INFORMATION PAPER

waste-to-energy (WtE) in the ACT

Transport Canberra and City Services Directorate

October 2018

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INSTRUCTIONS FOR CONSULTATION PROCESS

Transport Canberra and City Services invites you to have your say on waste-to-energy(WtE) in the ACT as part of a community consultation process open until 29 November 2018.

This background paper provides factual information about WtE, including what WtE is and the context for WtE in the ACT, along with the challenges and opportunities associated with the different kinds of WtE technologies.

It is intended to provide information for all stakeholders so that they can actively participate in and contribute to the development of a WtE policy in the ACT.

You can have your say in a number of different ways including:

- Completing the survey available on the YourSay page
- Engaging with us on YourSay.gov.au
- Talking to us in person, by joining us at one one of our drop-in sessions or registering for a one-on-one session
- Registering, through an expression of interest, to be involved in a focus group
- Writing to us at TCCS.BDU@act.gov.au or mailed to BDU, TCCS, GPO Box 158 Canberra ACT 2601.

Information on the WtE consultation process, including dates and registration for engagement activities, is available on the Your Say website at www.yoursay.act.gov.au. You can also find information in hard copy at all ACT public library branches.

After the consultation period we will gather all feedback and report back to you. The consultation will inform Government's consideration of WtE in the ACT.

YOUR say
www.yoursay.act.gov.au

MESSAGE FROM THE MINISTER

The management of our waste is an important issue that affects all Canberrans.

In May 2018 the Government welcomed the results of the Waste Feasibility Study (the Study) and the community and industry have had a chance to consider the recommendations and provide feedback.

The Study sought pathways to achieve the ambitious goals outlined in the ACT Waste Management Strategy 2011-25 including the target of 90 per cent of waste being diverted from landfill in the ACT by 2025. These pathways included the Container Deposit Scheme (CDS) which was successfully implemented in July 2018 and a range of actions that the Government will be investigating.

We know the Territory's resource recovery rate has plateaued at around 70 per cent for the last decade and of the around 1 million tonnes of waste produced each year by Canberrans we still have around 300,000 tonnes of waste going straight to landfill.

The Study found that as a City we are unlikely to achieve over 80 per cent resource recovery without some form of WtE, leaving around 200,000 tonnes of waste going to landfill.

I want to have a serious conversation as a community about what we should do with this remaining waste and whether waste-to-energy (WtE) is part of the solution.

WtE technologies sit on a spectrum – not all of these involve burning or heating and some technologies are already in use in the ACT, for example through landfill gas capture at our Mugga Landfill site.

This Information Paper sets out the facts about WtE in an ACT context and summarises the different kind of WtE technologies being used around the world. It also sets out some high level guiding principles for the policy development process, including the importance of protecting human health, our environment and working within the circular economy and waste hierarchy.

One of the key recommendations of the Waste Feasibility Study was the development of a WtE policy in the ACT to provide certainty to industry and the community about whether WtE has a role in the Nation's Capital. This Information Paper and community engagement process will deliver on this recommendation by encouraging the community and industry to have their say and be an active part in developing a WtE policy.

As the Minister for City Services I want our community and industry to be partners in co-designing a long-term, informed and evidence based policy vision for WtE in the ACT.

Minister Chris Steel MLA

INTRODUCTION

The ACT Government wants to find out what the community really think about waste-to-energy (WtE) including whether it has a role in the future of the ACT.

WtE includes a range of different kinds of technologies, from those that use incineration or heating methods to those that effectively use an advanced composting system (anaerobic digestion).

Both industry and the community have expressed concern and interest in WtE in the ACT. This, along with the Waste Feasibility Study which recommends the development of a WtE policy, have led to a clear need for a WtE policy in the ACT.

There are a variety of different approaches that could be taken in developing a WtE policy, ranging from prohibiting certain kinds of technologies through to encouraging responsible investment and WtE development. Different regulatory pathways could be available for different technologies, for example anaerobic digestion could be regulated differently to thermal technologies. These approaches will be informed by a robust community engagement, deliberation and consultation process.

We want to know… Does WtE have a role in the long-term vision for resource recovery and renewable energy in the Nation's Capital?

Based on the findings of the 2018 Waste Feasibility Study, and accounting for the range of other actions that will be taken to increase resource recovery rates in the ACT, a WtE policy is likely to have a significant impact on our resource recovery rates moving forward.

While reading this paper and considering WtE it is important to be aware that the Waste Feasibility Study estimates that the ACT can achieve a peak maximum rate of reducing, reusing and recycling waste of around 80% or 800,000 tonnes a year. While this would be a significant achievement and place the ACT at the forefront of reducing, reusing and recycling waste, this also means that we need to have a serious conversation as a community about where the remaining 20% or 200,000 tonnes of our waste goes and the consequences of the decisions we make around WtE. For example prohibiting WtE technologies may close the door to future options to move beyond 80% resource recovery.

The reality is that our population will grow, people will produce waste and it may not be economically feasible to reuse or recycle all waste (for example, soiled carpets, non-recyclable plastics or contaminated timber and paper). There are two options for our waste once all reducing, reusing and recycling has been exhausted:

1. recover energy from waste; or
2. landfill.

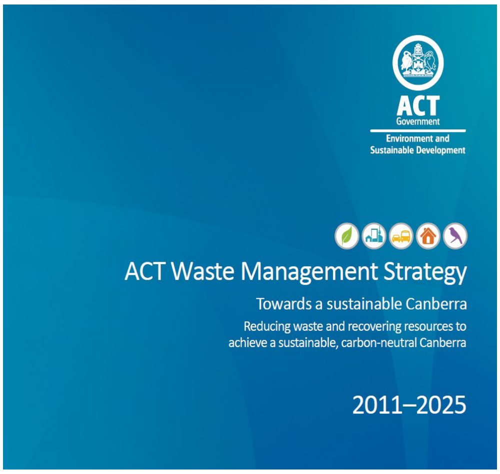
WtE is not a new concept and has been used globally for many decades, including in or around residential areas. However, the unique circumstances of the ACT and its community need to be considered in determining whether WtE has a future in addressing waste management in the Nation's Capital.

Long term means thinking about the potential for new and emerging technologies and solutions

We want to achieve a long term, informed and evidence based policy visions for WtE in the ACT that provides certainty for community and for industry?

BACKGROUND

The ACT Government is committed to improving the Territory's performance in waste management. This is reflected in the ACT Waste Management Strategy—Towards a Sustainable Canberra 2011-2025 (the Strategy).



The goal of the Strategy is to ensure that the ACT leads innovation to achieve full resource recovery (no waste going to landfill) and a carbon neutral waste sector. It also sets an ambitious goal of 90% resource recovery by 2025.

The ACT currently generates about one million tonnes of waste per year. The resource recovery rate has plateaued at around 70% for the last decade, with an average of about 250,000 to 300,000 tonnes of waste each year going straight to landfill.

The 2018 Waste Feasibility Study (the Study) was commissioned by the ACT Government to identify possible pathways (a roadmap) to achieve the ambitious goals set out in the Strategy, including driving towards 90% resource recovery.

The Waste Feasibility Study Roadmap and a Discussion Paper was released for public consultation in May 2018. Consultation closed on 2 July 2018.

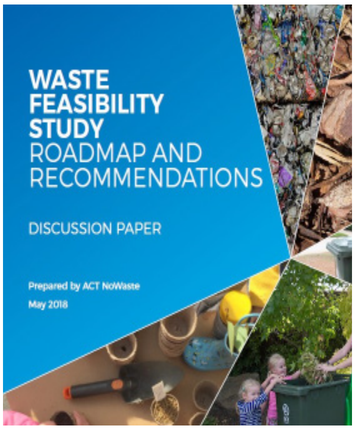
A number of comments were received about WtE which will be considered in this policy development process.

A key recommendation of the Study is the development of a WtE policy. The Study also makes it clear that the ACT will be unlikely to meet its target of 90% resource recovery, or move beyond 80% resource recovery, without some form of WtE.

It is important to note that the 2011 Strategy envisaged consideration of WtE technologies when it was released and in setting a target of 90% resource recovery.

Specifically, the Strategy set a target of doubling the energy generated from waste in the ACT by 2020, and to consider expanding bioenergy generation and investigating new WtE technologies.

At the time, the Strategy found that 10 to 20% of the ACT's waste streams could be better utilised for energy generation and could be a competitive form of renewable energy in the ACT, with WtE generating a number of positive outcomes including:



- increased resource recovery;
- reduced requirements for additional landfill;
- reduced greenhouse gas emissions;
- production of renewable energy from organic waste; and
- potentially sequestering carbon through biochar manufacture.

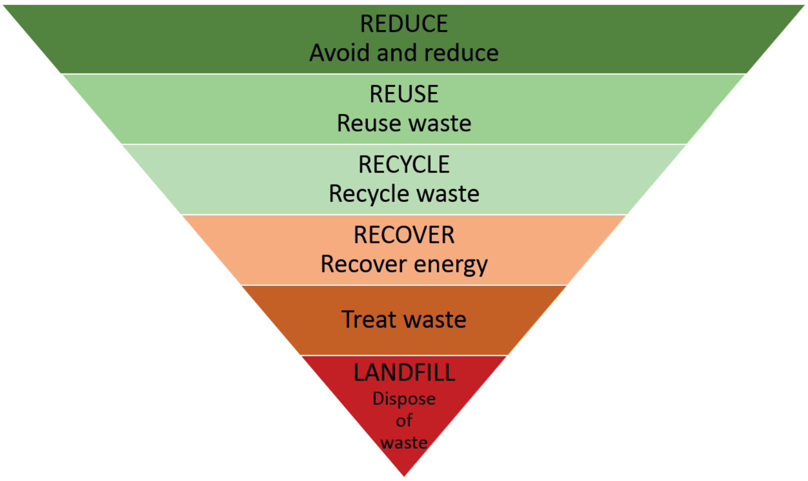
ACT CONTEXT

The ACT community has become increasingly aware of WtE over the last 18 months, driven in part by media interest in waste and two high-profile proposals (the Foy proposal in Hume and the Capital Recycling Solutions (CRS) proposal in Fyshwick). The Foy proposal resulted in an Independent Inquiry Panel being established by the Minister for the Planning and Land Management following an environmental impact assessment (EIS) process. The Panel recommended against the proposal. CRS initially proposed WtE through incineration but subsequently withdrew the WtE component of its project.

Concerns have been raised regarding the perceived potential for pollution and adverse health impacts from WtE, particularly thermal WtE, and use of technologies that may disregard the waste hierarchy.

Although adopting WtE is an option that sits just before landfilling in the waste hierarchy, it represents a significant proportion of resource recovery globally with a large number of plants operating in Europe, the US and Asia. Where implemented appropriately and safely, WtE can be an important tool to prevent waste ending up in landfill.

The waste hierachy



The waste industry has expressed interest in WtE technologies in the ACT. Industry has also expressed an expectation of policy and regulatory certainty.

Currently, there is no national framework for WtE and jurisdictions across Australia have established their own policy frameworks or are looking to do so. At a meeting of Australian Environment Ministers on 27 April 2018 it was agreed, at a national level, to explore WtE. The Federal Government has provided finance and grant funding to a number of new WtE projects in Australia through the Clean Energy Finance Corporation and Sustainable Cities Investment Program. Some jurisdictions in Australia, such as South Australia, also encourage and provide grant funding for WtE projects (for example, processed engineered fuel which will be discussed later in this paper).

Importantly, WtE already occurs in the ACT. Currently, energy is generated from methane gas capture at the Mugga Lane and West Belconnen landfill facilities, which powers around 3,000 homes and prevents the leakage of methane (a potent greenhouse gas generated in landfills) into the atmosphere. The ACT has also used thermal (heated) processing to manage sewage sludge since the 1970's, medical wastes since the 1980's and wood waste since 2015. Wood waste is burned in 'air curtain' burners for stockpile management at construction and demolition sites in Canberra.

Air emissions are regulated by the ACT Environment Protection Authority (EPA) under the ***Environment Protection Act 1997*** (EP Act). The Environment, Planning and Sustainable Development Directorate (EPSDD) is responsible for setting the policy, standards and guidelines around the EP Act. EPSDD is currently reviewing the existing Air Environment Protection Policy under the EP Act, which will include updating the EPA's policy position on emission standards.

OVERARCHING POLICY PRINCIPLES

There a number of high level principles that set a framework for considering a WtE policy in the ACT, including:

- **Respecting the waste hierarchy**
- **Respecting the circular economy**
- **Accurate and evidence based decision making**
- **Achievement of 90% resource recovery by 2025 without some form of WtE is unlikely**
- **The ACT has a target of zero net greenhouse gas emissions**
- **The community is a critical stakeholder and a partner in developing a WtE policy**
- **Industry is seeking certainty about the ACT's position on WtE**
- **Protecting human health and our environment is critical**
- **The ACT has energy needs and has set a range of targets to 2020 including secure and affordable energy, smarter use of energy, cleaner energy and growth in the clean economy**
- **Great cities work by taking sound long-term policy decisions.**

Community support and buy-in is critical to a successful WtE policy

WHAT IS WASTE-TO-ENERGY

Waste-to-energy describes a process where energy and resources are retrieved from waste through processing - resulting in heat, electricity or fuel. It describes a number of different treatment processes and technologies for generating a usable form of energy. These technologies are summarised on the following page.

While the burning or heating (thermal treatment) of waste is contentious in the community, it has been occurring around the world, particularly in Europe, for many years. Some of this technology is tried and tested with a clear understanding of health and environmental impacts, and other technologies are new and have not yet been tested at a large scale or at multiple sites.

Not all methods of WtE involve burning or even heating, for example pyrolysis is a process of heating materials at high temperatures in the absence of oxygen (no burning) while anaerobic digestion is in effect an advanced form of composting. Different regulatory options could be available for different technologies, depending on the outcome of this policy development process.

Thermal methods are common in Europe, where there are around 500 installations, as well as the United States (71 installations at the end of 2015), Japan (more than 1,000 installations) and china and South Korea (120 installations and growing quickly).

Other methods, such as processed engineered fuel (PEF) involve a manufacturing process without heat (for example, shredding) that feeds into a WtE plant. The PEF itself is burnt through other processes, such as the cement making process.

An option presented in the Waste Feasibility Study to bring the ACT above 80% resource recovery is the manufacturing of PEF within the ACT, without heating or burning occurring, for transport to other facilities for burning. It would mean that fossil fuels which are already used in processes such as cement making could be replaced with PEF.

There are many different types of wtE technologies that are explained on the next page

Thermal ('hot') methods — Prior to combustion — Non thermal methods

	1 Incineration (combustion)	2 Gasification	3 Pyrolysis	4 Refuse Derived Fuel (inc. PEF)	5 Landfill gas capture	6 Anaerobic digestion
Burning	✓					
Heating (thermal)	✓	✓	✓			
Technology	Combustion of waste through incineration	Heated with controlled amounts of oxygen (chemical reaction)	Biomass heated in very low or no oxygen	Simple mechanical process of sorting, crushing and shredding	Capture the methane from landfill	Breakdown organic material in a facility
Product	Steam* and ash	Gas and ash	Gas, biochar, oils and tar	Pellets/shredded waste	Methane	Biogas
Burning of end product e.g. in gas grid	✓	✓	✓	✓	✓	✓
GHG emissions compared to landfill**	↓	↓	↓	Displaces fossil fuels already being used		
Emissions compared to coal power plants	↓	↓	↓	Displaces fossil fuels already being used		
Feedstock (what goes in)	Varied waste	Varied but uniform waste (pre-processing needed)	Only really viable for organic waste at the moment	Varied but uniform waste (pre-processing needed)	All landfill, but needs an organic component	Organic waste
Successful at large scale	Yes	No	No	Yes – at Berrima	Yes – already in ACT	Yes - some underway in Aus
Health and pollution outcomes clear	Yes – if managed appropriately and feedstock known	Not demonstrated large scale	Not demonstrated large scale	Yes – part of existing burning process (e.g. cement kiln)	Yes – already in ACT, but methane leakage	Yes – already in ACT
Proven technology	✓			✓	✓	✓

WtE technologies sit on a broad spectrum. Not all involve heating or burning, and some already occur in the ACT

* Waste is burnt and creates a gas which is used to heat water to create steam. Scrubbers are used to remove regulated substances (e.g. toxic gases created from burning the waste).

** MRA Consulting Group prepared a Technical Summary of Energy from Waste for ACT NoWASTE on 3 July 2018.

1 Incineration/combustion

This is a process of burning residual waste at high temperature in combustion chambers. Temperatures must reach a minimum of 850 degrees Celsius. The incineration/combustion results in a high-temperature chemical reaction between a fuel and an oxidant that produces gases.

This method of burning waste and converting it to energy dominates in Europe, and has been occurring around the world for many years. Many incineration facilities are located within close proximity of residences overseas and operate within city limits, for example in Switzerland plants are located within 500 metres of homes and in Vienna (see case study below) plants are built into the urban environment.

Plants utilise filters (scrubbers and condensers) to remove regulated substances. Emission limits are strict and regularly monitored. No significant health issues or environmental impacts have been reported and facilities regularly and consistently come in below EU emission standards, which are considered to be the strictest in the world and much lower than restrictions on coal fired power plants and other industries in Australia. The health effects have been found to be negligible and lower than the effects of car pollution and household chimneys.

However, incineration/combustion does still result in emissions and there have been significant concerns raised with proposals in Australia, including locally within the ACT and NSW. A proposal to build an incinerator in Sydney's west was recently refused on the grounds of uncertainty around impacts on air quality. [1]

Some key benefits/challenges associated with incineration

Benefits	Challenges
Hazardous materials can be destroyed through combustion	Significant community concern within Australia
It is proven and reliable, and generally accepted by communities internationally	Health and pollution impacts need to be managed
Produces less GHG emissions than landfill	May not be economically viable in the ACT - requires a longterm feedstock commitment which means scalability can be an issue (e.g. needing to 'feed the beast').
Sits above landfill on the waste hierarchy	To ensure respect for the waste hierarchy should only use residual waste destined for landfill

Case study: Vienna, Austria

Vienna uses incineration to manage waste within the city limits. The Spittelau incineration plant is one of these facilities and is a city landmark (see photo to the right below).

The Spittelau waste incineration plant processes around 250,000 tonnes of household waste each year and powers more than 60,000 households in Vienna, including providing heating in winter.

1 See: https://www.planning.nsw.gov.au/News/2018/Planning-assessment-finds-the-proposed-energy-from-waste-facility-should-be-refused

2 Gasification

This is a process that heats residual waste at high temperatures of over 700 degrees Celsius, using a controlled amount of oxygen or steam to prevent combustion. This results in a gas.

Gasification was used as early as World War II to fuel vehicles from wood.

Gasification can also occur by exposing residual waste to high temperatures through a plasma arc (plasma gasification). A plasma arc is created through a high energy electrical process with gas (passing gas through an electrical spark).

Some key benefits/challenges associated with gasification

Benefits	Challenges
More efficient in recovering energy and lower capital cost than incineration	Not yet widely commercially developed and may not be commercially viable in the ACT
Produces less GHG emissions than landfill	Health and pollution impacts need to be managed
Sits above landfill on the waste hierarchy	To ensure respect for the waste hierarchy should only use residual waste destined for landfill
Less emissions than incineration	

3 Pyrolysis

This is a process that heats residual waste at high temperatures of over 400 degrees Celsius within very low oxygen environments. In the absence of oxygen the materials change composition, leaving a solid residue with a high concentration of carbon (char), as well as liquids and/or gases, which can all be combusted to generate energy.

The resulting char, known as biochar, can be used as a soil amendment to improve soil fertility or water holding capacity. Charcoal has been manufactured by pyrolysis for centuries.

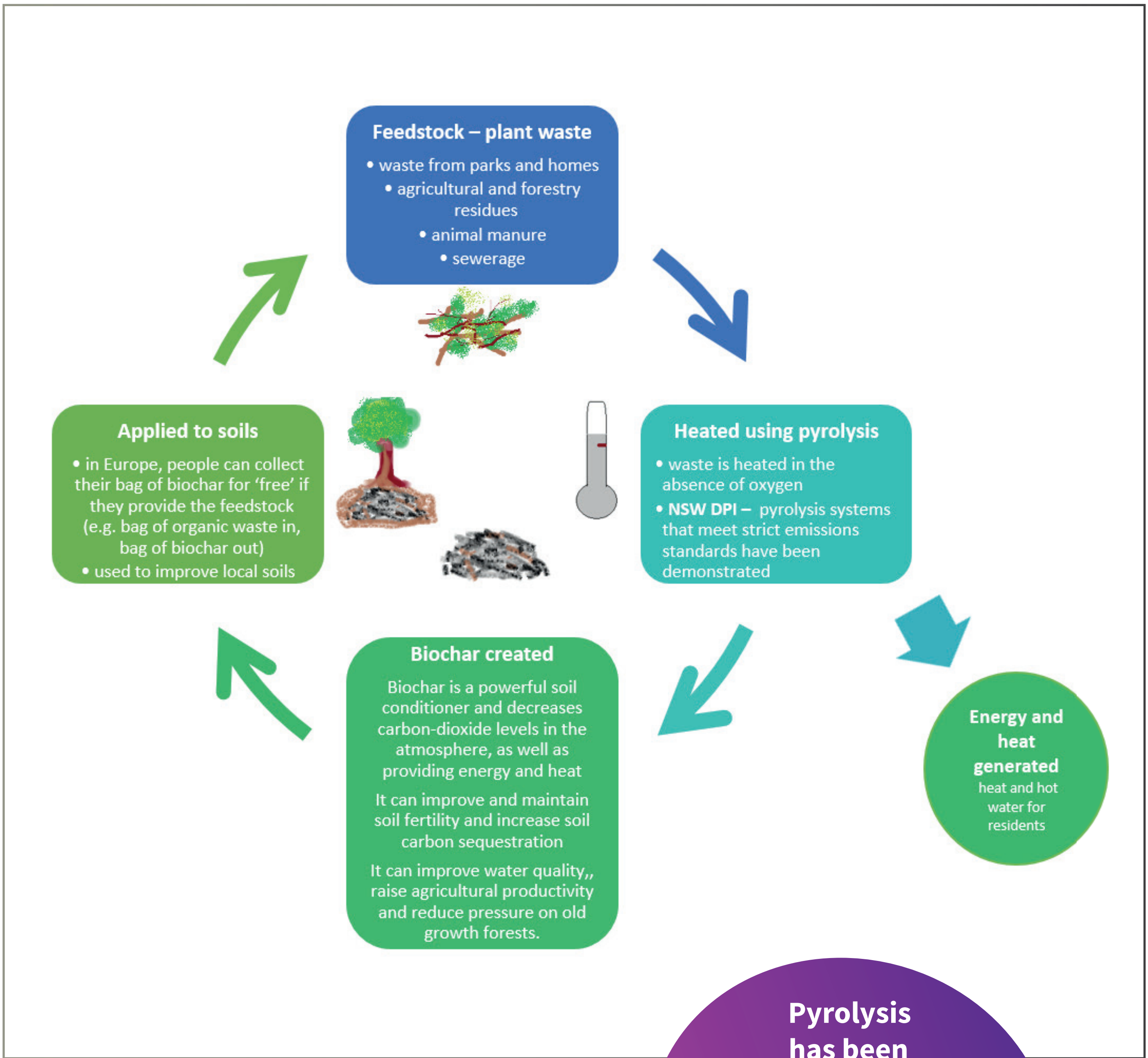
Pyrolysis is only operating successfully internationally on organic feedstocks.

Recently, an independent inquiry panel recommended the refusal of the Foy Proposal in the ACT which proposed to melt plastic waste and convert it into diesel, fuel and LPG using pyrolysis.

Some key benefits/challenges associated with pyrolysis

Benefits	Challenges
Produces less GHG emissions than landfill	Not yet widely commercially developed and may not be economically viable in the ACT
Uses organic feedstock and can produce biochar which is an attractive method of sequestering carbon in soil	Health and pollution impacts need to be managed
Sits above landfill on the waste hierarchy	To ensure respect for the waste hierarchy should only use residual waste destined for landfill
	Currently only proved to be viable for organic waste

An example of how biochar production through pyrolysis can work



Pyrolysis has been operating successfully internationally on organics, producing heating and biochar - a powerful tool to improve soil

4 Refuse Derived Fuel, including PEF

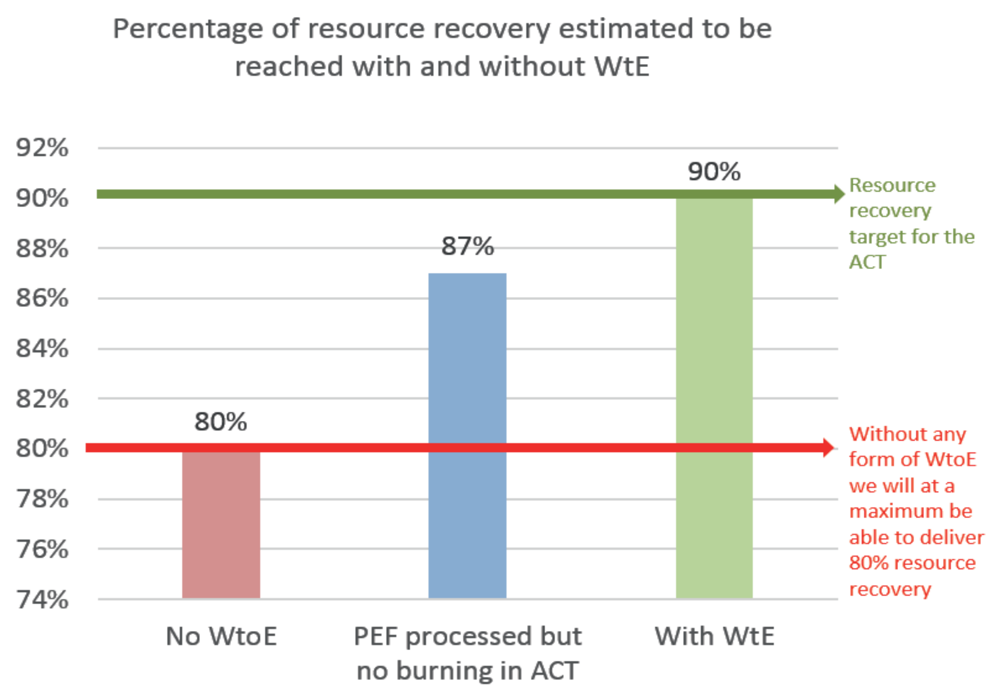
Refuse Derived Fuel (RDF) is the mechanical pre-treatment of residual waste prior to combustion to produce a specific fuel type. This includes Processed Engineered Fuel (PEF).

RDF consists of the combustible components of the residual waste stream, such as non-recyclable plastics, carpet or contaminated timber. The waste is separated and shredded into a uniform grain size through a basic manufacturing process (i.e. squashing and shredding). This enables the recovery of energy (through burning) at a different site to that where the waste is processed. While the contribution of the components of this fuel that are produced from fossil fuels (i.e. plastics) to energy generation cannot be considered 'renewable', the energy generated from the timber components can. This is why PEF can be considered as 'partially' renewable energy option

This is a well established and low risk technology. It means that waste could be processed into small pieces and transported elsewhere for burning. Burning of the fuel replaces the use of fossil fuels, for example fossil fuels that will already be burnt as part of the cement making process (in effect displacing fossil fuels with PEF). The cement making process also absorbs the ash produced through the burning process, so no additional disposal of the ash is required.

This is already occurring in western Sydney (transported to a cement kiln at Berrima) and South Australia.

PEF alone in the ACT has the potential to increase resource recovery rates in the ACT from 80 to 87%. If there was market interest, it would mean that certain waste types that could not be reduced, reused or recycled (e.g. soiled carpet, non-recyclable plastics and contaminated timber and paper) would be mechanically crushed and shredded in the ACT and then transported for burning as part of an already existing process, for example the cement making process.



PEF can be produced as shredded or pelatised material (left and right)

This already occurs in Australia and other countries around the world. The Waste Feasibility Study identified that much of the residual waste currently sent to ACT landfill is suitable for the use in energy generation and cement kilns outside of the ACT.

Some key benefits/challenges associated with RDF/PEF

Benefits	Challenges
Well established, low risk and proven technology that occurs locally	Heating/burning still occurs with the end product – but this is the same as gas from anaerobic digestion and landfill
Diversion of waste from landfill	Need to ensure does not undermine recycling efforts
No local combustion of waste needed	Unsure if there is market interest and economically viable in the ACT
Displaces fossil fuels used in existing processes, e.g. cement kilns	
Sits above landfill on the waste hierarchy on reduces the GHG emissions from landfill	
Can operate at a small scale suited to the ACT	
Scalable and does not require long-term supply commitments	

Case study: South Australia

There are PEF facilities in South Australia that replace gas used in the cement making process (burning in kilns) with PEF. Relevant approvals have been obtained.

The use of PEF reduces the carbon footprint of the kiln facility, lowers energy costs and in the case of one facility reduced the amount of naturally occurring clay used. In addition, it reduced waste to landfill in South Australia.

The PEF Facility operating in Adelaide produces enough PEF to replace around 20% of gas demand of the Adelaide Brighton Cement Kiln.

The manufacturing process consists of:

- Shredding and screening waste (to remove aggregates and sand);
- Hand sorting and removal of contaminants (steel, concrete, masonry etc); and
- Processing to produce PEF.

5 Landfill gas capture

Landfill gas is a complex mix of different gases created by microorganisms acting within a landfill. Landfill gas is 40 to 60% methane.

Landfill gases have an influence on climate change. The major components are carbon dioxide and methane, both of which are greenhouse gases. In terms of global warming potential, methane is around 21 times more detrimental to the atmosphere than carbon dioxide.[1]

Anaerobic digestion naturally occurs underground over time in landfills as organic material breaks down without oxygen. The gases produced within a landfill can be collected and used in various ways.

The efficiency of gas collection at landfills directly impacts the amount of energy that can be recovered - closed landfills (those no longer accepting waste) collect gas more efficiently than open landfills (those that are still accepting waste).

Landfill gas capture already occurs in the ACT at Mugga Lane. For example, a power plant was installed at Mugga Lane tip in 2005 to generate 3 megawatt (MW), which uses around 650 cubic metres of landfill gas each hour. The electricity produced supplies the power needs of up to 1000 homes, reduces greenhouse gas emissions from the landfill and can reduce methane from the landfill by over 1,700 tonnes each year (the equivalent of taking over 4,000 cars off the road).

In the long term however landfill gas capture is less appealing as an energy source compared to alternatives due to its limited efficiency (and the loss of other resources such as metals). It is estimated that over the life of a landfill only about 50% of the LFG is captured and the energy content of non-putrescible material is not recovered.

Some key benefits/challenges associated with landfill gas capture

Benefits	Challenges
No incineration or heating in capturing the energy (does combust the gas to drive a turbine to generate electricity)	Methane leakage from landfills (over 30%)
No separate facility needed	Health and pollution impacts need to be managed
Well established and low risk technology that is relatively cheap	Still results in landfilling of waste (the bottom of the waste hierarchy), and so does not increase waste recovery
	Landfills still need to be built and located in communities
	Landfill is the last resort in the waste hierarchy

Mugga Landfill site - landfill gas capture operation (left and right)

1AP2 A new climate change strategy and action plan for the Australian Capital territory (2012) at: https://www.environment.act.gov.au/__data/assets/pdf_file/0006/581136/AP2_Sept12_PRINT_NO_CROPS_SML.pdf

6 Anaerobic digestion

This is the process of using microorganisms to break down biodegradable material without oxygen present. Many food and drink products, and home fermentation, all use anaerobic digestion. The process produces a biogas which can be used as fuel.

In essence, the biological processes which occur naturally in a landfill environment are undertaken in an engineered in-vessel system.

The process can be considered to reduce emissions of greenhouse gases, because the carbon in biodegradable material is already part of a carbon cycle. These facilities are common internationally and there are some facilities within Australia.

In Sweden, where over 38,600 gas vehicles exist, 60% of the vehicle gas is biomethane generated in anaerobic digestion plants. Anaerobic digestion can exist very close to or within residential or commercial environments without signifcant odour issues.

Biogas is not the only output of anaerobic digestion. Anaerobic digestion can also produce liquids and solids which could be used for fertiliser, soil amendment, livestock bedding and fuel pellets for example.

Given the nature of anaerobic digestion, and the potential for it to contribute to a reduction in greenhouse gas emissions, a different approach may be warranted for this WtE technology.

Some key benefits/challenges associated with anaerobic digestion

Benefits	Challenges
Can be considered to reduce greenhouse gas emissions	Still a developing market nationally and a high initial start-up cost
No incineration or substantial heating involved	Health and pollution impacts need to be managed
Facilities already operating in Australia	Needs good source separation as needs a clean waste stream, and problems with treating garden waste mixed with food
	Biodegradable material only

Case study: Western Australia

The Richgro anaerobic digestion plant was commissioned in March 2015 and is located in Jandakot, Western Australia. The digestion process generates over 5,000 m3 of biogas per day.

A de-packaging process is utilised to separate organic waste from packaging wastes. Recyclable materials such as PET bottles and aluminium cans are also recovered for recycling.

The project received funding/ grants from

- Clean Energy Finance Corporation;
- Australian Government Clean Technology Investment Program; and
- WA State Government grant funding.

RESPECTING THE CIRCULAR ECONOMY

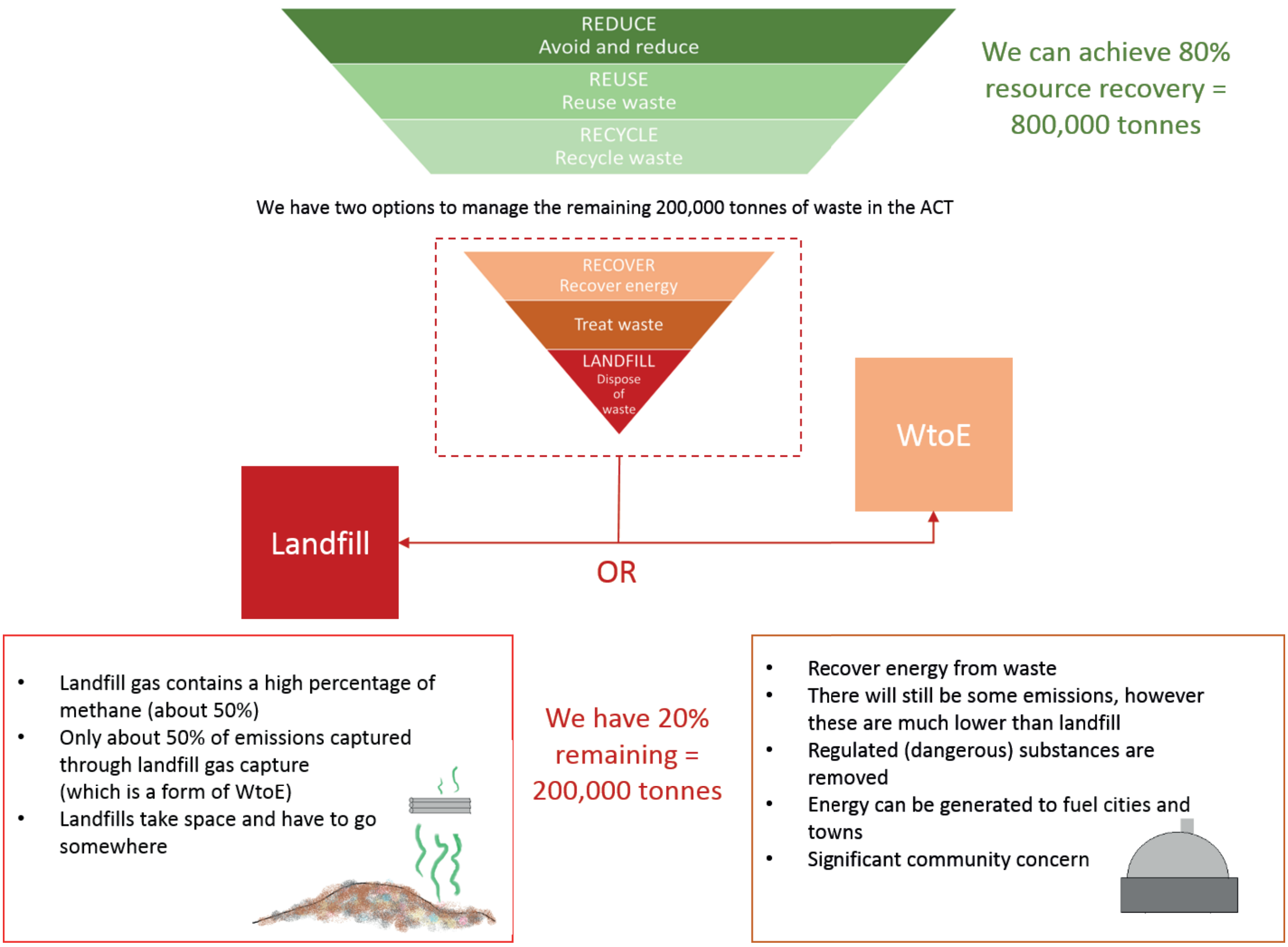
The 'circular economy' counters the existing 'linear economy' that exists in Australia and encourages the purchase and consumption of complex materials that end up in landfill, rather than the ongoing use of those items.

This linear economy is unsustainable as it requires more and more natural resources to be extracted to sustain high consumption lifestyles.

A circular economy aims to reduce environmental impacts by designing out waste and extracting resources from unwanted materials. This approach is enabled by changes to the waste system's design, including through regulation, and is ultimately a market-driven model.

As a vehicle to achieving the circular economy, the Waste Feasibility Study used the waste hierarchy as a filter through which the study and roadmap was developed.

Consistent with this approach, WtE should only be utilised where all reasonable efforts have been made to reduce, reuse and recycle waste. This can be achieved through regulating the industries that participate in WtE and require that only residual waste is used in any WtE activity (i.e. after all efforts to reduce, reuse and recycle have been made).



REGULATION OF WTE

Currently there is no WtE policy in the ACT, and proposed WtE projects are regulated under the *Planning and Development Act 2007* through the environmental impact assessment process and development application process.

The Territory Plan 2008 provides for land use zoning, with particular types of development being assessable within each zone. For WtE, a number of land uses may be applicable, including 'incineration facility' and 'waste transfer station'. Generally these types of uses are restricted to Industrial Zones (IZ1 – General Industrial Zone and IZ2 – Mixed Use Industrial Zone) and the services zone (TSZ2 – Services Zone). While these uses are assessable within a particular zone, this is not an indication of approval and the specific proposal must be assessed for site suitability and environmental impacts.

The ACT Environment Protection Authority (EPA) sets air emission standards and limits that any potential project would need to comply with, if approved. These are currently being reviewed, and could be brought in line with best practice internationally for WtE (currently the EU emissions standard limits).

The *Waste Management and Resource Recovery Act 2016* is the key piece of waste management legislation in the ACT for the operation of waste management businesses, which imposes conditions in line with community expectations on waste management by waste businesses, including waste facilities and waste transporters, operating in the ACT. Any WtE facility would be required to comply with this legislation.

A WtE policy is intended to provide guidance to industry and the community on what the ACT expects when it comes to WtE in the Nation's Capital. It could result in further regulation of WtE projects. For example, the implementation of strict environmental and health standards being applied to WtE projects or restrictions on the use of certain or all technologies. Some technologies, for example anaerobic digestion, may not require as strict regulation as other technologies.

CONCLUSION

At a high level, there are a number of pathways that a WtE policy in the ACT could take and a number of technologies that need to be considered in an ACT context, including whether there is an appetite in the community or from industry to participate in these technologies in the ACT to support waste resource recovery rates where all other options in the waste hierarchy have been exhausted.

This paper is intended to provide background and perspective for WtE in an ACT context and to stimulate discussion around how we manage our residual waste moving forward.

Where all efforts have been made to reduce, reuse and recycle, the ACT needs to decide how it will manage the remainder of its waste.

We want to hear from you about WtE and whether you think there is a future for WtE in the ACT, what kinds of technologies we should be considering and the outcomes we want to achieve as a Territory.

There are a variety of ways for everyone to have their say and be involved - find out more at www.yoursay.act.gov.au.

ACT Government

Transport Canberra and City Services Directorate

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