



ACT
Government

Environment and
Sustainable Development



ACT Waste Management Strategy

Towards a sustainable Canberra

Reducing waste and recovering resources to
achieve a sustainable, carbon-neutral Canberra

2011–2025




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MESSAGE FROM THE MINISTER

Waste management is an integral part of a sustainable Canberra and is an issue that affects every individual and organisation in the ACT.

We each play a role in the generation of waste and we all benefit from more sustainable waste management that reduces pressure on raw materials, reduces greenhouse gas emissions and creates a cleaner place to live.

The ACT is one of the leading jurisdictions in waste management in Australia with over 70% of waste generated in the ACT reused or recycled. Nevertheless, the Government remains committed to doing more and progressing towards its goal of zero recoverable waste sent to landfill.

The ACT has advantages in waste management. The Territory is relatively compact and has an environmentally aware community that supports government and business efforts in recycling. However, the Territory's relatively affluent and growing population also contributes to increasing levels of waste generation.

The government remains focused on working closely with the community and business to implement efficient waste management solutions. The ACT Waste Management Strategy 2011–2025: Towards a Sustainable Canberra will replace the existing No Waste by 2010 Strategy as the guiding document for the development of solutions to waste issues in the ACT.



I trust that the Canberra community will support this Strategy and look for ways, in their own lives, that they can reduce waste generation and increase recycling efforts and, by doing so, contribute towards making Canberra a more sustainable city. I commend this Strategy to the Canberra community.

A handwritten signature in black ink, appearing to read 'Simon Corbell'.

Simon Corbell MLA
Minister for the Environment and
Sustainable Development

*The ACT Waste Management
Strategy 2011–2025 will make
a significant contribution
to the ACT Government's
vision for Canberra*

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1.

INTRODUCTION



1. INTRODUCTION

The ACT Waste Management Strategy 2011–2025 (the Strategy) sets a clear direction for the management of waste in the ACT towards 2025. It builds on the success of the No Waste by 2010 Strategy, released in 1996, that successfully reduced the waste sent to landfill from nearly 60% of total waste in 1995–96 to below 30% by 2003–04.

The Strategy encompasses wastes from the household, commercial and industrial, construction and demolition sectors and biomass from wood and garden waste.

The goal of the ACT Waste Management Strategy 2011–2025 is to ensure that the ACT leads innovation to achieve full resource recovery and a carbon neutral waste sector.

This goal is supported by four key outcomes and identifies 29 strategies that will enable the achievement of the outcomes. The objectives are:

Outcome 1: less waste generated

Outcome 2: full resource recovery

Outcome 3: a clean environment

Outcome 4: a carbon neutral waste sector

This Strategy seeks to build on what the ACT is currently doing to manage waste resources and focuses on changes that can achieve the greatest benefits in terms of resource recovery, climate change and environmental amenity.

Better waste management is an opportunity to:

- relieve pressure on raw materials through the reuse of products and recycling of paper, glass, plastic, organic and other material;

- reduce greenhouse gas emissions; and
- ensure Canberra remains a clean safe place to live and enjoy through reduced litter, best-practice hazardous waste management and the provision of safe landfill as an option of last resort.

The ACT Waste Management Strategy 2011–2025 recognises waste as a resource. Deriving value from waste resources requires innovations by government and industry in order to transform waste into valuable products.

Technology in waste management has evolved since the 1990s when the No Waste by 2010 Strategy was first developed. New waste sorting and processing facilities provide more cost effective ways of achieving resource recovery and greenhouse gas abatement. New technologies for creating energy from waste (or bioenergy) can produce safe renewable base-load power for approximately 6% of the ACT's needs (as of 2010). Innovative bioenergy technologies also offer the potential to manufacture valuable products such as biochar or liquid fuels from wood, biosolids and other materials the ACT currently underutilises or inters in landfill.

The Strategy also recognises waste management as a system that is central to the ACT economy. Managing waste is an issue for all households and businesses. The ACT has a well developed waste management sector that generates significant employment and economic activity through the collection, transportation, sorting and processing of waste. Resources recovered are then reused in economic production.

FIGURE 1: THE ACT WASTE MANAGEMENT SYSTEM

The waste management hierarchy classifies waste management strategies according to their order of importance and is cornerstone of most waste minimisation strategies. The aim of the waste hierarchy is to extract the maximum practical benefits from products while generating the minimum amount of waste. The hierarchy employs strategies which aim to:

1. avoid products becoming waste (reduce and reuse);
2. find an alternative use for waste (recycle and recover); and
3. ensure safe and appropriate disposal as a last resort.

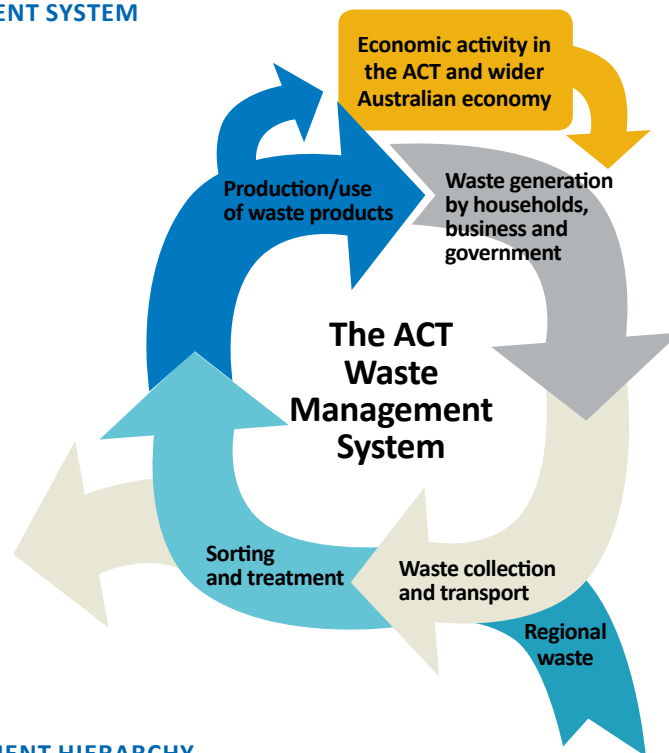
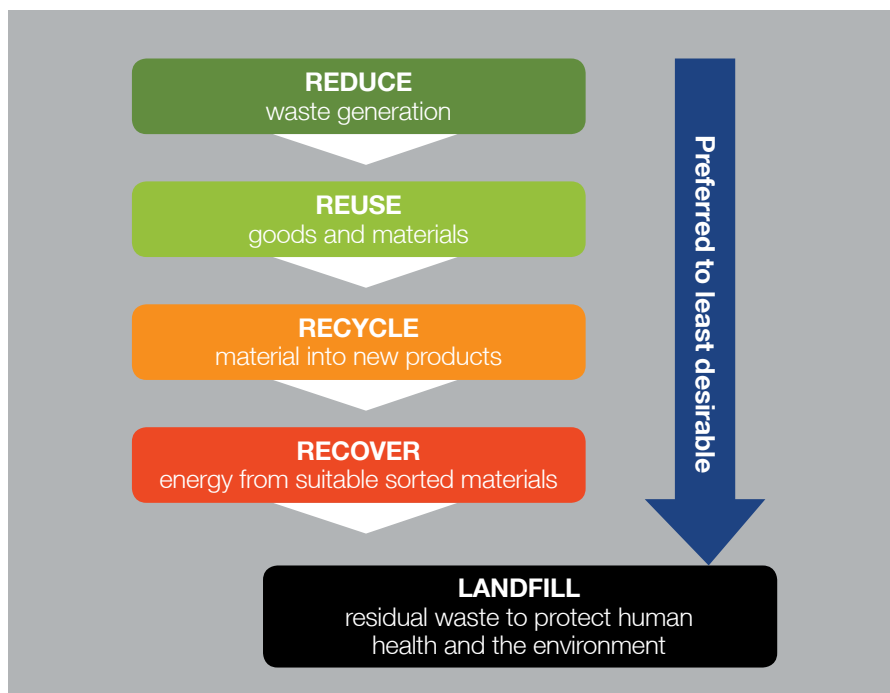


FIGURE 2 – THE ACT WASTE MANAGEMENT HIERARCHY



The waste hierarchy remains an important principle for waste management in the ACT and is embedded in ACT waste legislation. This ensures that the ACT's waste management strategy presents a holistic waste management system approach from the initial generation of waste through to its ultimate disposal

with opportunities to reduce waste at each step of the hierarchy.

The ACT Waste Management Strategy 2011–2025 has been finalised following the release of a draft strategy in December 2010 and a subsequent public and industry consultation process conducted in early 2011.

ACT WASTE MANAGEMENT STRATEGY 2011–25

GOAL: THE ACT LEADS INNOVATION TO ACHIEVE FULL RESOURCE RECOVERY AND A CARBON NEUTRAL WASTE SECTOR

OUTCOMES	1. Less waste generated	2. Full resource recovery	3. A clean environment	4. Carbon neutral waste sector
TARGET	<ul style="list-style-type: none"> The growth in ACT waste generation is less than the rate of population growth. Reuse of goods expands in the ACT. 	<ul style="list-style-type: none"> The rate of resource recovery increases: <ul style="list-style-type: none"> over 80% by 2015. over 85% by 2020. over 90% by 2025. 	<ul style="list-style-type: none"> ACT leads Australia in low litter and incidents of illegal dumping. ACT's natural resources are protected and, where feasible, enhanced through waste management. 	<ul style="list-style-type: none"> The ACT Waste Sector is carbon neutral by 2020: <ul style="list-style-type: none"> energy generated from waste doubling by 2020; waste resources are recovered for carbon sequestration by 2020.
STRATEGIES	<ol style="list-style-type: none"> 1.1 Awareness, education and action. 1.2 Support for community gardens and home composting. 1.3 Ban single-use plastic shopping bags. 1.4 Reduced packaging waste. 1.5 Promote reuse through ACT businesses and charities. 1.6 Promote reuse through bulky waste collection service. 1.7 Encourage on-site reuse for construction & demolition waste. 	<ol style="list-style-type: none"> 2.1 Boost commercial waste recycling. 2.2 Recover organic and residual waste resources. 2.3 Develop markets for organic and residual waste resources. 2.4 Provide free drop-off facilities for electronic waste. 2.5 Promote education and active recycling. 2.6 Government procurement. 2.7 Public place recycling. 2.8 Public event recycling. 2.9 Develop markets for recyclable materials and strengthen regional connections 2.10 Disincentives to landfill including appropriate pricing and regulation. 	<ol style="list-style-type: none"> 3.1 Reduce litter and dumping through laws and raising awareness. 3.2 National approaches to litter management. 3.3 Development of the Hume Resource Recovery Estate. 3.4 Maintain a safe and environmentally responsible landfill to meet the ACT's future needs. 3.5 Manage hazardous waste. 3.6 Increase soil reuse and rehabilitation. 3.7 Review waste operations and urban planning requirements for multi-unit dwellings. 	<ol style="list-style-type: none"> 4.1 Methane capture from landfill. 4.2 Minimise organic waste to landfill. 4.3 Expand bioenergy generation and investigate new energy-from-waste technologies to generate energy. 4.4 Increase recycling to avoid greenhouse gas emissions. 4.5 Ensure energy efficient waste collection and transport solutions.

2.

WASTE ISSUES IN THE ACT



2. WASTE ISSUES IN THE ACT

Growing importance of sustainability and climate change

Originally, managing waste was about protecting human health and maintaining environmental amenity. In the 1990s, sustainable development came to prominence and waste recycling became a priority.

In October 2010 the ACT Legislative Assembly passed the *Climate Change and Greenhouse Gas Reduction Act 2010* to address concerns about climate change. The Act establishes targets for greenhouse gas emission reductions in the ACT including:

- zero net greenhouse gas emissions by 2060;
- 80% below 1990 levels by 2050; and
- 40% below 1990 levels by 2020.

While the waste sector only accounts for around 3% of ACT greenhouse gas emissions, it has the potential to play a significant role in reducing the Territory's emissions profile. Electricity generated from waste streams, such as biomass and organic wastes, can displace electricity sourced from the National Electricity Market which is

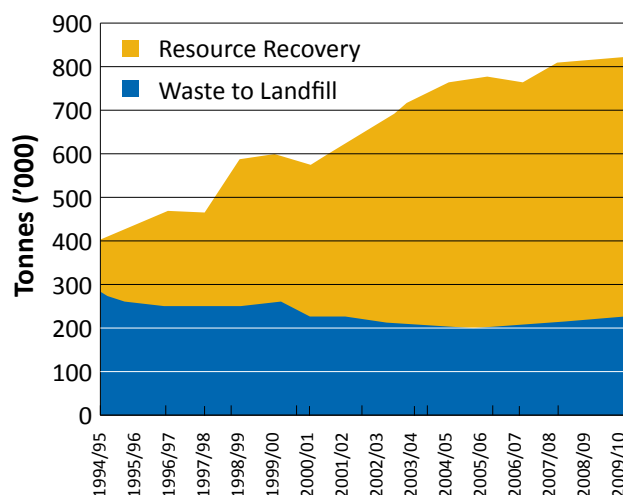
predominantly fossil fuel based. Energy-from-waste technologies can have zero net emissions due to the bio-organic origin of the fuel source. In addition, energy-from-waste technologies reduce the amount of waste going to landfill, thereby reducing greenhouse gas emissions attributable to the waste sector.

Increasing amount of waste to be managed

The amount of waste generated in the ACT grew on average by over 5% per year during the past 15 years. The amount of waste generated is affected by factors including population growth, income and consumption levels, consumer preferences for packaging and single use containers, and the life cycle of goods such as televisions, computers and other electronic items. In 2009–10 the total amount of waste generated in the ACT was 817,000 tonnes with 229,000 tonnes interred to landfill.

Growing waste generation increases the challenge of reducing the amount of waste sent to landfill. Figure 3 illustrates this challenge of reducing rates of waste to landfill while total waste generation continues to increase.

FIGURE 3: TOTAL WASTE GENERATION AND WASTE TO LANDFILL



Between 2007 and 2019 the ACT's population is projected to increase by around 50,000 to nearly 405,000.² The ACT also acts as a regional waste hub, processing waste from Queanbeyan and the surrounding region, whose populations are also growing. The ACT's population is expected to continue to age,³ and the average number of people in a household is expected to decrease from 2.55 in 2006 to 1.75 by 2019.⁴ Future waste management will need to take into account the growing population as well as the changing characteristics of the population and how we live.

The rate of resource recovery has plateaued

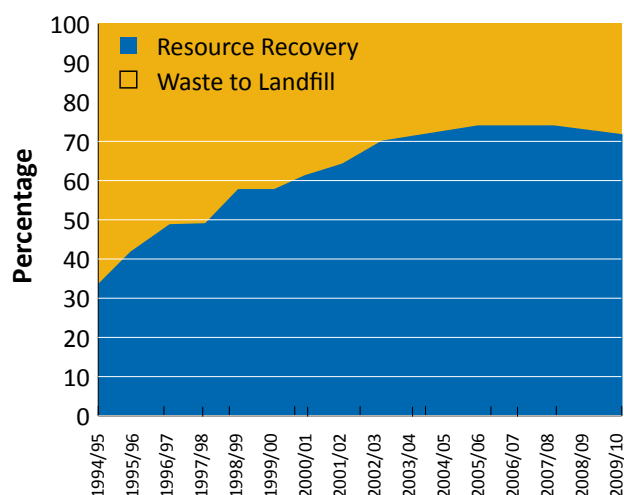
Since 1995 the ACT has more than doubled the amount of resources

recovered and recycled from waste, rising from 185,000 tonnes in 1995–96 to 588,000 in 2009–10.

The key steps that led to this success are highlighted below. The ACT has achieved one of the highest rates of resource recovery in Australia, at over 70%. While this rate peaked at 75% in 2005–06 it has since declined but remains at over 70% (see Figure 4).

More resources are being recovered each year, but the increasing generation of waste has kept the resource recovery rate at just over 70% since 2003–04. New infrastructure investments will be required to increase the rate of resource recovery further.

FIGURE 4: RATE OF RESOURCE RECOVERY IN THE ACT



2 ACT Government population projections—www.cmd.act.gov.au/_policy_strategic/actstats/projections/act

3 The percentage of the ACT's population aged 65 years and over is expected to rise from approximately 10% in 2007 to 14.3% in 2019 see http://www.actpla.act.gov.au/_data/assets/pdf_file/0007/7675/Canberra_at_2006_Census.pdf.

4 ACT Waste Management Strategy 2011–2025: Towards a Sustainable Canberra

Resource recovery in the ACT

- 1 During the 1980s a network of regional recycling drop off centres was established for recyclable material.
- 2 In 1994, the yellow-top bin was introduced into the household collection service. Waste collected in the yellow-top bin is sorted at a Materials Recovery Facility (MRF) in the Hume Resource Recovery Estate. By 2009–10 this improved system of collection had led to 34,000 tonnes a year of household material being recovered and recycled. The operation of the MRF uses light-sensing technology and automation and this has increased the resource recovery of many plastics and coloured glass.
- 3 Private sector investment in construction and demolition waste sorting facilities increased recovery and recycling of cement, bricks, metals, plastics, wood and other products. The rate of resource recovery in the construction and demolition sector increased from less than 50% in 1995–96 to over 90% diversion from landfill in 2008–09. In 2009–10 resource recovery from this sector fell to 85% due in part to the construction boom generating more wood waste than there was a market for.
- 4 Composting of garden waste significantly increased in the early 1990s due to the activities of commercial composters. The ACT has facilities at West Belconnen, Mugga Lane and Mitchell that Canberra residents deliver garden waste to which is then recycled into composts. In 1999, private drop-offs to these facilities further increased with the introduction of disincentives to send garden waste to landfill. These disincentives included landfill fees and charges as well as regulations banning garden waste from government bins under the *Waste Minimisation Act 2001*. Over 200,000 tonnes per annum of green waste (over 90% of ACT's total garden waste) is now recovered, processed and sold as high-value potting mixes and garden mulch.

3.

AREAS FOR BETTER RESOURCE RECOVERY



3. AREAS FOR BETTER RESOURCE RECOVERY

The ACT is estimated to have produced over 800,000 tonnes of waste in 2009–10, equivalent to over 2.5 tonnes for each ACT resident, the second highest per capita rate in the country after Western Australia.

The key sources of waste generated in the ACT are (in order of volume):

- **construction and demolition waste** generated by the building and construction industry;
- **garden waste** derived from households and the commercial management of gardens and landscapes;
- **commercial waste** generated by businesses; and
- **household waste** generated by around 140,000 households.

Other sources of waste, which to date have been managed separately to the ACT's municipal solid waste management system, are:

- **wood waste** from Canberra's urban green-space derived from urban forest management; and
- **biosolids** generated by the ACT's sewage treatment system.

The flows of waste (waste streams) in the ACT from waste generation, collection, sorting, treatment and markets are shown in Figure 5 and further detailed at Annex 1. In developing the draft ACT Waste Strategy the following waste streams were identified as key areas for improvement.⁵

Commercial sector waste

The commercial sector sent 103,000 tonnes to landfill in 2009–10. This

equates to almost half of the total waste sent to landfill.

- 30–40% of this waste going to landfill comprises readily recyclable materials such as paper, plastics and glass. Diverting this waste from landfill to recycling markets is the most cost effective option for increasing resource recovery in the ACT.
- 10–20% of commercial waste is organic waste, such as food and vegetation, and is most effectively managed in conjunction with similar wastes from the household sector.
- 40–50% of commercial waste is low value material with high energy content, such as contaminated paper and wood waste, which are an ideal resource for energy generation.
- A small proportion of material would remain that is not readily recoverable and will need to be sent to landfill.

Household sector waste

The contents of the green-topped bin collected weekly from households is transported directly to landfill and accounts for around 25% (60,000 tonnes) of waste sent to landfill.

- Approximately 40–50% of this waste is organic waste and is best managed in conjunction with organic waste from the commercial sector.
- 10–20% is readily recyclable materials such as aluminium cans and glass that has not been correctly sorted into the yellow top bin.
- 20–30% is low value materials with a high energy content which are an ideal resource for energy generation.
- The remainder is material that is not readily recoverable and will need to be sent to landfill.

⁵ URS EcoWaste: Economic modelling of options for waste infrastructure in the ACT (August 2010)

Wood waste

There has been a significant increase in stockpiling and landfilling of wood from the construction and demolition sector in recent years. Alternative resource markets such as energy-from-waste may create greater stability in the wood market and reduce the quantity of wood waste being sent to landfill.

that manufacturers and/or importers of these products take responsibility for collection and recycling of their products.

It is likely that future national product stewardship programs will be implemented for additional items including tyres, batteries, and fluorescent lights.

Extended producer responsibility for electronic and other wastes

Televisions and computers from the household and commercial waste sector have been identified as specific waste items that would benefit from better management. Through national product stewardship schemes these items can be managed in a way so

Hazardous wastes or non-recoverable wastes

Hazardous wastes include spent radioactive medicines, potentially infectious materials from hospitals and asbestos from demolition sites. Hazardous and non-recoverable wastes are an important target area for management; these are covered in more detail below in strategy 3.5.

Waste generation and recovery in the ACT

Construction and demolition waste

Construction and demolition activity in the ACT generated an estimated 285,000 tonnes of waste in 2009–10. This waste stream consists of a diverse set of resources including timber, concrete, asphalt and dirt. Over the last decade several Material Recovery Facilities (MRFs) have been built in the ACT that specialise in sorting construction and demolition waste into valuable resource streams for local and regional use (building and road construction).

This technology and the deterrent of high landfill prices has meant that the ACT is now diverting over 85% of the construction and demolition waste stream with only 27,500 tonnes of waste disposed of in landfill in 2009–10. However, demand for recovered wood has not matched production in recent years leading to a significant increase in stockpiling and landfilling. Energy-from-waste technologies can create a sustainable market for this wood and support wider resource recovery from the construction and demolition sector.

Garden waste

Garden waste includes prunings, leaves and grass clippings from household gardens and parks. High participation in the delivery of this garden waste has led to over 90% of garden waste being diverted from landfill with a significant portion turned into high value composts by private operators. Garden waste recycling has increased from 65,000 tonnes in 1995–96 to 187,000 tonnes in 2009–10. This high level of garden waste recovery matches international best practice.

Waste generation and recovery in the ACT (continued)

Commercial waste

The commercial sector including government agencies, retailers, businesses, offices and restaurants sent approximately 103,000 tonnes of waste to landfill in 2009–10. Unlike households which receive a government collection service, businesses are responsible for arranging their own waste and recycling services through commercial providers. There are several commercial and industrial service providers operating in the ACT. In using these services, some ACT businesses separate and recover dry recyclables such as paper and cardboard.

Increased uptake of the ACTSmart Business and ACTSmart Office recycling programs along with the construction and operation of a new mixed-commercial-waste Material Recovery Facility (Commercial MRF) from 2014 should significantly increase resource recovery from this sector.

Household waste

Household waste is collected and transported by government-funded kerbside collection services or delivered to resource recovery centres by residents. In 2009–10 61,000 tonnes of household waste from ACT households was disposed of in landfill. The ACT waste management system also receives waste from Queanbeyan households, which accounted for an additional 8,000 tonnes to ACT landfill in 2009–10.

Wood waste

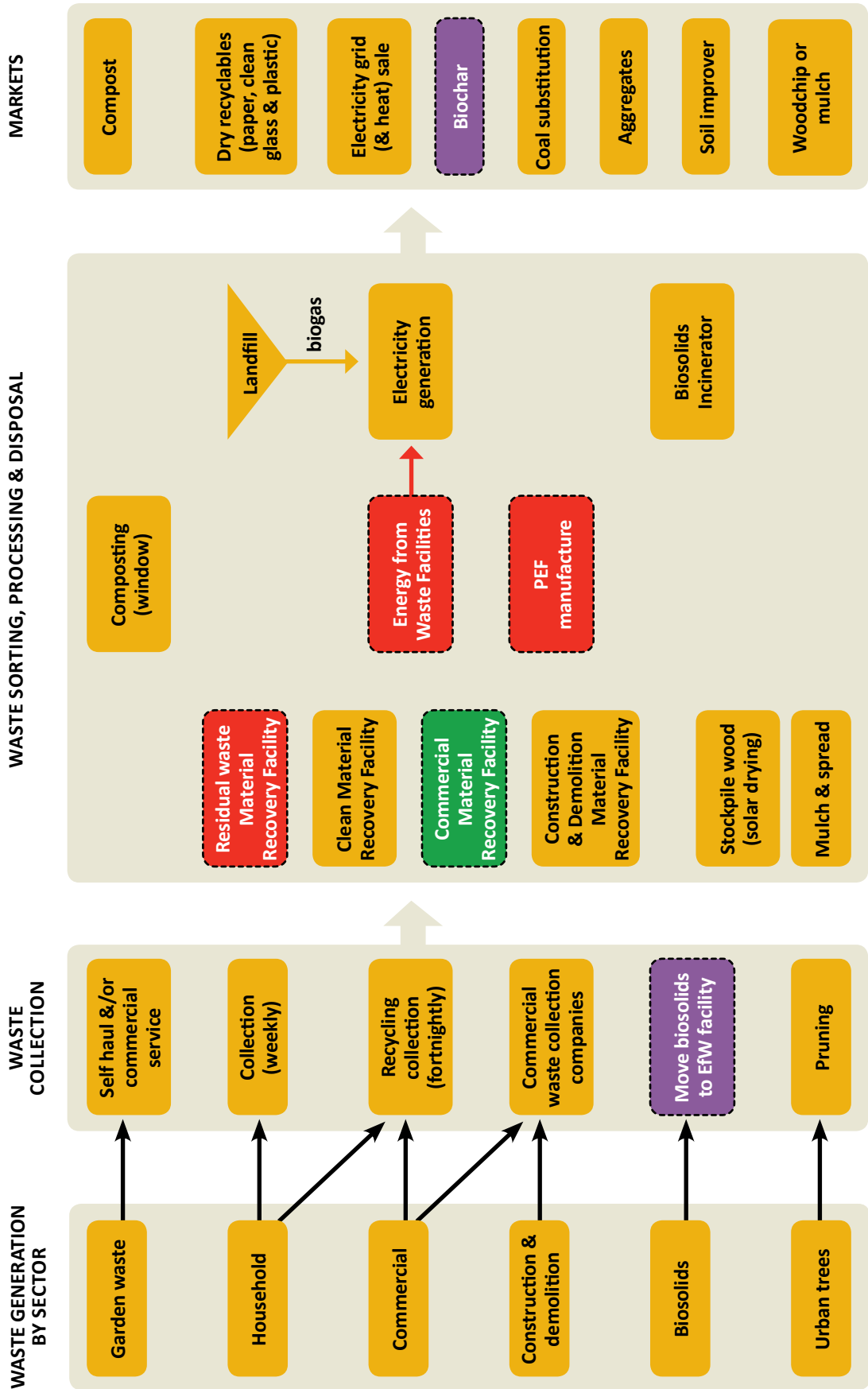
Currently wood waste collected from parks and urban tree management activities is primarily used for mulch. Approximately 30,000 tonnes of urban logs and prunings are harvested each year. However, the age profile of the urban forest will mean a significant increase in tree replacement over the next 15 years resulting in greater quantities of wood waste. This wood could be used to generate renewable energy where higher value uses are not available.

Biosolids⁶

Biosolids are a by-product of sewage treatment with 13,500 dry tonnes being generated by the ACT each year. These continue to be managed by ActewAGL and are a component of waste that has not previously been considered as part of the municipal waste management system. However, biosolids represent a significant organic resource that has potential synergies if incorporated into the ACT waste management system. ActewAGL's Strategic Review of Sewage Treatment Services includes options for the more sustainable management of biosolids.

6 Note: Biosolid waste management is not included in waste to landfill or recycling statistics

FIGURE 5: THE ACT'S WASTE MANAGEMENT SYSTEM WITH POTENTIAL OPTIONS FOR GREATER RESOURCE RECOVERY



Legend: Yellow boxes represent existing waste services, facilities and markets. Dashed boxes represent new waste options.



4.

OUTCOME ONE—LESS WASTE GENERATED



4. OUTCOME ONE—LESS WASTE GENERATED

The government will:

1. Educate and conduct awareness raising campaigns to encourage waste avoidance and product reuse.
2. Support community gardening and home composting.
3. Ban single-use plastic shopping bags.
4. Pursue reductions in waste packaging through the Australian Packaging Covenant, government procurement and by working with local businesses to reduce packaging.
5. Promote reuse through ACT businesses and charities.
6. Promote reuse through the bulky waste collection trial.
7. Encourage on-site reuse for construction and demolition waste.

These actions aim to achieve the following targets:

- The growth in ACT waste generation is less than the rate of population growth by 2020, by:
 - waste avoided through a reduction in plastic shopping bags.
 - reuse of goods expands in the ACT.

Avoiding or minimising the generation of waste means less waste to manage. This, in turn, leads to reduced costs associated with transporting, sorting and recycling materials and ultimately less waste sent to landfill.

Reducing the volume of waste has proven to be a significant challenge for the ACT along with other Australian jurisdictions. As one of Australia's most affluent communities, the ACT produces a relatively large amount of waste per capita, second only to Western Australia. The population of the ACT is also growing, which increases the ACT's overall waste generation.

The government has identified seven strategies to achieve the targets for generating less waste.

Strategy 1.1: Awareness, education and action

This Strategy aims to integrate complementary education, training and initiatives targeting industry and households, as well as within schools

and training institutes. The Government considers integrated long term sustainability education practises as critical for achieving lasting behavioural change to minimise waste, and increase resource recovery.

Canberra is a rapidly growing city and one of the Territory's aims is to minimise waste generation to a rate less than the population growth. Education programs will promote more sustainable patterns of living, encourage people to consider value and adopt environmentally sensitive behaviours that work towards creating a sustainable future.

Feedback from the Canberra community has indicated that a greater emphasis on community education and engagement can contribute towards reducing the amount of waste we generate. In addition, education and awareness raising activities can also contribute towards other primary objectives that this strategy is seeking to achieve, particularly Outcome 2: Full Resource Recovery.

ACT—100% AuSSI Schools

The Australian Sustainable Schools Initiative ACT (AuSSI ACT) works to encourage all ACT schools to manage waste, water and energy sustainably. All members of the school community (students, staff and parents) are encouraged to take ownership and responsibility for sustainable waste management. Environmental leadership teams establish and maintain effective recycling stations throughout the school to ensure sustainable waste management becomes an everyday practice.

This approach takes a whole of school and school system approach to identify improvements in a school's management of resources and facilities including energy, water, waste, biodiversity, landscape design, products and materials; and addresses associated social and economic issues. AuSSI ACT provides a framework for other education around sustainability activities in schools and can be balanced with existing programs.

At present Australians throw away around 3 million tonnes of food worth around \$5.2 billion, or around 136 kilograms per person per year. The Government is currently looking at education campaigns to help address this issue within the ACT.

As part of its education service the Territory and Municipal Services Directorate (TaMS) maintain a campaign on household recycling. TaMS also run educational tours through the Materials Recovery Facility at Hume, which engages with 8,000 to 10,000 visitors a year, to show the community the effects of waste on their immediate environment. Information on these tours is available by emailing MRFTours@act.gov.au.

The ACT Government welcomes the participation of the community to tackle the issues of sustainable living and encourage lifelong learning. The government will continue to encourage and support community initiatives in this area.

The government will fund and support awareness campaigns encouraging the community to generate less waste, and also to maximise use of current waste collection systems so waste going to landfill is minimised where possible and practical.

Strategy 1.2: Support for community gardens and home composting

Community gardens provide an opportunity for many different members of the community to engage in gardening activities and growing food for personal use and pleasure. Community and home gardens also provide an excellent opportunity for householders to reduce waste by composting household organic materials. Home grown food also avoids waste associated with commercial food production and distribution.

The ACT Government supports the establishment and operation of community gardens in the ACT through initiatives including:

- A 'one stop shop' approval process to facilitate the granting of a licence to establish a community garden, including a waiver of licence fees and exemption from development approval on unleased land.
- The development of Site Selection Criteria under which licence applications for community gardens will be assessed. The Site Selection Criteria will require to the proponent to take into account relevant Development Code

provisions in the Territory Plan and undertake community consultation to demonstrate support from the neighbouring community.

The ACT Government also supports social and personal horticulture by sponsoring courses in sustainable organic gardening, providing the necessary skills for community gardeners or those gardening on their own land.

Strategy 1.3: Ban single use plastic shopping bags

The Plastic Shopping Bags Ban Act 2010 came into effect on 1 July 2011 and from 1 November 2011 bans the distribution and use of polyethylene bags of 35 microns or less.

The implementation of the ban was finalised after considerable consultation with the community and retailers and was in part motivated by the fact that plastic bags are a symbol of a consumer-driven and wasteful society. Extensive cooperation from the retail sector, including signage predominantly displayed at most major outlets, has led to a wide-spread understanding of the ban in the community.

The government is encouraging the use of alternative options such as a biodegradable bag that meets the Australian Standard, or a multi-use bag designed to be used regularly over an extended period of time.

Strategy 1.4: Reduced packaging waste

The Australian Packaging Covenant is a national initiative that aims to reduce consumer packaging. The ACT is a signatory to the Covenant, and will continue to participate in this initiative. The Covenant identifies four priority areas to minimise waste. These are:

- optimise packaging to achieve resource efficiency and reduce environmental impact without compromising product quality and safety;
- the efficient collection and recycling of packaging;
- a commitment to product stewardship by the supply chain and other signatories; and
- action to reduce the incidence and impact of litter.

In 2011 the ACT Government released its *Action Plan for Australian Packaging Covenant 2011-2016*. The ACT Government commits in the Action Plan to use procurement to reduce packaging where possible, for example through establishing packing quantities as a criteria in its tender documentation for stationery contracts. These “green” or “sustainable procurement” requirements are also a component of the ACTSmart Business and ACTSmart Office recycling programs.

The ACT Government will also encourage businesses to provide customers with choices that allow purchases with less packaging, for example allowing people to bring their cup for take-away coffee and purchasing fruit and vegetables without packaging.

Strategy 1.5: Promote reuse through ACT businesses and charities

Bulky goods and clothing that can be reused sometimes end up in landfill. Also, food that is bought but unused or prepared but not sold is often discarded, contributing to large amount of food wastage.

The government recognises the valuable contribution that charities and businesses involved in the collection and reuse of household items, clothing and food make to the ACT community.

The ACT Government will work with the charity, community and business sectors to promote increased participation in reuse and second hand markets in Canberra and the region.

Strategy 1.6: Promote reuse via the bulky waste collection trial

Access to collection services for large or bulky items, particularly for less mobile members of the community, was identified as an issue through community feedback. In response to

community requests for a bulky waste collection service the government is conducting a trial bulky waste household collection service.

The trial commenced across Canberra in April 2011 and will run for 12 months, following which an evaluation will be undertaken to determine the effectiveness of the program.

Strategy 1.7: Encourage on-site reuse of construction and demolition waste

The vast majority of waste generated by the construction and demolition industry can be readily re-used and recycled.

The nature of new suburban development in the ACT, where many new homes are built concurrently, means there is an opportunity for temporary on-site facilities which can be used to encourage local recycling into products that can be used within the development and the exchange of surplus construction and demolition materials within the development site.

The ACT will consult with facility providers and the construction industry to explore options for temporary construction and demolition facilities within new development areas.



5.

OUTCOME TWO—FULL RESOURCE RECOVERY



5. OUTCOME TWO—FULL RESOURCE RECOVERY

The government will:

1. Boost commercial waste recycling.
2. Recover organic and residual waste resources from the household and commercial waste sectors.
3. Develop markets for organic and residual waste resources.
4. Establish free drop-off facilities for electronic waste including televisions and computers.
5. Promote education and awareness about recycling.
6. Promote government purchasing of recycled products.
7. Establish public place recycling.
8. Support public event recycling.
9. Develop markets for recyclable materials and strengthen regional connections.
10. Strengthen disincentives to landfill.

These actions aim to achieve the following targets:

- Increase the rate of resource recovery to over 80% by 2015.
- Increase the rate of resource recovery to over 85% by 2020.
- Increase the rate of resource recovery to over 90% by 2025, with no recoverable waste sent to landfill.

A key goal of the government in waste management is to achieve full resource recovery so that the need for the disposal of waste to landfill is largely limited to non-recoverable materials.

Improvements in the availability of waste treatment technologies mean that resources can be more effectively recovered from mixed waste than in the 1990s. The role of technology in the waste management system will be expanded in order to meet the 2025 vision for full resource recovery.

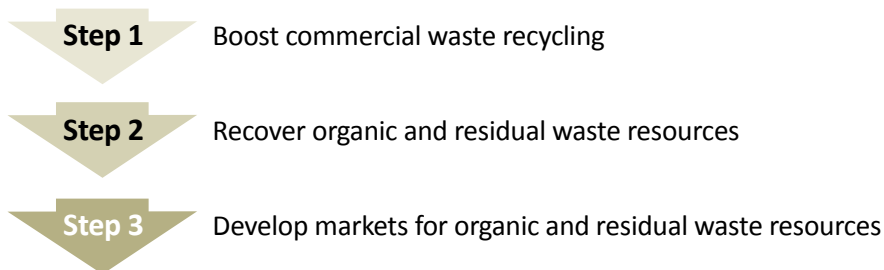
There are significant economic and employment benefits from increased resource recovery. According to the National Waste Report (2010),

“the waste and recycling services industry in Australia has been valued in the range of \$7 to \$11.5 billion a year. This was nearly 1.2% of total Gross Domestic Product (GDP) in 2006–07. Recycling can create employment within the economy with 9.2 jobs per 10,000 tonnes of waste recycled compared to 2.8 jobs for landfill disposal.”⁸

The government has identified ten strategies to achieve the targets for full resource recovery. These strategies maintain the established goal of no recoverable waste to landfill as a central indicator of success.

8 The National Waste Report 2010 at http://www.ephc.gov.au/sites/default/files/WasteMgt_Nat_Waste_Report_FINAL_16_Chapter_4_0_201005.pdf at page 228

FIGURE 6: THREE STEPS TO INCREASING THE RATE OF RESOURCE RECOVERY



Strategy 2.1: Boost commercial waste recycling

Just under 50% of waste sent to landfill comes from the commercial sector with 30 to 40% of this waste being readily recyclable glass, metals, plastics and paper. The Strategy aims to increase the ACT rate of resource recovery from over 70% to over 80% by redirecting readily recyclable waste from landfill to recycling markets.

To maximise the recovery of waste from the commercial sector the government facilitating the establishment of a mixed commercial waste Material Recovery Facility (Commercial MRF) at the Hume Resource Recovery Estate. The Commercial MRF is expected to recover between 40,000 and 70,000 tonnes of waste resources from the commercial sector, substantially reducing the waste this sector would normally send to landfill. The Commercial MRF should be operational by 2014 with recovered material being sent to its highest value use.

The ACTSmart Office and ACTSmart Business recycling programs, launched by the government in August 2009, will be continued and expanded to further help participants sort and recycle their wastes. In many cases the introduction of the ACTSmart recycling program has reduced the cost of waste management for the offices and business involved. Through ACTSmart Office and ACTSmart Business Branding, the ACT Government is providing recognition to offices and businesses which

are actively recycling. This provides consumers with the information they need to support businesses that have good environmental credentials.

All ACT Government agencies and directorates will improve recycling efforts and report on improved waste management in annual reports as required for the Chief Minister's Annual Report. The ACTSmart Office and ACTSmart Business recycling programs will be the primary programs for improved recycling.

Strategy 2.2: Recover organic and residual waste resources

There are a number of different approaches used by local governments to collect household waste, including:

1. Two bin collection service—one bin for readily recyclable waste (paper, glass, metal, hard plastic) and one bin for remaining/residual waste (food, non-recyclable materials and soft plastics). This is the current system operating in Canberra;
2. Garden waste third bin collection service—one bin for readily recyclable waste, one bin for green garden waste (excluding food) and one bin for remaining/residual waste;
3. Organic waste third bin collection service—one bin for readily recyclable waste, one bin for organic waste (food and garden waste), one bin for remaining/residual waste (cloth, soft plastics and nappies).

While a government funded garden waste collection service is desired by some ACT residents⁹, the ACT already recycles over 90% of the city's garden waste using windrow composting. This garden waste is currently transported to commercial composters by private delivery (self-haul); or via a commercial green-waste collection service, such as trash packs. Due to the high rate of resource recovery through the current system, a third bin garden waste collection service would not significantly reduce waste to landfill but could adversely affect established small businesses providing gardening services.

Similarly, an organic-waste third-bin collection service would not significantly reduce the amount of garden waste interred to landfill. However, it would increase the recovery of food waste. Organic-waste collection systems in other Australian jurisdictions have recovered between 18 and 51% of the food waste in the residual bins; these recovery rates are consistent with international experience. The total recovery of household organics would generally be well under 50% as tissues, nappies and incorrectly binned paper and cardboard as are often left in the residual waste bin.

Hyder Consulting estimated the net cost to the Territory of establishing an organic waste collection system at \$20.0 million pa by 2021¹⁰. The net costs consist of new bins and their collection, a facility to receive the third bin material, remove contaminants and compost it minus the savings associated with less material going to landfill. This indicates that a third bin service for organic waste collection is a relative expensive way to address household food waste, which would not divert even half of the organic waste currently going to landfill.

A Material Recovery Facility for residual waste from households (Residual-waste MRF) could recover nearly all of the organic material currently sent to landfill as well as dry-recyclables that have not been appropriately placed in the yellow top bin (around 15% of the total).

Hyder Consulting (2011) estimated the net cost to the Territory of a Residual-waste MRF at \$8.4 million per annum by 2021.

A Residual-waste MRF could also take mixed wastes from the commercial sector that are too wet, or contaminated to be processed in the new Commercial MRF—there may be over 50,000 tonnes a year of such material. A final decision on a Residual-waste MRF would not be made until the Commercial MRF has been operational for 12 to 24 months. This is to enable the ACT Government and private sector technology providers to better understand the impact of the Commercial MRF on the commercial waste sector.

Strategy 2.3: Develop markets for organic and residual waste resources

The ACT's future waste system development will adhere to the principle that waste should be directed to the highest-value use.

Submissions to the draft strategy highlighted the potential and advantage of composting organic and food waste. Composting and worm farming (to break down organic matter) can produce organic soil conditioners. However, composting also produces greenhouse gases and is not suited to producing high value products from residual household organics.

9 See TAMS Community Satisfaction Surveys at http://www.tams.act.gov.au/__data/assets/pdf_file/0004/193234/Customer_Satisfaction_Summary_Nov_2009.pdf

10 Hyder Consulting: Assessment of Waste Infrastructure and service option for the ACT, November 2011.

Nonetheless, composting or worm farming is a suitable technology for some clean waste streams including garden waste and well sorted commercial food waste. Home composting has substantial benefits in that it allows the organics to be collected and beneficially reused on site without associated transport or supply chain costs.

The ACT Government's policies and programs such as AuSSI schools and the ACTSmart Office and ACTSmart Business programs are diverting a large amount of garden and food waste into composting businesses and worm farms.

Energy-from-waste technologies can provide a value or benefit to the ACT through the conversion of appropriately sorted and pre-processed low-value materials such as wood waste and process engineered fuels (PEF) into heat, power or transport fuels.

Energy-from-waste technologies produce renewable "bioenergy" through the conversion of organic

wastes, such as wood, contaminated paper, cardboard and food, into energy. Thermal based technologies can also safely convert plastics into energy.

Energy-from-waste technologies support resource recovery facilities by providing a market for materials that would otherwise have little value or would incur an expense associated with landfilling. This strategy recognises that some wastes currently being land filled are not suitable for power generation due to their low energy content or the risk of atmospheric pollutants requiring expensive exhaust cleaning.

The government will continue to investigate the costs and benefits associated with developing markets for waste streams with a view to providing services that deliver the maximum benefit to the Canberra community in a cost effective manner. This investigation will proceed concurrently with the review under the *Sustainable Energy Policy 2011–2020* that will examine renewable energy opportunities in general.

Role of energy-from-waste technologies in the ACT waste management systems

In June 2009, the ACT Government commissioned URS-Eco Waste to provide advice on how to improve resource recovery in the ACT through a holistic "material flow analysis" of the ACT's waste streams, with a focus on the potential role of energy from waste in the ACT.

The report identified a range of suitable materials that have limited market potential for a range of reasons, including high costs of recovery and low value or contamination. Consequently, much of this material ends up in landfill or is stockpiled. Such materials include:

- wood waste from the construction and demolition sector and from the ACT's urban forests;
- film plastics;
- commercial food waste;
- dirty mixed plastics;
- dirty or wet paper; and
- fabrics (old clothes and carpet).

Role of energy-from-waste technologies in the ACT waste management systems (continued)

Following analysis of the ACT's waste streams and potential technologies currently available, it was estimated that 10–20% of the ACT's waste streams could be better utilised for energy generation. The study found that new bioenergy capacity could be sustainably developed with currently available feed stocks and could be a cost competitive form of renewable energy for the ACT.

The establishment of bioenergy facilities in the ACT would achieve a number of positive outcomes including:

- increasing resource recovery;
- reducing requirements for additional landfill;
- reducing greenhouse gas emissions through removing organic waste from landfill;
- generating renewable energy; and potentially
- sequestering carbon through biochar manufacture for use in agriculture or horticulture.

Strategy 2.4: Provide free drop-off facilities for electronic waste (e-waste)

The ACT became the first jurisdiction to divert all computers and televisions units from landfill by introducing mandatory recycling for televisions in 2010, complementing the mandatory recycling for computers introduced

in 2005. This is presently a user-pays system.

The Commonwealth's *Product Stewardship Act 2011* came into effect in August 2011. Regulations for the television and computer product stewardship scheme were passed in late 2011. This scheme is expected to provide at least two free drop-off sites in the ACT, by the end of 2012.

The National Waste Policy

The former Environment Protection and Heritage Council (EPHC) agreed to the National Waste Policy: Less Waste More Resources in November 2009, which replaced the 1992 National Strategy for Ecologically Sustainable Development. The aims of the National Waste Policy are to:

- avoid the generation of waste and reduce the amount of waste;
- manage waste as a resource;
- ensure that waste management is undertaken in a safe and environmentally sound manner; and
- contribute to the reduction in greenhouse gas emissions, energy conservation and generation, water efficiency and the productivity of the land.

The ACT will work closely with other jurisdictions to implement the National Waste Policy and proposed product stewardship schemes. This approach enables the ACT to meet its national obligations and address particular categories of waste that are best managed via product stewardship schemes such as e-waste and tyres.

Strategy 2.5: Promote education and active recycling

Educating the public and businesses about recycling remains an important component of maintaining and improving resource recovery rates. The ACT Government provides an extensive amount of information for households and businesses on its websites, as well as conducting targeted education and awareness programs. Information and awareness raising is important for changing behaviour and attitudes and ensuring that recycling efforts are maintained within the home and matched by recycling efforts at work, while shopping and at events.

The Territory is presently working towards this via a number of programs, including the Australian Sustainable Schools Initiative (AuSSI), and educational programs such as the ACTSmart Business and ACTSmart Office program, as well as through ACT NOWaste.

AuSSI provides curriculum material and structured opportunities for schools to educate children on the importance of waste management; to enable students to understanding what happens to waste once it is put into bins; and why this is important. AuSSI involves more than 110 schools in the ACT.

The Waste Wise component of AuSSI focuses on minimising waste to landfill through recycling paper and plastic products; and composting organic material as well as smart purchasing. The program has been highly successful in reducing waste and saving money in schools. Waste Wise aims to change attitudes from viewing what we would traditionally throw away as 'waste' to viewing these materials as 'resources'.

ACT NOWaste undertakes educational programs aimed at waste reduction and raising awareness with a focus on household recycling and waste management using a range of activities. These activities aim to promote actions in the community, as well as an understanding of the services available

for reuse, recycling and disposal in the ACT. These activities include tours of waste facilities, visits to schools, businesses, residential facilities and community events. The ACT's consistently high household recycling rates are testament to the value of waste education. Education and awareness raising will continue using present forms of media and will evolve with technology and social trends.

The ACT Government actively participates in the National Waste Education Division of the Waste Management Association of Australia. This participation assists in the sharing of best-practice approaches to waste education.

Strategy 2.6: Government procurement

The ACT Government's Sustainability Policy 2009, *People, Place, Prosperity*¹¹, includes principles for sustainable procurement to be incorporated into the ACT's procurement processes.

The ACT Government purchases a range of goods and services. The ACT Government can use sustainable procurement principles to provide a market driver for increased use of recycled materials in the goods and works that it procures. It can also encourage service suppliers to use recycled products where practical. The ACT Government will review the specifications used for government tendering to identify where recyclable alternatives can replace non-recyclable materials, for example in the tendering of construction and landscaping projects.

As part of its proposed Carbon Neutral ACT Government Framework, the ACT Government will pursue additional sustainable procurement practices.

Strategy 2.7: Public place recycling

The ACT Government is trialling street level recycling to increase the opportunities for the public to recycle and to divert recyclables from landfill.

11 See http://www.cmd.act.gov.au/_data/assets/pdf_file/0003/119730/people_place_prosperity.pdf

Following the initial trial, that will commence by the end of 2011, the program will be evaluated to determine the effectiveness of the program and options for its continued operation.

Strategy 2.8: Public event recycling

Public events produce significant amounts of material, some of which is waste, but mostly consists of potentially recyclable material including paper, cardboard, glass, metal, plastics and organics.

In April 2011 the ACT Government commenced a twelve month trial to encourage recycling at public events around the ACT. The aim of the program is to assist event organisers in managing waste in the most efficient and effective manner. It is designed to help event organisers implement recycling facilities within a public event, and provide the public the opportunity to recycle within that event. The ACTSmart Public Event program is available to any event in the ACT. The ACTSmart Public Event logo provides customer recognition of an event's waste management achievements. All events are required to supply waste and recycling disposal data on completion of their program.

The Environment and Sustainable Development Directorate has extended the program until June 2013 and will work with the Economic Development Directorate to ensure that the more than 100 events that form the Centenary of Federation celebrations will be ACTSmart Public Recycling events.

Strategy 2.9: Develop markets for recyclable materials and strengthening regional connections

The ACT Government will further develop waste markets in the ACT and surrounding region.

As part of the National Waste Policy the ACT will work both locally and nationally to develop a suite of agreed guidelines and standards to remove

impediments to the development and operation of effective markets for potential wastes. The ACT will ensure its procurement processes reflect the new standards once these are agreed.

The ACT Government will continue to explore and implement options for regional resource recovery, including the South-East working with Regional Organisation of Councils which is the primary regional waste organisation of local governments in the region.

The ACT currently provides waste and recycling services to the Queanbeyan City Council. In the future, there may be opportunities to expand the ACT's regional role by increasing access to ACT resource recovery facilities for regional councils and businesses. This has the potential to significantly enhance the sustainability of south-east NSW, while offsetting the cost of new waste facilities for Canberra residents and businesses.

Strategy 2.10: Disincentives to landfill including appropriate pricing and regulation

Price signals are an important mechanism to influence people's behaviour. Landfill charges create a disincentive to send waste to landfill while drop-off facilities that are free or charge nominal fees for specific types of recyclable waste (for example, garden waste, paper cardboard and other recyclables, oil, batteries, and in the future, e-waste) will encourage people to sort and deliver waste to these facilities.

The aim of future landfill and facility charging will be to encourage resource recovery and discourage waste being dumped or going to landfill. Regulation can also complement price signals, for example the banning of televisions, computers and other recyclable wastes from going to landfill.

The government will continue to update its regulatory and pricing approach to assist the efficient operation of the ACT's evolving waste management system.

6.

OUTCOME THREE—A CLEAN ENVIRONMENT



6. OUTCOME THREE—A CLEAN ENVIRONMENT

The government will:

1. Reduce litter and dumping through laws and awareness raising.
2. Participate in national approaches to litter management.
3. Further develop the Hume Resource Recovery Estate to co-locate resource recovery facilities.
4. Maintain a safe and environmentally responsible landfill to meet the ACT's future needs.
5. Improve management of hazardous waste.
6. Improve management of soil waste through reuse and rehabilitation.
7. Review waste operations and urban planning requirements.

These actions aim to achieve the following targets:

- ACT leads Australia in low littering and incidents of illegal dumping:
 - the ACT has the lowest litter levels in Australia; and
 - incidences of illegal dumping declines.
- ACT's natural resources are protected and, where feasible, enhanced through waste management:
 - ACT landfill is industry best practice; and
 - soils are remediated or reused.

Historically, waste was managed to reduce environmental and health risks associated with landfill, dumping and uncontrolled burning. While there are now additional objectives relating to resource recovery and climate change, these original aims remain.

The government has identified seven key strategies to achieve the targets for a clean environment.

Strategy 3.1: Reduce litter and dumping through laws and raising awareness

Litter management in the ACT is an important contributor to the amenity of urban environments. The existing regulatory framework provides a mechanism for penalising individuals and businesses who engage in littering and dumping. The government continues to encourage reporting of illegal dumping.

Litter laws in the ACT

The *Litter Act 2004* (ACT) aims to enhance the natural and built environment by regulating deposits of litter, or other material that may become litter, and to facilitate the removal of litter. Littering of any kind is illegal under the Act.

It is an offence under the Act to dump rubbish in a public place. If the rubbish contains hazardous waste, it is also an offence under the *Dangerous Substances Act 2004*. Under these Acts the following penalties apply:

- basic littering penalties include \$1,000 for individuals and/or \$5,000 for businesses;
- aggravated littering by means of littering that could cause injury to person animal or public place carries higher penalties, being \$5,000 for individuals and/or \$25,000 for businesses or imprisonment for 6 months or both;
- the dumping of illegal substances under the *Dangerous Substances Act 2004* carries penalties up to \$200,000 for individuals and/or \$1 million for businesses and/or 7 years imprisonment and the possibility of other penalties.

The government will also continue to promote awareness through anti-litter campaigns and provide targeted clean up services to reduce the amount of litter in the ACT.

Illegal dumping is a concern in Canberra because it:

- pollutes our lakes, rivers and waterways;
- may contain hazardous waste;
- may be dangerous to the public, for example, discarded syringes and asbestos;
- may attract rats and cockroaches and spread disease;
- looks unsightly and reduces amenity;
- is a waste of resources as most dumped items can be recycled or reused; and
- is a financial burden to rate payers.

Illegal dumping on Canberra's streets may occur when people do not have

access to appropriate transport for moving bulky goods. Recognising this, the ACT Government is trialling an on-demand bulky waste collection service.

Strategy 3.2: National approaches to litter management

The ACT participates in the National Litter Index conducted by *Keep Australia Beautiful*¹². The National Litter Index reports annually on litter in each state and territory and provides national averages. The National Litter Index 2010¹² provided further evidence that Canberra is one of the national leaders in waste management, with the ACT recording the lowest rate of litter in Australia in terms of volume.

In April 2008, the Commonwealth and state/territory Ministers through the Council of Australian Governments (COAG) Standing Council on Environment and Water (SCEW formerly the Environment Protection and Heritage Council) agreed to conduct an assessment of options for

¹² Keep Australia Beautiful National Litter Index Report 2011 www.kabq.org.au/National-Litter-Index.

national measures to address resource efficiency, environmental impacts, and the reduction of litter from packaging wastes such as beverage containers. The SCEW agreed to undertake the development of a consultation regulatory impact statement (RIS) for a Container Deposit Scheme (CDS), and other options which may have a positive cost benefit and a tangible impact on recovery rates and litter reduction. The ACT is an active participant in this national work.

The ACT Government also supports national approaches to the management and recovery of hazardous wastes such as lamps containing mercury and end-of-life batteries.

Strategy 3.3: Development of the Hume Resource Recovery Estate

There are a range of government resource recovery facilities in the ACT which provide ACT residents and businesses with a number of accessible options for recycling. These include:

- Mugga Lane Resource Management Centre;
- Mitchell Resource Management Centre;
- West Belconnen Resource Management Centre; as well as
- recycling drop-off Centres at Belconnen, Mitchell, Phillip, Gungahlin, Weston and Tuggeranong.

These facilities will continue to provide accessible waste services to different areas of Canberra. However, major new waste infrastructure will primarily be located in the Hume Resource Recovery Estate beside the Mugga Lane Resource Management Centre.

The Hume Resource Recovery Estate is being developed in conjunction with the Mugga Lane Resource Management Centre as a recycling estate housing a range of facilities.

There are a number of benefits that arise from the co-location of waste facilities in the Hume Resource Recovery Estate, including the synergies between different parts of the recycling industry which could result in increased resource recovery, reduced costs and reduced traffic movements.

There are a number of government and privately owned and operated facilities for resource recovery in the ACT outside of the Hume/Mugga Lane precinct, including green waste facilities at Macgregor and Mitchell, and a construction and demolition recycling centre at Pialligo.

Strategy 3.4: Maintain a safe and environmentally responsible landfill to meet the ACT's future needs

The ACT's landfill will continue to be operated at best environmental standards. The National Waste Policy identifies that state and territory governments need to ensure the safety and health risks arising from landfill gas emissions are managed across all landfills through appropriate regulation and licence requirements. The ACT Government is committed to maintaining a safe and environmentally responsible landfill for its waste workforce and the Canberra community. Methane gas capture is in place for both the current and former landfills.

On present projections, the current landfill cell at Canberra's only operational landfill at Mugga Lane is expected to be filled by 2015–16. The territory is progressing the development of Mugga Lane Landfill Stage 5 to the north-east of the existing landfill cells.

At current projected waste generation rates Mugga Stage 5 will provide for the ACT's landfill needs to 2040. With the improvements in resource recovery outlined in this strategy Mugga Stage 5's expected life may extend through to 2100.

Strategy 3.5: Manage hazardous waste

Materials which have the potential to cause environmental harm are generated for a variety of reasons including medical applications, fuels, pest control, refrigeration and air conditioning, automotive applications and cleaning. Hazardous materials may also be produced as a result of industrial processes and in household waste.

In the ACT, handling of hazardous substances is governed by legislative requirements. The ACT will continue to regulate the management of hazardous

wastes according to its regulatory requirements and national and international best practice.

The management of hazardous materials is an area of active policy development nationally as the range of hazardous materials grows over time.

The ACT Government is participating in national efforts through implementation of the National Waste Policy to further improve the system for the identification, classification, collection, treatment, disposal and monitoring of hazardous substances and waste.

Environment Protection and Waste Management Legislation in the ACT

Considerable work is being done nationally and internationally to minimise the risk to the environment from activities which involve hazardous materials. National approaches to the management of hazardous materials are developed under the *National Environment Protection Act 1994* and equivalent legislation in other jurisdictions.

In the ACT, the Commonwealth's *National Environment Protection Act 1994* is given effect through the *National Environment Protection Council Act 1994*. Together, the Acts provide for the development and implementation of National Environmental Protection Measures (NEPMs). NEPMs currently address aspects of hazardous materials management including the Movement of Controlled Wastes between States and Territories NEPM and the National Pollutant Inventory NEPM.

The *Environment Protection Act 1997* [EP Act] aims to prevent environmental degradation and adverse risks to human health and the health of ecosystems. The EP Act promotes reuse and recycling of materials and waste minimisation programs. The EP Act also aims to regulate, reduce or eliminate the discharge of pollutants and hazardous substances into the air, land or water consistent with maintaining environmental quality. Related acts include the *Clinical Waste Act 1990*, which relates to the treatment, storage, transportation and disposal of clinical waste, and the *Dangerous Substances Act 2004*, which aims to protect the health and safety of people, and to protect property and the environment from the hazards associated with dangerous substances. The duties in relation to dangerous substances are in addition to duties in the EP Act.

The *Waste Minimisation Act 2001* [WM Act] further embeds waste minimisation objectives and principles into how waste is to be managed. The WM Act provides the legal framework for the management, regulation and reduction of waste. The Act allows for Industry Waste Reduction Plans and the supply of waste management services and waste disposal facilities.

Strategy 3.6: Increase soil reuse and rehabilitation

Soil Reuse

Virgin extracted natural materials (VENM) from construction sites are sometimes landfilled in the ACT. The ACT Government will work to facilitate the beneficial use of this material in new construction sites or as landscaping products. In particular, the government will seek to have temporary soil and construction and demolition material exchange sites established to allow the efficient reuse of these materials where possible without excessive transport or transaction costs.

Soil Rehabilitation

The ACT has number of sites that have been contaminated by past activities such as old petrol stations. The ACT Government will continue to work with industry to ensure that these sites are rehabilitated so they are suitable for new developments. The soil from old petrol station sites, for example can be biologically remediated over a period of months to produce material suitable for beneficial reuse at other sites. This has been successfully undertaken in the ACT.

Strategy 3.7: Review waste operations and urban planning requirements for multi-unit dwellings

As Canberra grows, the pattern of human settlement is changing. Inner city areas are becoming denser with more multi-unit housing and new suburban areas have smaller blocks. This has implications for both waste collection services and for the design of buildings.

The ACT Government will work with the waste management industry, building designers and developers to identify potential ways to increase resource recovery, and reduce the impacts of litter and dumping. This will inform future waste collection services and the design rules for urban settlement. The ACT Government's aim is assured and efficient collection services with an urban design that works for residents.

7.

OUTCOME FOUR—CARBON NEUTRAL WASTE SECTOR



7. OUTCOME FOUR—CARBON NEUTRAL WASTE SECTOR

The government will:

1. Continue methane capture from landfill.
2. Minimise organic waste going to landfill.
3. Investigate options to adopt Energy-from-Waste technologies.
4. Increase recycling to avoid greenhouse gas emissions.
5. Promote energy efficient waste collection and transport systems.

These actions aim to achieve the following targets:

- The ACT waste sector is carbon neutral by 2020, including through:
 - waste resources are recovered for carbon sequestration; and
 - energy generated from waste doubling by 2020.

Waste management and energy-from-waste will play an important role in achieving the Government's goal of a 40% reduction in greenhouse gas emissions by 2020. According to the ACT Greenhouse Gas Inventory (2009), the waste sector generated just over 124kt CO₂-e in 2009, or around 3% of the Territory's greenhouse gas emissions.

Extraction systems to capture most of the methane emissions from landfill were installed in 1998 and limit greenhouse gas emission capture from the ACT's waste sector to under 3% of the ACT inventory. A carbon neutral waste sector could be achieved through redirecting organic waste into composts, biochar production and renewable energy generation.

The methodology for determining carbon neutrality will be consistent with the methodology adopted for the preparation of the ACT's Greenhouse Gas Inventory. Methodologies to account for offsets from soil carbon and renewable energy generation will be consistent with the Australian Government's Carbon Farming Initiative and Clean Energy Future Acts and regulations.

The government has identified five key strategies to achieve the targets for a carbon neutral waste sector.

Strategy 4.1: Methane capture from landfill

Organic waste disposed of in landfill produces methane—a potent greenhouse gas.

Methane is extracted from Canberra's only operational landfill (Mugga Lane) and at the closed landfill facility (West Belconnen) and is burned to generate renewable electricity. The ACT's Mugga Lane landfill uses best practice techniques to capture most of this methane and the ACT Government receives an annual royalty on the renewable energy generated from the landfills.

Methane captured from both the Mugga Lane landfill and the West Belconnen facility generates more than 28,000 megawatt hours a year of renewable energy¹³, sufficient to power nearly 3,300 homes.

Approximately 40% of methane may diffuse out of landfills in Australia despite gas extraction¹⁴. The Territory

13 Australian Government Office of the Renewable Energy Regulator <http://orer.gov.au/rec-registry/index.html>.

14 "A typical gas collection system recovers 60% of landfill gases (the default value used for the estimation of emissions from landfills to the National Pollutant Inventory). This is supported by a recent analysis by Hyder Consulting that argues that while capture efficiencies of up to 95% have been reported and best practice is accepted as 75%, a more realistic typical value over an extended period of operation would be closer to 60%. BDA Group (2009) The full cost of landfill disposal in Australia see <http://www.environment.gov.au/settlements/waste/publications/pubs/landfill-cost.pdf>.

will continue to support the Australian Landfill Gas Emissions Reduction (ALGER) research program seeking to improve the capture rates of methane extraction systems as well as to remediate diffuse methane emission via biologically active landfill covers.

The government will continue the capture of greenhouse gas emissions from landfill and minimise organic waste being sent to landfill.

Strategy 4.2: Minimise organic waste to landfill

Greenhouse gas emissions from the waste sector are primarily a result of organic waste sent to landfill creating methane as it decomposes. Around 50% of waste sent to landfill is organic, made up of food, wood, paper and garden wastes. Organic waste comes from all waste sectors-household, commercial and construction and demolition.

The new dry-Commercial-waste Material Recovery Facility (commercial MRF) is planned to recover over 40,000 tonnes of material a year that would otherwise have been landfilled. Much of this material will be organics such as paper, timber and cardboard. The commercial MRF is expected to be operational in 2014.

Energy from waste facilities capable of utilising wood waste, with a lower gate fee than the landfill, will also minimise wood waste that is landfilled.

Due to high rates of garden waste diversion in the ACT, an organic-waste third-bin collection service would not significantly reduce the amount of garden organics sent to landfill. It may reduce food waste in some specific households. Organic-waste collection systems in other Australian jurisdictions have recovered 18–51% of the food waste in the residual bins; and these recovery rates are consistent with

international experience. The total recovery of household organics would generally be well under 50% as tissues, nappies as well as incorrectly binned paper and cardboard as are often left in the residual waste bin.

A Material Recovery Facility for residual waste from households (Residual-waste MRF) could recover nearly all of the organic material currently sent to landfill as well as mixed wastes from the commercial sector that are too wet or contaminated to be processed in the new Commercial MRF. There may be over 50,000 tonnes a year of wet-mixed Commercial waste (See Strategy 2.2. for more information on these material recovery facilities).

Strategy 4.3: Expand bioenergy generation and investigate new energy-from-waste technologies to generate energy

Some waste streams have little value in recycling markets but may have significant calorific (energy) value that can be used to generate electricity. Where these wastes are organic, such as wood, soiled paper and food, the electricity generated is a renewable source of energy (bioenergy).

If coupled with electricity production, research suggests that a thermal conversion facility could produce 1,330 MWh of electricity in 2020, avoiding emissions from electricity sourced through the National Electricity Market by around 112,000 tonnes CO₂-e with a further reduction of 18,000 tonnes CO₂-e from avoided emissions from landfill¹⁵.

The government will continue to investigate the costs and benefits associated with developing markets for waste streams with a view to providing a service that will deliver the maximum benefit to the Canberra community in a cost effective manner.

¹⁵ Pitt&sherry, "Weathering the Change: The ACT's Draft Climate Change Action Plan 2: An analysis of pathways, costs and benefits", July 2011.

Investigating energy-from-waste technologies

Energy-from-waste technologies include in-vessel anaerobic digestion, landfill gas extraction, pyrolysis, gasification and direct combustion. The technologies can be categorised as biological (anaerobic digestion) or thermal (pyrolysis, gasification and direct combustion).

Energy-from-waste technologies produce renewable “bioenergy” through the conversion of organic wastes, such as wood, contaminated paper, cardboard and food, into energy. The ACT generated more than 28 000 MWh of bioenergy from landfill gas extracted from existing landfill sites. Thermal based technologies can also safely convert plastics into energy.

While gasification and direct combustion processes destroy most of the agronomic value of the organic matter in producing energy, anaerobic digestion and pyrolysis can enable most of the nutrients and some of the carbon to be captured and recycled back into the soil.

Biochar produced from “slow” or low-temperature pyrolysis can not only sequester carbon for thousands of years but may offer significant agronomic and environmental benefits, such as improved water and nutrient retention within Australia’s naturally low- carbon soils.

The potential to create biochar from organic waste streams provides an opportunity for long-term carbon sequestration. However, pyrolysis for waste processing is quite novel and the value of waste derived biochar remains uncertain. The ACT Government will work with research institutes and the Australian Government, to determine the agronomic, carbon sequestration benefits of producing and using biochars in the ACT and surrounds.

The Territory has supported the Fenner School of Environment and Society at the Australian National University to use biochar in glass-house pot trials (the ANU trial). The ANU trial involves creating a growing medium consisting of one of the five biochars blended with both—an organic compost “potting mix” and a locally sourced top soil. Biochar concentrations ranged from 0.5 to 6% by volume. The growth media were then potted with five different plants, both native and exotic species. This randomised block plant trial contains over 1500 pots.

Measurements of plant growth are being taken regularly and total biomass harvesting will occur in over late 2011 and early 2012. However, due to the time postulated for biochar to be fully incorporated into the soil and colonised by soil flora, it is likely that definitive results may need a further 12 to 24 months of repeated measurements. A range of soil chemical and physical properties are currently being measured on the different treatments.

Process engineered fuels (PEFs) can be derived from residual wastes with low value but high energy content. PEFs can be used to generate heat for industrial process such as steel, cement or paper manufacture or in power stations. While PEFs are widely used internationally—especially in Europe—

the use of PEFs as a fossil fuel substitute is still relatively novel in Australia.

At present only South Australia licences the use of PEFs, at the Brighton Cement Kiln, which has been receiving PEFs from Resource Co’s Material Recovery Facility since 2003.

Opportunities to better utilise biosolids

The ACT currently generates 38,000 wet tonnes of biosolids a year (13,500 dry tonnes) from ACTEW's Lower Molonglo Water Quality Control Centre (LMWQCC). The biosolids are co-fired with diesel in a hearth furnace to produce an ash. The ash is high in calcium, phosphorous and micro-nutrients and is sold as a soil improver.

As the LMWQCC is upgraded to further improve biological nutrient removal the amount of biosolids will increase and become much wetter. Hence increasing amounts of diesel will be needed to incinerate them.

Alternatively, these biosolids could be processed with other ACT waste streams. The biosolids could increase the energy yield from a bioenergy facility. If the bioenergy facility were producing a compost or biochar then the biosolids could significantly enhance the value and quality of these products.

ACTEW's Strategic Review of Sewage Treatment Services includes options for managing biosolids and provides an opportunity to transition to a more sustainable integrated solution for the management of biosolids in the ACT.

Strategy 4.4: Increase recycling to avoid greenhouse gas emissions

Recycling avoids the generation of greenhouse gases by both reducing the production of raw materials and diverting waste away from landfill.

Recycling can also reduce water and energy use. Estimations of these savings have been made for different types of recycled materials. Indicative figures based on ACT NOWaste recycling data for 2009–10 and Commonwealth estimates are shown in Table 1.

TABLE 1 GREENHOUSE GAS AND WATER SAVINGS FROM RECYCLING

Type of material	Tonnes recycled 09–10 A	water saving per tonne (KL)	Water savings (KL) B	GHG saving per tonne	GHG emissions savings (tCO ₂ -e)
Paper	51224	15.58	798,000	1.54	79,000
Timber	47543	0.07	3,000	0.15	7,000
Glass	16783	2	34,000	0.33	6,000
Aluminium	2319	233.2	541,000	15.80	37,000
Steel cans	1026	1.1	1,000	0.81	1,000

A – Figures provided by Territory and Municipal Services Directorate, ACT Government.

B – Figures from GHD (2009) 'Waste Technology and Innovation Study' for the Department of the Environment, Water, Heritage and the Arts (DEWHA) at <http://www.environment.gov.au/settlements/waste/publications/waste-technology.html>.

The ACT Government is committed to increasing recycling and to develop

markets for recoverable waste streams as described under Outcomes 1 and 2.

Strategy 4.5: Ensure energy efficient waste collection and transport solutions

Collection and transport systems are a crucial part of the waste management and resource recovery system in the ACT. The government will seek to ensure that collection systems are optimised both for collection logistics and efficient down-stream resource recovery and processing.

The ACT currently has an established and well supported household recyclables collection service (yellow top bin). When combined with resource recovery centres, garden waste drop off facilities and other niche recycling services, the current waste management system in the ACT promotes a low cost and effective approach to diverting a large proportion of dry recyclables and green waste from landfill. The government will maintain this highly effective system.

Sorting of mixed waste through materials recovery facilities can reduce greenhouse gas emissions associated with transportation of waste. Separation of waste at the source of the waste generation supported by pick-up of specific waste types may, however, increase the value of waste materials for recycling e.g. higher grades of paper. The increased cost and separate transportation of food waste may mean that this is only appropriate for large producers of food waste, such as hospitals and supermarkets, rather than individual households.

Like other forms of transport, waste transportation involves the production of greenhouse gases. As part of the government's commitment to reduce transport emissions the government will work with commercial waste operators and contractors to examine the feasibility of introducing low emission waste transport vehicles.

8.

MONITORING AND REVIEW



8. MONITORING AND REVIEW

This Strategy outlines a vision for waste management to 2025 with success to be monitored through targets identified for each of the strategy's four objectives. Progress against targets will be monitored and, where possible, quantitative data will be used, for examples tonnes of waste, items and volumes of litter. The ACT Government will ensure timely production each year of waste generation, resource recovery and landfill data.

Outcome 1	Target 1:
Less waste generated	The growth in ACT waste generation is less than the rate of population growth.

The amount of waste generated in the ACT is monitored through annual Resource Recovery Surveys in conjunction with data collected from weigh bridges at the Resource Management Centre. The rate of waste generation will be compared to population growth annually. Strategies that promote waste avoidance, such as awareness raising campaigns, and product reuse through second hand businesses and charities will also be monitored to evaluate the effectiveness of these strategies.

Outcome 2	Target 2:
Full resource recovery	The rate of resource recovery increases to: <ul style="list-style-type: none">– over 80% by 2015– over 85% by 2020– over 90% by 2025.

Resource recovery surveys and audits of waste composition will be maintained and updated as required to provide ongoing reporting and analysis of trends in waste to landfill and resource recovery rates.

Individual programs will also be monitored to identify the contribution that different strategies are making to increase the rate of resource recovery and reduce waste to landfill. For example ACTSmart Office and Business programs will collect information on the volume of waste their participants divert from landfill to recycling.

Outcome 3	Target 3:
A clean environment	ACT leads Australia in low litter levels and incidents of illegal dumping.

Littering rates will be monitored through the National Litter Index. The National Litter Index is published by Keep Australia Beautiful as a part of an ongoing assessment of litter volumes and numbers of items across a range of sites to inform the general public about the trends in litter at key locations. The audits of litter are undertaken twice a year in May and November and are reported on a financial year basis. The 2009–10 National Litter Index counts covered 76 sites across the ACT. Illegal dumping incidents will be reported calling Canberra Connect and as well as being monitored through the National Litter index.

Target 4:	
	ACT's natural resources are protected and, where feasible, enhanced through waste management.

Landfill leachate quality will be monitored to ensure risks from heavy metals and nutrients are being appropriately managed.

The number of contaminated sites will be reported each year by the EPA. The quantity of contaminated soil remediated each year will also be recorded by the EPA.

Outcome 4	Target 3:
Carbon Neutral Waste Sector	Energy generated from waste doubles by 2020 The ACT Waste Sector is carbon neutral by 2020.

Energy generated from landfill gas and new bioenergy facilities will be monitored and reported each year.

Greenhouse gas emissions from the ACT Waste Sector will be monitored as part of the annual ACT Greenhouse Gas Inventory. The ACT Government commissions an ACT specific

greenhouse gas inventory to provide comprehensive information on the major emission sources. Emissions for the ACT are broken down into sectors —electricity, natural gas, transport, land use and land use change, waste, and miscellaneous. The ACT Greenhouse Gas Inventory is used to inform the ACT on how it is tracking against greenhouse gas reduction targets.

The Inventory includes the Scope 2 emission related to energy generated outside the ACT but consumed in the ACT. The emissions avoided by generating energy from waste will be counted towards the achievement of a carbon neutral waste sector.

The ACT Waste Management Strategy will be reviewed every three to five years to measure progress and ensure that the strategies remain current. The review will be informed by monitoring against targets as outlined above and will identify:

- infrastructure investment for further diversion of wastes from landfill;
- modifications to actions such as program delivery and education and awareness raising; and
- progress in national waste issues, including national stewardship program for e-waste.



9.

ACT GOVERNMENT AGENCIES' ROLES AND RESPONSIBILITIES IN MANAGING WASTE



9. ACT GOVERNMENT AGENCIES' ROLES AND RESPONSIBILITIES IN MANAGING WASTE

Environment and Sustainable Development Directorate (ESDD)

ESDD develops and implements sustainable environmental policies and practices, particularly in the areas of natural resource management, biodiversity, greenhouse gas abatement, energy, water and waste management.

The Directorate also implements a number of programs including ACTSmart Office and ACTSmart Business recycling programs and the Australian Sustainable Schools Initiative.

ACT Planning and Land Authority (ACTPLA)

The ACT Planning and Land Authority (ACTPLA) sits within ESDD and is the ACT Government's statutory agency responsible for planning for the future growth of Canberra in partnership with the community. ACTPLA is also the technical regulator of utilities and administers technical and network safety codes for licensed entities, which includes ACTEW Corporation Limited (ACTEW).

Environment Protection Authority (EPA)

The EPA sits within ESDD and has legislative responsibility to administer the *Environment Protection Act 1997* covering activities that can impact on air, land and water quality such as environmental noise, contaminated sites, waste transport and disposal and pesticide use. These responsibilities

are fulfilled through a combination of policy development, education and information, resolving complaints and formal regulation.

Territory and Municipal Services Directorate (TaMS)

TaMS is the primary delivery agency for implementation of the ACT waste strategy through ACT NOWaste. TaMS also contributes to keeping Canberra clean through management of public places.

ACT NOWaste

ACT NOWaste is a Business Unit of TaMS that manages contracts and service agreements for domestic waste and recycling activities delivered to around 130,000 Canberra households. ACT NOWaste also encourages the resource recovery industry to maximise the recovery and recycling of wastes in the ACT and surrounding region. Other responsibilities include management of waste acceptance and disposal facilities.

ACTEW and ActewAGL

ACTEW Corporation Limited (ACTEW) is a government owned company with assets and investments in water, wastewater, electricity, gas and telecommunications totalling over \$1.4 billion. ActewAGL provides water and wastewater services to the people of the Australian Capital Territory through an agreement with ACTEW Corporation, who owns the ACT's water and wastewater assets.

ANNEX 1

ACT waste streams and estimated volumes ('000 kg) in 2008

