products with viable end markets. And importantly, they want to achieve this while maintaining community amenity and protecting human, animal and environmental health by ensuring this waste stream is managed safely.

That's why the Government has developed a strategy with a 30 year vision and a comprehensive five year action plan to better manage organic waste.

The strategy identifies seven strategic directions which prioritise the protection of the environment, human and animal health; and building the knowledge, skills and infrastructure for Victoria to realise the benefits of the better use of organic resources.

The five-year action plan prioritises increasing the recovery of organic wastes; improving practices and building confidence in recycled organic products. These actions, when delivered together, will establish a strong foundation for the Andrews Government to achieve a vibrant, viable and sustainable recycled organics industry that contributes to Victoria's economy through the creation of jobs, development of new markets for recycled organic products and protects the environment and human and animal health.

The Hon Lisa Neville MP
Minister for Environment, Climate Change and Water

1 Australian Bureau of Statistics, 4613.0 - Australia's Environment: Issues and Trends, 2006
2 Victorian Local Government Annual Survey 2010-11

FIGURE 1 VICTORIAN ORGANICS RESOURCE RECOVERY STRATEGY SUMMARY

30 year vision

A vibrant, functioning recycled organics market will ensure that the environment, human and animal health and amenity impacts of organic waste are eliminated. Organics resources will be contributing to climate change adaptation and mitigation by improving the quality of our soil and providing an energy source to local infrastructure.

Goals

Reduce the impact of climate change

Protection of the environment, human and animal health and amenity

Risk based and proportionate approach

Strong and sustainable markets

Strategic directions

Best practice environmental management

Sustainable markets

Leverage existing assets

Identify future needs

Outcomes

Environmental, human and animal health and amenity impact of organics waste management are eliminated

Market demand drives product development and innovation

Victorian soil condition is improved because of the use of quality products

Organic waste management facilities are not subject to community concern

Local organic management infrastructure is financially viable and is supporting local economies

5 year actions

Develop and implement an organic waste management framework that protects the environment, human and animal health and amenity

Undertake research that determines the impacts of the application of unprocessed/processed waste to land.

Work with industry to develop standard quality assurance processes and standards for recycled organic products

Provide industry with information that enables them to produce higher quality products for markets through the development of product profiles/specifications

Work with end markets to understand/demonstrate the benefits of using organic products

Identify the barriers to increasing the growth of markets for recycled organic products and work with others to develop the right conditions for markets to grow and mature.

Identify appropriate co-location sites, through the development of Regional Waste and Resource Recovery Implementation Plans (RWRRIPs) that have the appropriate buffers and social licence to operate to receive, process or treat organic waste

Identify locations and volumes of available biomass across regional Victoria

Identify opportunities for the aggregation and/or consolidation of organic waste streams, particularly from the commercial and industrial (C&I) sector to support business and industry investment in organic waste management facilities

Provide clear guidance on the legislative requirements to facilitate co-location opportunities for organic waste management facilities on existing waste and resource recovery sites.

Provide a framework for industry and local government to enable the full analysis of alternative options for organic processing systems

Clarify process and opportunities for energy generation from organic resources for local benefit

Conduct a horizon scan to identify potential emerging products made with recovered organics and produce a report on emerging technologies, products and opportunities for organic resources

Undertake research to understand the implications of emerging organic processing options.

Education to facilitate change	Building collective knowledge	Streamlined governance and strong leadership
Demand for organic resources is exceeding supply	Local government and industry partnerships deliver local solutions for social and economic benefit Value of organic resources exceeds the cost of disposal	Policy and market settings support innovative technological advances for organic management with limited government intervention
Increase community and business awareness of food waste and promote food waste avoidance Support local governments, businesses and industry to minimise organic waste and reduce contamination in organic waste streams Address community concerns regarding waste treatment processes to ensure that localised waste treatment options for organics are accepted, and the impact of organic waste on our environment and the social and economic benefits of recovering organic waste are understood and accepted Work with other government agencies to target sectors that: › dispose of organics inappropriately to inform them of alternatives and/or provide them with the information they require to dispose of organic waste within the current legislative frameworks › receive untreated organic waste to inform them of the associated risks and appropriate management, regulatory or legislative requirements.	Provide local government and industry with the information and support required to build their capabilities in managing organic wastes, including: › a guide to organic waste collection services that assists local government to determine the most effective and efficient collection services › an economic modelling tool that considers all options for organic waste management › a review of the *Guide to Best Practice for Organics Recovery* (2009) › work with Waste and Resource Recovery Groups (WRRGs) to identify C&I organic waste streams, identifying volumes and location as well as opportunities › produce procurement guidelines that consider supply chain implications of collection systems, transport systems, processing/ treatment options and end market use of organics › develop contract mechanisms for metropolitan and regional organics management that specify contamination management controls for collectors, processors and products (including meeting minimum product standards) › investigate mechanisms for including 'buy-back' options in organics management contracts – for either compost or energy.	Establish and coordinate a state government working group to ensure that government policies, strategies and interventions are aligned Produce a guide that documents the government framework for the appropriate management of organics.

Introduction

Victoria in 2043 will be a very different place to what we know today. *Victoria In Future*[3] projections indicate that by then Victoria will be a state of almost nine million people, an increase of over three million people from 2014. There will be increased demand for housing, energy, food supply and the services required by a modern society. This is especially true for our waste management system, a system that exists to protect our environment, human and animal health and amenity and to recover economic value from the wastes that we generate.

The challenges for Victoria are diverse, high density urban areas surrounded by lower density urban fringe and regional centres of varying population profiles means that waste management services vary in their availability and mix. Current collection systems deliver good localised results, but in some cases are constrained by infrastructure, geographical profile and cost.

Victoria has a strong track record in managing its waste, recovering valuable resources from the waste stream and demonstrating national leadership in waste management. Despite Victoria's strong track record, investment in advanced recovery practices that recover more and reduce our reliance on landfill has been challenging for the organics waste management sector.

The Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP) provides Victoria with the roadmap to guide future investment in waste management and resource recovery infrastructure that effectively manages the expected mix and volumes of waste, reflects the principles of environmental justice, supports a viable resource recovery industry and reduces the amount of valuable materials going to landfill.

The SWRRIP and the *Victorian Organics Resource Recovery Strategy* are key components of a comprehensive and complementary suite of strategies such as the *Victorian Community and Business Waste Education Strategy* and a *Victorian Market Development Strategy for Recovered Resources* currently being developed by Sustainability Victoria (see Figure 2 below). To support these strategies Sustainability Victoria is developing an investment facilitation framework and collaborative procurement functions to address investment barriers. These initiatives will establish the conditions for achieving a contemporary waste management and resource recovery system for Victoria that protects the environment, human and animal health and amenity and delivers economic benefits from our resources.

Environmental justice

The principles of environmental justice are based on the concepts of equity and participation. The principles require that environmental benefits and impacts should be distributed proportionately and affected communities should be able to participate in decision making.

Understanding the problem

Not all organic materials enter the waste management or resource recovery system. Agricultural wastes in general fall outside of the current waste management framework and are generally handled on-farm while some manufacturing organic waste is diverted away from the waste and resource recovery system. Some food waste, sourced from supermarkets and restaurants, is redirected through other channels such as charitable reuse and directly to agriculture. A significant quantity of organic waste that is currently unaccounted for in the waste and resource recovery system is the residual waste from waste water treatment facilities, such as sewerage sludge or biosolids. Timber waste and food waste continues to represent a large proportion of waste that goes directly to landfill.

Organic waste, when disposed, decomposes and generates methane, a gas that is at least twenty-one times more potent than carbon dioxide in our atmosphere, trapping heat and contributing to climate change. In 2011-12 Victorian waste management practices contributed over 20% of the total national greenhouse gas emissions attributed to waste[4]. In addition, there are significant land, human and animal health and amenity risks with managing organic wastes within the current waste and resource recovery system, including odour, leachate, attraction of vermin, biosecurity and biodiversity risks.

3 Department of Transport, Planning and Local Infrastructure 2014, *Victoria in Future 2014 – Population and Household Projections.*

4 Australian Government, Department of the Environment, 2014; *Australian National Greenhouse Accounts, State and Territory Greenhouse Gas Inventories 2011-12.*

Our vision

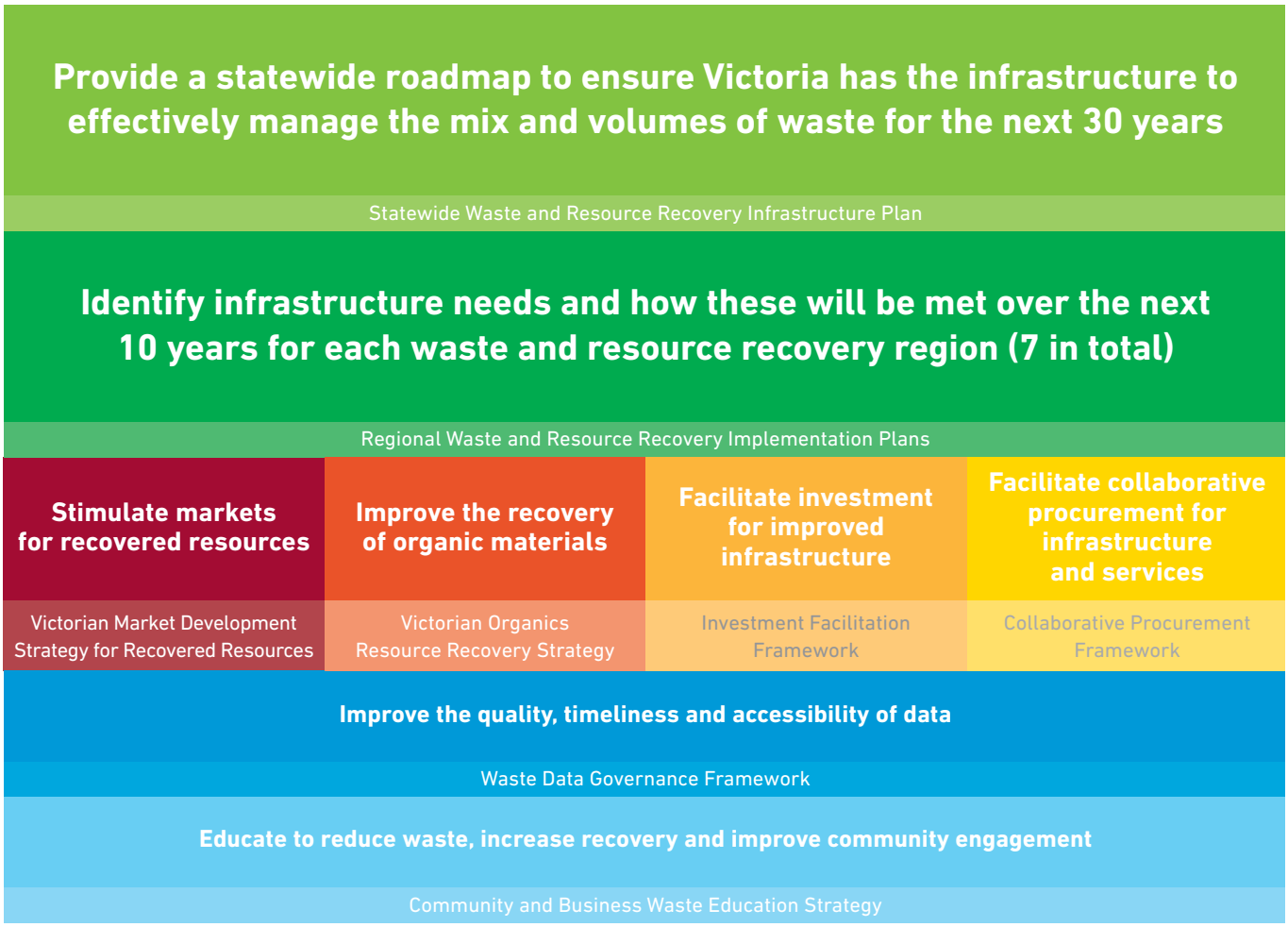
The Victorian Government's vision for organic resources is to improve the recovery of organic resources to deliver:

- A vibrant, functioning market for organic waste and resource recovery that will ensure that the environmental, human and animal health and amenity impacts of organic waste are eliminated; and
- Organic resources will be contributing to climate change adaptation and mitigation by improving the productivity of our soils and provide an energy source to local infrastructure.

To achieve this vision we will:

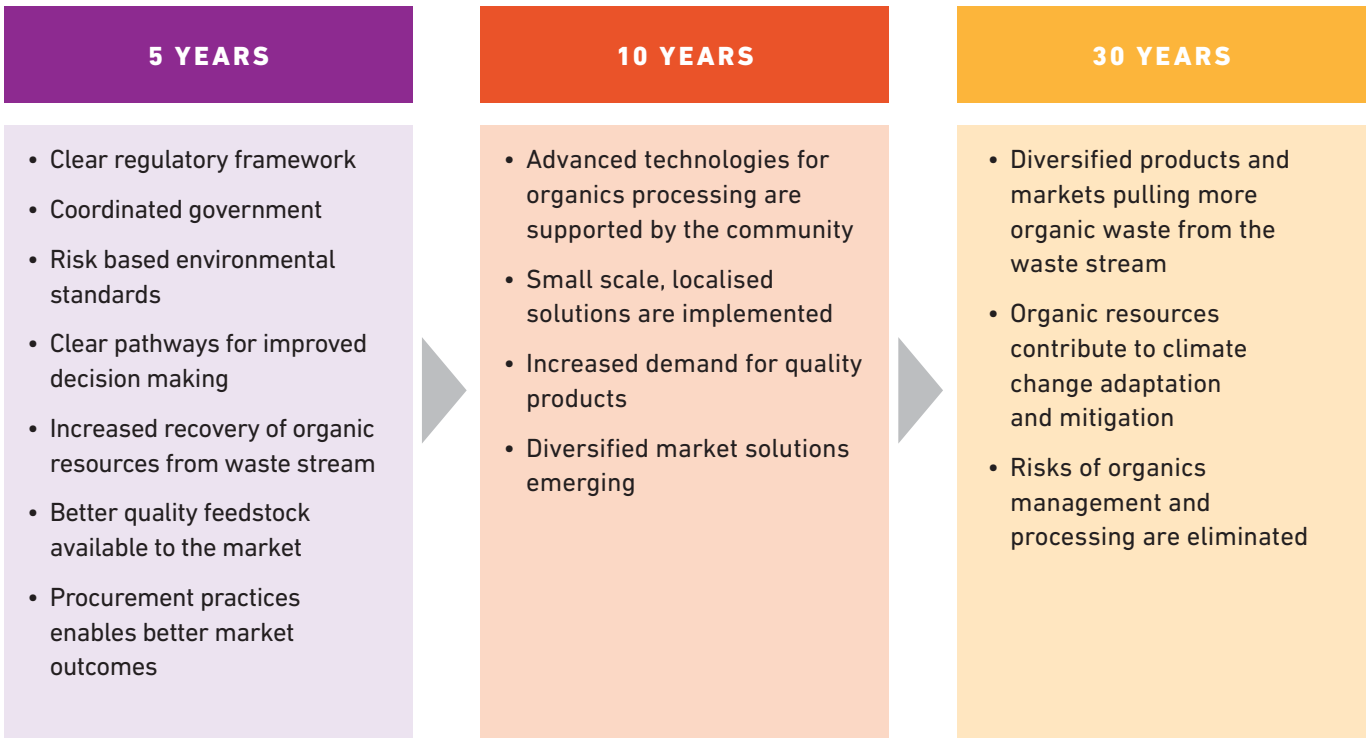
- Develop and implement an organic waste management framework that protects the environment, human and animal health and amenity
- Build knowledge and improve practices to increase the recovery of organic resources
- Build understanding of and confidence in the organics resource recovery industry
- Work with others to improve the quality of recycled organic products and build market confidence in the use of recycled organic products
- Make it easier for local government, business and industry to understand the regulatory and policy framework that governs the recovery and management of organic resources
- Provide the market with the required information to attract and support investment.

FIGURE 2 VICTORIA'S PRIORITIES TO REALISE AN INTEGRATED WASTE AND RESOURCE RECOVERY SYSTEM



What will be different

FIGURE 3 OUTCOMES OF THE VICTORIAN ORGANICS RESOURCE RECOVERY STRATEGY



Partnerships and engagement

Organic waste management in Victoria is subject to a complex legislative, regulatory and planning and investment framework. There are at least 24 Victorian Government regulatory policies or strategies that either impact on or influence organic waste management.

During 2014 Sustainability Victoria, in collaboration with the Environment Protection Authority and the Department of Environment, Land, Water and Planning coordinated a wide ranging engagement process involving other government agencies, waste and resource recovery groups, local governments, business and communities to understand the barriers and opportunities for improving the recovery and management of organic waste in Victoria. The outcome of those workshops is a strategy that responds to the complexity of organics recovery and management and recognises the importance of partnering with all stakeholders to realise the environmental and economic potential of the better recovery and use of organic resources.

Establishing goals

The strategy has identified four goals:

- Reduce the impact of climate change
- Protection of the environment, human and animal health and amenity
- Risk based and proportionate approach
- Strong and sustainable markets.

Providing direction

To achieve these goals, seven strategic directions will guide the delivery of the strategy:

- Best practice environmental and human and animal health management
- Sustainable markets
- Leverage existing assets
- Identify future needs
- Education to facilitate change
- Building collective knowledge
- Streamlined governance and strong leadership.

Climate change mitigation and adaptation

National modelling[5] of the impacts of climate change predicts that Victoria will be more susceptible to the impacts of climate change than other Australian states. Current organic waste management practices contribute to the speed at which Victoria will be impacted by climate change, requiring immediate action. Better use of organic resources can assist in mitigating and adapting to this changing environment.

More than 70% of Victoria's electricity is generated using non-renewable energy sources such as coal and gas, contributing to more than half of the state's greenhouse gas emissions. While there has been an increase in the online capacity from renewable energy sources, such as wind and solar, the use of biomass as an energy source has generated a great deal of interest but is largely unrealised on a commercial scale.

Energy from waste facilities form a part of the energy generation mix, particularly in the northern hemisphere. Stimulated by the right policy and economic settings in Europe energy from waste facilities have contributed to the growth in renewable technologies, displacing demand from fossil fuel sources through a range of renewables including biomass. The United Kingdom has an estimated biomass resource of over 300 million tonnes of biomass[6] available as an energy source resulting in bioenergy accounting for approximately 20% of renewable energy capacity[7] in the UK. According to the 2012 report *Fuelled for Growth - Investing in Victoria's biofuels and bioenergy industries* there is an estimated 10 million tonnes of biomass available annually in Victoria, however, in 2011 Victoria produced just over 633 Gwh of renewable bioenergy[8], approximately 1%[9] of the total electricity generated.

A 3%[10] increase in Victoria's renewable energy mix using organic waste as a feedstock will require approximately 1.9 million tonnes of biomass per annum and has the potential to offset approximately three million tonnes of greenhouse gas emissions. To achieve this there will need to be a change in current waste management systems. The agricultural sector has perhaps the greatest opportunity to realise the benefits. By utilising onsite waste such as animal manures and dairy effluents, the energy generated has the potential to provide a significant amount of energy, heat and steam to energy intensive activities. With an estimated 10 million tonnes[11] of biomass available to Victoria, the opportunity for increasing renewable energy generation and use is within reach.

The agricultural and horticultural sectors will be more impacted by climate change than most. Increased frequency of extreme weather conditions such as drought and flood will have a detrimental impact on our productive land, impacting our food supplies and the health of livestock. For many years, compost has been competing with fertiliser as a soil improver but while compost products can add some nutrient benefits to soil, they cannot deliver the same seasonal results that phosphor based fertilisers can. However, compost offers more potential for medium to long term soil health by adding carbon and improving soil condition. Compost can increase moisture retention in soil, reducing water usage, herbicide requirements and improving the permeability of soil providing protection for degradation as a direct result of flood[12]. With Victoria's agricultural areas more susceptible to climate change looking after the health of our soils will ensure that we reduce and adapt to the impact of climate change.

5 Australian Government, Department of the Environment, Climate Change impacts in Victoria available from http://www.climatechange.gov.au/climate-change/climate -science/climate-change-impacts/victoria

6 http://www.cleantechinvestor.com/portal/bioenergy/5170-uk-energy-from-waste.html

7 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/338750/DUKES_2014_printed.pdf

8 Clean Energy Council, 2012, *Renewable Energy in Victoria*

9 Sustainability Victoria, 2012, *Electricity from renewable energy in Victoria 2011*

10 Assumes 1 tonne of food waste generates 300 Kwh energy (http://www.biogas-info.co.uk/faqs.html). In 2011, 633Gwh of renewable energy equated to 1% of Victoria's energy generation.

11 Victorian Government, 2012, *Fuelled for Growth - Investing in Victoria's biofuels and bioenergy industries*

12 Boldrith, A., Anderson, J.K., Møller, J., Christensen, T.H. & Favoino, E. (2009) *Composting and compost utilization: accounting of greenhouse gases and global warming contributions.* Waste Management and Research, 27: 800-812.

Organics supply chain

The organics waste management supply chain is a network of individuals, organisations, activities, processes and products that are directly related to, contribute to, and influence the end use of organic products. The supply chain relies on the flow of materials, products, information and finance which function to support end markets.

The supply chain for organics is best understood through the categories of generation, collection, processing and manufacture, product and markets for organic material.

The recycled organic processing and manufacturing sector in Victoria has been driven by the introduction and expansion of kerbside garden waste collections. Local governments utilise competitive tendering processes to deliver a cost effective solution for garden waste collections and processing. This activity supported the development of a processing industry to divert this waste from landfill. Despite the benefits and opportunities of increased recovery and recycling of organic waste, the recycled organics industry has faced, and will continue to face, significant barriers and challenges. Local governments keen to incorporate food waste into the kerbside service mix need to consider the implications on the capacity and capability of industry to process mixed organic waste streams as well as the flow on effects throughout the supply chain.

Commercial and industrial (C&I) organics can range from timber and woody waste (similar to garden waste) through to liquid organic waste, the residual from manufacturing processes or as a result of commercial and industrial activities. These wastes are mainly diverted to composting as a landfill avoidance measure but also as a supplement to the composting process where liquid additives may be required to benefit the composting process. However, not all organic wastes are suitable or add benefit to the composting process and may be a contributing factor to ongoing concerns regarding environmental, human and animal health and amenity impacts as well as concern about the potential impact on the quality of manufactured products applied to land.

End product quality is highly dependent on the levels and types of contamination in the available feedstock. Despite mechanisms being in place (i.e. contamination thresholds built into contracts by processors) the market has little direct influence over the quality of feedstock which impacts on the quality of the end products.

Timber and woody waste is either mulched or chipped and sold into a strong urban amenity market. Despite this, timber remains a significant component of waste landfilled and Victoria will face challenges in the coming years to handle volumes of treated timber as well as finding suitable market solutions for stockpiled timber. Energy from waste is a considerable way from providing the solution as the cost of research and construction of appropriately sized and managed gasification or direct combustion solutions often outweighs the short to medium term economic benefits. This may change as energy prices rise and opportunities for carbon neutral solutions present themselves.

Market dynamics

Successful markets 'pull' materials through the system and the value of the product in the end market exceeds or equates to the value of raw materials and inputs. The value to communities of the availability of a kerbside collection for commingled packaging and cardboard/paper led to the development of a market for the end products, increasing their value. This has not been replicated for kerbside garden waste. In fact, the minimum cost approach to processing organic wastes has resulted in an industry that is reliant on the gate-fee for survival, which is a disincentive to improving processes and quality to improve market demand. Despite significant government and industry investment the recycled organics processing industry is continuing to be impacted by supply and demand challenges.

The inclusion of C&I waste has improved the viability of the composting industry, but has resulted in materials being accepted to the process that may increase the risk profile of facilities where they are located near urban areas. Growing community concern and complaints about facilities has resulted in increased environmental standards for the industry, and while some operators are able to meet those standards, some facilities have closed. Recent local government procurements are driving industry to establish higher technological, large scale facilities to handle increasing volumes and an increasingly diverse waste stream, however, gate fees remain low, resulting in high volumes of low quality material flooding the market at reduced price points.

Generation

Organic waste is predominately generated in municipal (households) and C&I sectors, very little organic waste is generated by the construction and demolition (C&D) sector. Food waste has been identified as a waste minimisation opportunity given the high quantity and cost to householders and businesses. Of the total amount of food waste generated (all sectors) approximately 4% is recovered[13].

Contamination presents significant issues for processing of both streams and the volume of garden waste is variable throughout the year with seasonal peaks resulting in inconsistent volumes and feedstock composition. Data collection methods for the municipal solid waste (MSW) sector are well established, however, data relating to the generation, composition and management of organic material from the C&I sector is patchy and may provide consistent volumes of clean organic feedstock, such as organic waste from food manufacturing processes to support investment.

Collection

Waste and resource recovery collection systems have evolved over the past twenty years. Local governments were instrumental in driving this change, introducing the first recycling collection service in the early 1990s. Increased community desire to use our resources more productively has seen a greater range of municipal waste management services offered to ratepayers. Increasing urban densification will require significant effort and coordination to overcome the challenges in multi-unit developments.

13 Victorian Government 2013, *Getting Full Value: The Victorian Waste and Resource Recovery Policy*.

Issues of concern

Composting practices

Many compost facilities were established in Victoria in response to the introduction of kerbside garden waste collection services. Councils keen to incorporate food waste in existing kerbside collection services will present a further challenge, both from volumes of material flowing through the system and the potential increase in contaminants, such as glass and plastics impacting on the quality of feedstock. The increasing volumes of waste and current management practices have put considerable pressure on the industry's ability to manage this waste through licenced facilities, resulting in the diversion of that waste away from licenced facilities and onto productive agricultural land to supplement the composting of farm waste. Of particular risk is the potential importation of unprocessed or partially processed organic waste of mixed origins onto farms, increasing risks associated with biosecurity, biodiversity and contamination of land and water.

Animal feed

The use of food waste for animal feed presents serious risks. The *Victorian Livestock Disease Control Act 1994*[14] prohibits the feeding of pigs with food waste that contains, or has come into contact with meat or meat by-products.

The Department for Economic Development, Jobs, Transport and Resources has identified that a number of food outlets have provided food waste to pig farmers which is in breach of current legislation. This practice presents a major risk of introducing foot and mouth disease. It was the cause of the 2001 outbreak of foot and mouth disease in the UK which resulted in over 6.5 million animals being slaughtered[15].

Feeding recycled cooking oil to ruminants (e.g. cattle, sheep and pigs) is also prohibited under the *Ruminant Feed Ban Legislation*[16] unless it has been processed, because of the risk of spreading mad cow disease (Bovine Spongiform Encephalopathy).

Emerging opportunities

Identifying the opportunities

The use of recycled organic products such as compost as a renewable energy source has the potential to assist in mitigating and adapting to climate change[17]. Using organic resources as a renewable energy source can realise a reduction in our reliance on fossil fuels such as coal, gas and oil resulting in a reduction in emissions. Recycled organic products resources such as compost provide additional benefits such as reducing the need for frequent watering, improved soil structure and reduced soil degradation[18] providing farmers with the necessary amendments to improve the productivity of their soils.

Soil beneficiation

The distribution of recycled organic products has been restricted by the availability of product in the areas where they can be of most benefit. Many farmers from the intensive agriculture sector have been making and using their own compost to improve their land as they have a readily available and constant supply of feedstock. However, the broad-acre agricultural sector in Victoria is located considerable distances from where the majority of organic waste is generated and processed. Increasing costs of transport further impedes the wider distribution of recycled organic products.

Distributed energy solutions

Food waste is readily available in all populated centres and as a residual from manufacturing processes. However, a lack of appropriate collection services and investment in tried and tested technologies has reduced the incentive to use local resources for local benefits. Small scale anaerobic digesters are commonplace in areas where strong policy drivers favour these types of technologies. It is unlikely that Victoria will replicate the European Union (EU) experience (see Appendix 1 for more information) in distributed energy solutions to the same extent and scale, however increasing the knowledge and building confidence in the effectiveness of distributed energy solutions will bring these technologies and outcomes within our reach.

Bioproducts

There are a range of emerging products produced from organic waste that have yet to gain acceptance and use in Victoria. Biofuels and bioplastics are attracting the attention of industries such as the aviation and packaging sectors. Continuing research and innovation will identify more emerging opportunities with new drugs and diagnostics in health, higher-yielding food crops in the agricultural sector, emerging biofuels to reduce dependency on oil and biobased chemical intermediates (chemicals in the value chain that facilitate the production of coatings, plastics, detergents and more).[19]

14 Victorian Government, *Livestock Disease Control Act 1994*. Available from: <http://www.depi.vic.gov.au/agriculture-and-food/pests-diseases-and-weeds/animal-diseases/poultry/newcastle-disease/livestock-disease-control-act-1994> [1994].

15 Department for Environment, 'Origin of the UK Foot and Mouth Disease epidemic in 2001', Food and Rural Affairs, United Kingdom. Available from: <http://archive.defra.gov.uk/foodfarm/farmanimal/diseases/atoz/fmd/documents/fmdorigins1.pdf> [June 2002].

16 Victorian Government 2005, *Agricultural and Veterinary Chemicals (Control of Use) (Ruminant Feed) Regulations.*

17 IPCC, 2014: Summary for Policymakers. In: Climate Change 2014: Mitigation of Climate Change. Contributions of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Edenhofer, O., R. Picks-Madruga, Y. Sokona, E. Farahani, s. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen

18 Boldrith, A., Anderson, J.K., Møller, J., Christensen, T.H. & Favoino, E. (2009) Composting and compost utilization: accounting of greenhouse gases and global warming contributions. Waste Management and Research, 27: 800-812.

19 The White House (2012) National Bioeconomy Blueprint, US Government, Washington D.C.

Organics priorities and actions

A review of past and current practices both locally and internationally, supported by feedback received during the engagement and consultation process, identified the barriers and opportunities to inform the establishment of seven strategic directions. Analysis of these barriers and opportunities determined the appropriate government actions in the next five years.

Best practice environmental, human and animal health and amenity management

Protection of the environment, human and animal health and amenity requires a strong, clear policy and legislative framework. In recognising the long-term impact of organic waste in landfills, the Victorian Government has signalled its intent through the SWRRIP that:

- the government will continue to use appropriate interventions to stimulate markets for recovered resources[20]
- the long-term purpose of landfills is to receive only treated, residual waste[21].

Within a relatively short period the management of organics has evolved to provide a solution for many different types of organic waste. Organic processors have started to adapt the technology and management practices to manage the range of organic waste with some success. However, odour from organic processing continues to be a key concern of communities.

Best practice management and processing of organic waste can result in minimal impact on the environment, human and animal health and amenity, as well as creating a quality assured product for use in Victorian agriculture, horticulture and urban amenity markets. Further work is required to understand the implication of the application of some organic wastes to the health of our soils and waterways and to better understand the benefits.

Five year actions

The Victorian Government will:

- develop and implement an organic waste management framework that protects the environment, human and animal health and amenity
- undertake research that determines the impacts of the application of unprocessed/processed waste to land.

20 Victorian Government, *Statewide Waste and Resource Recovery Infrastructure Plan*, 2015
21 Victorian Government, *Statewide Waste and Resource Recovery Infrastructure Plan*, 2015

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• Legislative framework is clear and consistently applied • A framework for organics mangement is proportionate to the environmental, human and animal health risks • Risk profile for products derived from organic waste enables industry to improve product quality for end use	• Best practice environmental standards for organic waste management are in place and driving better practice and higher quality product	• Environmental, public health and amenity impact of organics waste management are eliminated

Sustainable markets

A significant barrier to the growth of organic waste and resource recovery has been the absence of strong and sustainable end markets for recycled organic products.

The single end market focus for recycled organic products has presented significant challenges for producers of recycled organic product. The establishment of organic waste management facilities in and around the metropolitan centres has resulted in large quantities of low value recycled organic material being produced significant distances from the market, (e.g. broad acre agricultural sector, viticulture, horticulture). The additional cost of transport further erodes the profitability of the recycled organic industry.

The perception of poor quality product, a remnant of highly contaminated feedstock that was difficult to clean in the early years of municipal garden waste kerbside collections, has undermined the development of a strong market. Primary producers (agriculture and food) are unwilling to apply products that have unacceptable levels of contamination and have low confidence in the ability of the product to improve their soil conditions.

The lack of information regarding the benefits of recycled organic products (such as compost) and the lack of evidence for the rates of application for different soil conditions, weather conditions and producer requirements has been identified as a market information barrier.

Five year actions

The Victorian Government will:

- work with industry to develop standard quality assurance processes and standards for recycled organic products
- provide industry with information that enables them to produce higher quality products for markets through the development of product profiles/specifications
- work with end markets to understand/demonstrate the benefits of using organic products
- identify the barriers to increasing the growth of markets for recycled organic products and work with others to develop the right conditions for markets to grow and mature.

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• Quality of recycled organic products is increasing demand from existing markets • Benefits of recycled organic products are better understood	• Demand for recycled organic products is improving the quality of products	• Market demand drives product development and innovation • Victorian soil condition is improved because of the use of quality products

Leverage existing assets

The siting of existing facilities, close to feedstock supplies, has enabled the growth of the organic processing industry, particularly in the metropolitan region. However urban encroachment and an increase in the use of odorous feedstocks has increased the amenity risks associated with the management of organic waste.

An increase in the number of complaints against organic management facilities is making it more difficult for the organic processing industry to operate on some existing sites, despite good management practices being in place. However, there are a number of highly protected sites in Victoria that have extensive buffers and a social licence to operate that have the potential to support a growing, sustainable organic recycling industry (e.g. waste water treatment facilities). This supports the 'hubs and spokes' model for waste and resource recovery infrastructure, as outlined in the SWRRIP.

Constraints on the current siting of some facilities will mean that the ability for processers to diversify their product range will be challenging and they will not be in a position to participate in the aggregation or consolidation of organic waste streams in the future.

Five year actions

The Victorian Government will:

- identify appropriate co-location sites, through the development of Regional Waste and Resource Recovery Implementation Plans (RWRRIPs) that have the appropriate buffers and social licence to operate to receive, process or treat organic waste
- identify locations and volumes of available biomass across regional Victoria
- identify opportunities for the aggregation and/or consolidation of organic waste streams, particularly from the C&I sector to support business and industry investment in organic waste management facilities
- provide clear guidance on the legislative requirements to facilitate co-location opportunities for organic waste management facilities on existing waste and resource recovery sites.

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• RWRRIPs identify appropriate co-location of organic management facilities • Clear guidance on legislative and regulatory framework for organics waste management	• Increased number of organic management facilities are co-located with appropriate, protected buffers	• Organic waste management facilities are not subject to community concern

Identify future needs

The market conditions for organic waste management have remained relatively stable since the market was established. While there are some advanced processing options in place these are the exception rather than the rule. A single end market for recycled organic material and complex regulatory framework has, in some cases, stymied the development of alternative uses and markets for recycled organic waste.

Victoria has an opportunity to evaluate the progress, challenges and issues experienced in similar markets and use that knowledge to determine the optimal configuration of technologies to handle the volumes and composition of organic waste into the future.

Five year actions

The Victoria Government will:

- provide a framework to enable the full analysis of alternative options for organic processing systems that considers the challenges of metropolitan, regional and rural Victoria and includes consideration of location, feedstock composition, collection, processing options, products, markets and regulation
- clarify process and opportunities for energy generation from organic resources for local benefit
- conduct a horizon scan to identify potential emerging products made with recovered organics and produce a report on emerging technologies, products and opportunities for organic resources
- undertake research to understand the implications of emerging organic processing options.

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• Local government, business and industry are supported to deliver best local outcomes • Market is informed about innovative organics management options	• Increase in the uptake of innovative products and technologies	• Local organic resource management infrastructure is financially viable and is supporting local economies

Education to facilitate change

Waste education is currently being delivered by state and local government, WRRGs, the waste and resource recovery industry, schools and community organisations.

Despite broad delivery and extensive investment, success in addressing critical issues has been variable. Education is pivotal in addressing one of the prime barriers to market development for the composting industry – contamination (namely, plastic, glass and debris) which affects the quality of the end product. Similarly, variable community understanding and support of the need for waste-related infrastructure can be a barrier to investment and effective ongoing operations.

An uncoordinated and inconsistent approach to education across the state reduces its effectiveness, often sending mixed messages to communities. There are also no clear guidelines for the assessment of the most effective approach to education as a solution to particular problems, or whether or not education is, in fact, the most appropriate mechanism to address a particular issue.

There is also a clear gap in the provision of education to C&I waste generators, and limited and uncoordinated guidance or support for them, in the provision of education to their staff and/or customers.

Five year actions

The Victorian Government will:

- implement activities identified in the *Victorian Community and Business Waste Education Strategy* that increase community and business awareness of food waste and promote food waste avoidance
- support local governments, businesses and industry to minimise organic waste and reduce contamination in organic waste streams
- assist businesses to understand how to improve the productivity of organic materials and avoid unnecessary waste
- address community concerns regarding waste treatment processes to ensure that localised waste treatment options for organics are accepted, and the impact of organic waste on our environment and the social and economic benefits of recovering organic wastes are understood and accepted
- work with other government agencies to target sectors that:
  - dispose of organics inappropriately to inform them of alternatives and/or provide them with the information they require to dispose of organic waste within the current legislative frameworks
  - receive untreated organic waste to inform them of the associated risks and appropriate management, regulatory or legislative requirements.

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• Consistent education approach reduces contamination in organic wastes • Better quality organic waste is available to the market • Less organic waste ending up in landfill • Organic waste is disposed of appropriately	• Organic waste infrastructure is not subject to community concern • Organic resources are used more efficiently	• Demand for organic resources is exceeding supply

Building collective knowledge

Organics management is a suite of complex interactions that occur along the supply chain for recovered organics. It is often a disconnected process of multiple players with different priorities.

Local governments as a result of kerbside collection systems are a participant at multiple stages in the supply chain and have built a suite of valuable knowledge in a variety of areas, while industry and businesses have alternative perspectives and understanding.

The successful operation of the supply chain requires a collective understanding of organic waste generation, collection, processing, products and end markets. While each sector collects and uses their unique knowledge and intelligence for better outcomes, the disconnected nature of organic generation and waste management has resulted in gaps in data, knowledge, market intelligence and outcomes.

A one-size-fits all approach to organic waste management fails to recognise the unique challenges of service delivery in metropolitan, regional and rural settings or the opportunities for managing organic waste for local benefits.

Five year actions

The Victorian Government will:

- provide local government and industry with the information and support required to build their capabilities in managing organic wastes, including:
  - a guide to organic waste collection services that assists local government to determine the most effective and efficient collection services
  - an economic modelling tool that considers all options for organic waste management
  - a review of the *Guide to Best Practice for Organics Recovery* (2009)
  - identify commercially viable volumes and quality of organic waste streams suitable for processing
  - produce procurement guidelines that consider supply chain implications of collection systems, transport systems, processing/treatment options and end market use of organics
  - develop contract mechanisms for metropolitan and regional organics management that specify contamination management controls for collectors, processors and products (including meeting minimum product standards)
  - investigate mechanisms for including 'buy-back' options in organics management contracts - for either compost or energy.

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• Local government and industry adopt new practices to improve the recovery and management of organic waste • Waste and resource recovery infrastructure plans identify organics infrastructure needs • Local government procurement builds in end market considerations • Organics management facilities demonstrate best practice site management	• Advanced organics management and processing options are environmentally and economically viable and are being implemented	• Local government and industry partnerships deliver local solutions for social and economic benefit • Value of organic resources exceeds the cost of disposal

Streamlined governance and strong leadership

The regulatory framework for the governance of organic waste is complex. It spans across generation, transport, treatment, product manufacture and end uses. It extends across all levels of government; Commonwealth, state and local. Within the Victorian Government it crosses multiple portfolios with varying levels of influence including environment, planning, transport, energy, agriculture and business.

The most common theme to emerge from consultation was the lack of clarity and the complex relationships between different departments in government which made it difficult for local government, businesses and industry to navigate. As a result there is confusion about the requirements for best practice organics management.

Stakeholders are seeking a single entry point to government that collates information about the activities, priorities, legislative requirements, policies and strategies across government to facilitate better decision making for investment in organic recovery and recycling.

Five year actions

The Victorian Government will:

- establish and coordinate a working group consisting of representatives from other government agencies with an interest or influence on organic waste management to ensure that government policies, strategies and interventions are aligned to achieve the outcomes of the strategy
- provide clear legislative, regulatory and planning requirements for best practice organics management to ensure clarity for decision making in organic waste management
- provide guidance on the government pathways that enable local government, industry and community to plan for the appropriate management of organics.

Strategic outcomes

5 YEARS	10 YEARS	30 YEARS
• Local government, industry and community have clear pathways for organics management that improve the management of organic waste	• Advanced organics management and processing options are environmentally and economically viable and are being implemented	• Policy and market settings support innovative technological advances for organics management

Attachment 1

International trends

The European Union (EU) directive on waste establishes a strong regulatory environment that required significant and immediate changes to how waste is managed in the EU. Investment in new technologies has been significant and the result is a complex suite of technologies fed by large centres of population, providing additional community benefit through the generation and distribution of heating and power. The primary driver has been increasingly ambitious landfill reduction targets over time and punitive fines for every tonne of waste landfilled over the target. This has incentivised significant multi-billion dollar investments in new infrastructure. The complex mix of waste infrastructure is evidence of this working. Multiple bins and a community well versed in source separation enables the system to function; however, there have been challenges.

In the United Kingdom (UK) alone, there are 233 anaerobic digester plants with a capacity to treat 5.4 million tonnes of material. Of these, 51 handle mixed organic waste including food, 36 handle farm waste and 146 facilities operate on sludge generated by waste water treatment. In November 2012 there were a further 222 planning applications for anaerobic digestion facilities in the UK[22]. A recent market analysis of the available feedstock for anaerobic digester plants in the UK found that with the additional infrastructure planned there is likely to be an oversupply of anaerobic digester capacity coming online which will increase the competition for quality and available feedstock[23].

Similar growth in organic recovery is seen across Europe. In 2011 approximately 14 million tonnes[24] of organic waste was handled by more than 1,000 composting facilities and approximately 85 anaerobic digesters[25]. Of this, over four million tonnes was collected from municipal waste collections[26]. Within a strong EU regulatory environment, Germany is continuing to implement strong measures to ensure that quality feedstock is available to the market and EU targets are met with the introduction of a mandatory separate organic waste collection at the national level (in January 2015) which is anticipated to reduce residual household waste by one-third. France has recently (May 2015) announced a ban on supermarkets destroying unsold food and under new laws will have to donate it to charities or to other recovery options. Supported by a food minimisation program it is part of France's commitment to halving the amount of food waste by 2025[27].

The United States of America (USA) leads the world in landfill gas collection, with over 300 biogas-generating landfills in operation, but relatively few composting sites sort organics from municipal solid waste (MSW) or accept source separated household wastes, and the strong public policies driving uptake of high-technology options for organics processing in Europe are "largely lacking in the USA"[28]. However, a number of research groups are actively involved in adapting and improving existing MSW anaerobic digestion systems. There are currently 25 USA states that ban some form of organics disposal in landfills[29], while 34.5 per cent of organic waste (87 million tonnes) is recycled through composting[30].

Meanwhile, Canada produces about six million tonnes of organic waste per year, 17 per cent of which is processed by composting across about 350 facilities[31]. Garden bin collections are a significant component of MSW diversion, with materials largely going towards a combination of composting and waste to energy processors. Canada has seven waste to energy facilities with a combined capacity of over 127 Megawatts[32]. Research undertaken by Environment Canada[33] identified a range of issues and challenges relating to the choice of processing technology, facility size and capacity, regulatory barriers and constraints, financing risks, community expectations and the economics of projects.

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Sustainability Victoria
Level 28, Urban Workshop,
50 Lonsdale Street, Melbourne VIC 3000
Phone (03) 8626 8700
sustainability.vic.gov.au

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