PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

From Rubbish to Resources: Building a Circular Economy

House of Representatives Standing Committee on Industry, Innovation, Science and Resources

December 2020
CANBERRA

ISBN 978-1-76092-170-5 (Printed Version)

ISBN 978-1-76092-171-2 (HTML Version)

Chair's Foreword

When we consider our day, from the moment we wake to the time we return to bed, how many times do we engage with the garbage bin beside the fridge?

From the obsolescence of your mobile phone to the change in fashion bringing a change in the wardrobe, to the end of the carrots that you don't want to eat, to the drink bottle you purchased with the pie. All these are disposed of but often that is a euphemism to mean merely placed out of sight.

The magic of the disposable society; but the apparition that waste harmlessly disappears, carried away in a truck, is like most magic a mirage.

Waste must be managed for hygiene, for the pure necessity that it can't just lie as litter, arbitrarily scattered around the house and across the fields and over the streets. Waste must be managed for toxins. Waste is an unavoidable by-product of a modern economy that gives us the standard of living we take for granted.

This report addresses the dilemma in some way that the rubbish a nation creates in 2020 must be effectively, efficiently and sustainably dealt with by the nation that creates it. No one is going to put up with our garbage anymore. Finding big old holes in the ground to throw it in is a poor reflection of a nation that wishes to present itself as a clever country.

Nothing in the universe can be destroyed. We are governed by the law of the conservation of energy and mass. Matter does not disappear it just changes form. Following this rule, we must change the form of rubbish, walking it back up the ladder of utility into its reusable component parts.

Organic rubbish can become fertiliser and methane for power. Plastic can become plastic again, steel returns to steel. But some waste is vastly more complex to deal with. How many years has the, at first view, simple task of recycling old tyres alluded us on a wide scale commercial basis? Burying things should be the last option so if you cannot develop the end use technology to recycle then we must

change the initial component parts and technology at the manufacturing of a product. The nation must develop the front-end technology so we can recycle at the end.

In this task of waste management, the nation must be effective in delivering a unified approach across states. It would be inefficient and cumbersome for there to be two different policies either side of the Tweed River for instance. Additionally, policy should not reach so far into domestic or small business that the encumbrance and overhead creates, not a vision for a better environment but a resentment against an excessive government.

I would like to thank the committee members for their participation and efforts especially Madam Deputy Chair, Sharon Bird, Member for Cunningham. Additionally, I would like to note my deep appreciation for the diligent work of the Secretariat.

Hon Barnaby Joyce MP
Chair

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Terms of Reference

The House Standing Committee on Industry, Innovation, Science and Resources will inquire into and report on innovative solutions in Australia's waste management and recycling industries, including:

- Industrial, commercial and domestic waste;
- Waste in waterways and oceans;
- Landfill reduction; and
- Other related matters.

The Committee is to focus on opportunities presented by waste materials, including energy production, innovative recycling approaches and export opportunities, and to also consider current impediments to innovation.

Abbreviations

ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
ACTA	Australian Circular Textile Association
AEC	Australian Energy Council
AFGC	Australian Food and Grocery Council
AIEN	Australian Industrial Ecology Network
ALGA	Australian Local Government Association
AMA	Australian Medical Association
APCO	Australian Packaging Covenant Organisation
APVI	Australian PV Institute
ARENA	Australian Renewable Energy Agency
ASPIRE	Advisory System for Process Innovation and Resource Exchange
ATSE	Australian Academy of Technology and Engineering
ATWA	Anti-Toxic Waste Alliance
CDS	Container Deposit Schemes
CEC	Clean Energy Council
CEFC	Clean Energy Finance Corporation
CHQHHS	Children's Health Queensland Hospital and Health Service
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation

DAWE	Department of Agriculture, Water and the Environment
DEA	Doctors for the Environment Australia
DEE	Department of Energy and the Environment
DEWLP	Department of Environment, Water, Land and Planning
DIIS	Department of Industry, Innovation and Science
DISER	Department of Industry, Science, Energy and Resources
EAF	Electric Arc Furnace
EfW	Energy from Waste
ER	Energy Recovery
FOGO	Food Organics and Garden Organics
LGAQ	Local Government Association of Queensland
LGASA	Local Government Association of South Australia
LGPA	Local Government Professionals Australia
LIV	Law Institute of Victoria
MBT	Mechanical and Biological Treatment
MRF	Materials Recovery Facility
NACCHO	National Aboriginal Community Controlled Health Organisation
NACRO	National Association of Charitable Recycling Organisations
NCTRS	National Computer and Television Recycling Scheme
NFRC	National Federation Reform Council
NHS	National Health Service
NSW	New South Wales
NT	Northern Territory
NWRIC	National Waste and Recycling Industry Council
OECD	Organisation for Economic Co-operation and Development
PHN	Primary Healthcare Networks
PV	Photovoltaics
PVC	Polyvinyl Chloride
R&D	Research and Development

RMF	Recycling Modernisation Fund
SA	South Australia
SCSWA	South Coast Sustainable Waste Alliance
SDU	Sustainable Development Unit
SMaRT	Sustainable Materials Research and Technology
SOFT	Separation of Fibre Technology
SSROC	Southern Sydney Regional Organisation of Councils
TREMS	Transformation of Reclaimed Waste into Engineered Materials and Solutions
UNSW	University of New South Wales
VCA	Vinyl Council of Australia
WA	Western Australia
WALGA	Western Australia Local Government Association
WBGS	World's Biggest Garage Sale
WMRR	Waste Management and Resource Recovery Association of Australia
WRAP	Waste Resource Action Plan
WSROC	Western Sydney Regional Organisation of Councils
WtE	Waste to Energy

List of Recommendations

Recommendation 1

2.65 The Committee recommends that the Commonwealth Government in consultation with state and territory governments implement a pathway to a predominantly national circular economy. This should pay attention to the design and composition of products to enable the greatest capacity for end of life recycling, and consider regulation and incentives to encourage greater repair, reuse, recycling and recovery of materials.

Recommendation 2

2.66 The Committee recommends that the Commonwealth Government undertake further research to identify and examine waste management and resource recovery opportunities related to commercial and industrial, and construction and demolition waste.

Recommendation 3

3.47 The Committee recommends that the Commonwealth Government update the National Waste Policy Action Plan to include measures focused on the transportation and infrastructure requirements to manage national waste across regions and state and territory borders.

Recommendation 4

3.48 The Committee recommends that waste management and resource recovery be included as a standing item on the National Federation Reform Council agenda to monitor federal and state and territory progress against the National Waste Policy Action Plan 2019 and Response Strategy.

Recommendation 5

3.49 The Committee recommends that the responsible Minister report annually to Parliament on the progress of the targets and actions set out in the National Waste Policy Action Plan 2019.

Recommendation 6

3.50 The Committee recommends that recipients of Commonwealth waste management and recycling funding be required to report on the waste management and resource recovery outcomes as a result of that funding.

Recommendation 7

4.146 The Committee recommends that the Commonwealth Government, in consultation with industry, identify and consider the inclusion of additional waste streams under the Product Stewardship Act 2011, particularly emerging or complex waste streams such as e-waste, solar panels, medical waste and textiles.

Recommendation 8

4.147 The Committee recommends that the Commonwealth Government undertake stakeholder consultations to better align the existing waste management and recycling funding and investment programs with industry's needs.

Recommendation 9

4.148 The Committee recommends that the Commonwealth Government undertake an assessment of Australia's current and future waste management and resource recovery infrastructure capacity, with particular emphasis on the volume of waste to be managed and potential markets.

Recommendation 10

4.149 The Committee recommends that the Commonwealth Government, in consultation with the state and territory governments work towards identifying and harmonising relevant waste management and resource recovery policies and legislation to enable a seamless, coordinated and integrated industry across the country.

Recommendation 11

4.150 The Committee recommends that the Commonwealth Government work with state and territory governments to improve access to container deposit facilities and collection points, particularly for people who use these facilities to earn extra money or fundraise.

Recommendation 12

4.151 The Committee recommends that the Commonwealth Government design and implement a national public education and awareness campaign that emphasises avoiding waste, the impact of waste, and how it can be better managed by consumers.

Recommendation 13

5.46 The Committee recommends that the Commonwealth Government develop a national waste to energy policy in consultation with state and territory governments. Consideration should be given to where waste to energy fits into the waste management hierarchy.

5.47 In developing a national policy, the Committee recommends that the Commonwealth Government review current state and territory waste to energy regulation with a view to ensuring national consistency across planning, approval and operational processes.

Recommendation 14

5.48 The Committee recommends that the Commonwealth Government in consultation with state and territory governments develop a national methane-to-power program for landfill sites in cities and larger regional centres.

Recommendation 15

6.40 The Committee recommends that the Commonwealth Government facilitate and coordinate a national assessment of the capacity and potential of rural, regional and remote communities to establish a local waste management and resource recovery industry or serve as a regional hub. This assessment should include an examination of the attributes of communities, including but not limited to, the regional landscape, existing transport routes, local

infrastructure, current amenities and services, and markets for recovered waste.

Recommendation 16

6.41 The Committee recommends that the Commonwealth Government examine measures for rural, regional and remote communities to access adequate funding to invest in local waste management and resource recovery infrastructure and solutions.

Recommendation 17

6.42 The Committee recommends that the Commonwealth Government, in consultation with state and territory and local governments, establish a mobile waste management and recycling program for rural, regional, remote and Indigenous communities designed to:

- Collect waste directly from properties, farms and Indigenous communities and transport this waste for processing and resource recovery in larger regional or town centres.
- Collect abandoned vehicles from properties and roads for crushing and resource recovery in larger regional or town centres.

Recommendation 18

7.55 That the Commonwealth Government examine the flow of textile waste and other household goods in Australia, as well as Australia's current and future capacity to process and recover this waste. The aim of this assessment is to identify challenges and opportunities to better manage this waste stream.

Recommendation 19

7.56 That the Commonwealth Government develop a specific national textile waste policy which is underpinned by the principles of a circular economy. It is recommended this policy focus on, but not be limited to:

- greater investment in domestic recycling technology and infrastructure;
- improved product stewardship and design;

- introduction of standards and specifications for recycled content in textiles;
- targeted government procurement policies for recycled textiles;
- consistency across state and territory policy; and
- greater consumer education and awareness regarding textile waste, reuse and repair.

Recommendation 20

7.57 That the Commonwealth Government, in consultation with state and territory governments, examine options for:

- improving the placement and availability of charitable and commercial clothing recycling bins in local government areas; and
- minimising the costs associated with managing illegally dumped goods or unsuitable donations.

Recommendation 21

8.93 The Committee recommends that the Commonwealth Government undertake further research into improving waste management and resource recovery in the medical sector including opportunities to reduce, recycle and reuse waste from hospitals, clinical practices and medical facilities.

8.94 Consideration should be given to establishing a unit similar to NHS England's Sustainable Development Unit to harmonise Commonwealth and State and Territory regulation.

8.95 The Committee recommends that the Department of Health take the lead on this body of work in consultation with the Department of Agriculture, Water and the Environment.

Recommendation 22

8.96 The Committee recommends that the Commonwealth Government in consultation with the states and territories, ensure that any ethical issues arising from the management, handling and disposal of human and anatomical waste are respectfully addressed.

Recommendation 23

8.97 The Committee recommends that the Commonwealth Government in consultation with the states and territories explore options for resource recovery of food organics and garden organics waste including processing as compost and fertiliser for horticulture and agriculture.

8.98 It is recommended that a business plan be developed to identify opportunities for reprocessed food organics and garden organics waste to be transported and sold in rural and regional markets.

Recommendation 24

8.99 The Committee recommends that the Commonwealth Government in consultation with state and territories explore options to sustainably manage decommissioned wind turbines.

Executive Summary

Australians generate 2.7 tonnes of waste, each, per year. Approximately, 40 per cent of this waste ends up in landfill.

Changes to Australia's waste management and recycling landscape have combined to create new opportunities for industries to innovate with waste. A national ban on many waste exports, the global shift to a circular economy and the redefining of waste as a resource has highlighted the potential of industry to do more with what people discard as rubbish.

On 17 October 2019, the Minister for Industry, Science and Technology, the Hon Karen Andrews MP, asked the Committee to examine innovative solutions to waste management and recycling in Australia, including the opportunities presented by waste and current impediments to innovation.

Much of the evidence presented to the Committee related to current impediments to innovation. It emphasized the policy and systemic settings needed to better support innovation, and in particular, to upscale and commercialise resource recovery facilities and operations.

The Committee has made 24 recommendations designed to remove these impediments and improve resource recovery.

The Committee's inquiry progressed as a series of Commonwealth policies, strategies, and investment funds to support Australia's waste management and resource recovery industries were developed. These include the:

- National Waste Policy Action Plan;
- $100 million Australian Recycling Investment Fund;
- National Plastics Summit;
- Response strategy to implement the waste export bans;
- Commonwealth Procurement Guidelines;
- $190 million Recycling Modernisation Fund;

- Recycling and Waste Reduction Bill; and
- $20 million Product Stewardship Investment Fund.

These Commonwealth initiatives are part of a broader $1 billion transformation of Australia's waste and recycling industries. The Committee supports these reforms.

To better manage waste there is a need to better manage what happens to products before they become waste – that is, before a product is thrown out.

This path commences well before deciding in which bin to discard rubbish. It starts from when a product is manufactured. It refers to rethinking all of the resources and materials that are used to make a product, including the components, parts and packaging. It starts with transitioning to a circular economy.

The aim of a circular economy is to essentially 'design out waste'. Under this model, once consumers have finished using a product, the product should be repairable, broken down into parts which can either be reused or recycled; or captured, composted or converted into energy. Only that which remains, if anything, is landfilled.

If manufacture and waste is reconsidered in this way, innovation will lead to new opportunities that will create jobs, grow the economy, protect the environment and improve health and wellbeing.

Impediments to innovation

The Committee heard that technology and solutions are not really the missing link in developing Australia's waste management and recycling industries, particularly as there are already technological solutions available domestically and overseas. Rather, what is needed is a national framework within which regulation, incentive-based actions, taxes and levies, and long-term policy certainty are key features.

The Commonwealth Government has a crucial role in developing this framework, most importantly in leading and coordinating national approaches, and removing the impediments to innovation. Key areas identified for reform include:

- Product stewardship;
- Markets and end users of recycled products;
- Infrastructure investment;
- National coordination;
- Research and data; and
- Education and awareness.

These key areas are similar to those characteristic of top-performing countries such as Germany, South Korea, Slovenia and Austria when it comes to waste management and recycling.

Product stewardship schemes are necessary to drive change and shift the responsibility for waste to manufacturers, importers and producers. Markets for — and end users of — recycled products are fundamental to strengthening the value of waste. Accessible funding and greater investment in infrastructure will not only diversify onshore operations and markets but allow recycled products to be exported overseas. Available information and investment in research and development will drive innovation and inform policy and investment decisions. While community awareness and education will help reset social norms regarding how we avoid, manage and dispose of waste.

Notwithstanding that state and territory and local governments are primarily responsible for waste management and resource recovery in Australia, the Commonwealth has an important leadership and coordination role. Essentially, it must bring together and harmonise eight different jurisdictions to create a more seamless waste management and resource recovery industry as well as a competitive domestic and international market for recycled products.

The Committee has made a series of recommendations to address the impediments to innovation and to facilitate greater consistency in resource recovery policy and legislation. The Committee has recommended that consideration be given to the inclusion of additional waste streams under *the Product Stewardship Act 2011,* better alignment of existing funding and investment programs with industry needs, and a national assessment of waste management and resource recovery infrastructure capacity.

Waste to energy

Waste-to-energy (WtE) technology refers to a range of technologies that convert waste that would otherwise go to landfill into energy sources such as electricity, heat and fuel. Compared to other countries, WtE is relatively new in Australia and predominantly comprises small-scale bioenergy plants that generate energy from organic waste.

Waste-to-energy technology is a contentious area of waste management and resource recovery although the Committee heard that many of these concerns primarily relate to thermal processes that incinerate waste. Specifically, debate surrounds the environmental friendliness of these technologies and whether they undermine other waste management and recycling strategies by burning waste that could be recycled, reused or recovered in other ways.

Advocates who support this technology however consider it to be the missing link in Australia's waste management hierarchy and called on the Committee to consider a national policy to provide clarity, certainty, and regulatory consistency for WtE stakeholders. The Committee supports this position. It has recommended the development of a specific WtE policy, as well as the development of a national methane-to-power program for landfill sites in cities and larger regional centres.

Rural and regional Australia

The Committee heard that 23 per cent of local governments (123 councils) across Australia do not provide kerbside collection for recycled materials. Differences in geographic areas, population, revenue, and access to waste management and recycling infrastructure all contribute to service disparity between local government areas.

This disparity is most evident in rural, remote and regional communities. Dispersed populations, lower revenue streams, longer distances to larger town centres and high transport costs usually mean that most municipal waste in these areas is sent to landfill rather than diverted.

Rural and regional Australia offers significant opportunities to better manage and process Australia's waste. Regional Australia's willingness to attract, invest and establish local industries, as well as their geographic assets lend themselves to this type of industry, particularly compared to the often more populated, congested and land limited cities.

The Committee recognises that the location of waste management and resource recovery facilities is primarily a matter for state and territory and local governments. However, in order to maximise the opportunities offered by rural and regional communities, the Committee recommends that the Commonwealth Government prioritise its coordination and leadership in two key areas. First, in assessing the potential of rural and regional towns to manage and process waste. This assessment should consider key attributes of a location such as the regional landscape, existing transport routes, local infrastructure and amenities, and potential markets for recovered waste. Second, in assisting with investment in the necessary infrastructure to support a local industry.

The Committee also recognises the difficulty of rural, regional and Indigenous communities in accessing resource recovery services, particularly for agricultural waste, and for disposing of vehicles and machinery in a sustainable way. The Committee recommends that where possible, consideration be given to the introduction of mobile waste management services to help collect, transport and process waste in these areas.

Textiles

Textile waste is a large and rapidly growing problem, having the lowest recovery rate of all waste types. The Committee's examination of textile waste focused on three key areas: consumer waste and turnover of goods, opportunities to recycle and reuse products, and current impediments. Clothing, in particular, 'fast-fashion' was cited as particularly problematic creating pressure on landfill and donated clothing associations.

There was strong support for the introduction of a national textile policy that includes standards, targets and uniformity across states and territories to reduce the volume of textile waste disposed in landfill. Some stakeholders submitted their own 10 year road maps for addressing textile waste.

Expanding the re-use of textiles through textile collection bins and online systems as well as expanding the recycling of textiles through technology and manufacture were highlighted as two avenues to increase the recovery rates.

The Committee has made the following recommendations in this area including an assessment of the flow of textile waste in Australia to better understand this issue, the introduction of a national textile waste policy, and reconsidering the accessibility and location of clothing recycling bins in local government areas. Measures to minimise the costs associated with disposing of illegally dumped or unsuitable goods are also recommended.

Focus areas

The Committee examined a broad range of waste types including food and garden waste, medical waste, solar panels, wind turbines and mining waste. The selection of waste types emphasised the breadth of opportunity that exists for resource recovery across various sectors and products, as well as waste management challenges in these areas. For example:

To better manage waste in waterways and oceans, the Committee heard that there is a need to prevent waste – particularly single use plastics and litter – from entering waterways in the first place. This can be achieved by reducing our use of plastic, improving rubbish disposal, and ensuring that manufacturers and producers are responsible for the waste arising from their products. The Committee was encouraged by the many programs and initiatives introduced by local and state governments to address this issue.

Evidence suggests that as much as 50 per cent of household waste is food and garden waste. This presents a number of problems for local councils and communities. Food and organic waste takes up space in landfills, produces harmful methane gas, and is a missed opportunity to recover a valuable resource

for energy, livestock feed and compost. The Committee recommends that options be explored to process this waste as compost or fertiliser for agriculture.

Australian healthcare produces around 130,000 tonnes of waste per year. The difficulty of recycling medical waste in hospitals is compounded by a number of issues including the absence of a clear, generally agreed definition of clinical waste, lack of recycling infrastructure set up to manage waste, limited staff training and knowledge of this area, and a heavy reliance on single-use plastic items. The Committee sees significant potential for greater resource recovery in the medical sector which would benefit from the wider roll out of existing initiatives, national coordination of efforts, sustainable procurement policies, and improved education and training of staff. The Committee recommends further examination of these issues.

Solar panels are set to become one of Australia's largest electronic waste streams in coming years, with around a quarter of Australian households having installed solar panels. The growth of solar panels in Australia was described as 'sustained and significant'. The Committee heard that Australia does not have a systemic sustainable process for managing end-of-life solar panels, although the core components of solar panels – glass, plastic and metal – can be recycled. Currently, end of life solar panels may end up in landfill, be stockpiled or recycled. The Committee has recommended that solar panels be included under the *Product Stewardship Act 2011*.

As the current of wind turbines reach their end of life, consideration should be given to how these pieces of infrastructure can be managed more sustainably. Evidence received by the Committee stated that the biggest issue with the management of wind turbines is the blades, given the composite materials used to make them. The Committee recommends that the Commonwealth Government in consultation with state and territories explore options to manage decommissioned wind turbines.

The Committee examined two former mining sites – the Mount Morgan Mine in Queensland and the Woodsreef Mine in New South Wales – as case studies of managing and removing harmful or toxic waste. This is an important area requiring further examination. It is essential that hazardous waste is limited and contained to the site where it was created and poses no risk to surrounding communities, waterways or the environment. It is the Committee's view that opportunities to reuse old mining sites through backfilling or re-mining be explored.

Community engagement

Half of the submissions received by the Committee included a broad range of suggestions for improving domestic recycling, diverting waste from landfill, and changing the content of products. The submissions overwhelmingly called for a ban on single use plastics and stressed the need for alternatives to materials, products and practices that are harmful to the environment.

There is much reform already underway in the waste management and resource recovery sector and more work is still to come. Underpinning all this effort is a willingness for change – whether at the consumer, community, commercial or government level – that is fundamental to reducing our waste and managing these resources more effectively. To help drive this change, the Committee has recommended the development of a national public education and awareness campaign that emphasises avoiding waste, the impact of waste, and how it can be better managed.

1. Introduction

Background

1.1 There is growing recognition that waste has value. Discarded material from households, commercial premises and industrial sites is not merely considered rubbish but a useful resource that can be turned into new components, products and energy.

1.2 In Australia, waste is collected and processed by the waste management and resource recovery sector; an industry which contributes over $15 billion a year to the Australian economy, and employs 50,000 people.[1]

1.3 In 2016-2017, Australia produced an estimated 67 million tonnes of waste, which equates to roughly 2.7 tonnes of waste per person.[2] Of this 67 million tonnes, 58 per cent was recovered (either through recycling or energy recovery) and approximately 40 per cent was sent to landfill.[3]

1.4 While rates of recycling and resource recovery in Australia are increasing, and the amount of waste generated per person is decreasing, overall waste in Australia is increasing.[4] This is largely the result of population and economic growth.

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1 Ms Gayle Sloan, Chief Executive Officer, Waste Management and Resource Recovery Association of Australia, *Committee Hansard*, Canberra, 26 August 2020, p. 6.

2 Blue Environment Pty Ltd, *National Waste Report 2018*, report prepared for the Department of the Environment and Energy, p. 2 <www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf > accessed 20 October 2020.

3 Blue Environment Pty Ltd, *National Waste Report 2018*, pp. 92-94.

4 Blue Environment Pty Ltd, *National Waste Report 2018*, pp. x-xi.

1.5 Improving Australia's rates of resource recovery and recycling is fundamental to improving economic, social, health, and environmental outcomes. This is particularly evident when considering that for every 10,000 tonnes of waste that is recycled, nine jobs are created.[5]

1.6 Changes to Australia's waste management and recycling landscape have combined to create new opportunities for industries to innovate with waste. A national ban on waste exports, the global shift to a circular economy and the redefining of waste as a resource has highlighted the latent potential of our industries to do more with waste.

1.7 On 17 October 2019, the Minister for Industry, Science and Technology, the Hon Karen Andrews MP, asked the Committee to inquire into and report on innovative solutions in Australia's waste management and recycling industries.

1.8 Specifically, the Committee was asked to focus on opportunities presented by waste materials, including energy production, innovative recycling approaches and export opportunities, and to consider current impediments to innovation. A copy of the Terms of Reference can be found on page xiii.

Inquiry process

1.9 The Committee issued a media release on 25 October 2019, announcing the inquiry and calling for submissions. In total, 236 submissions and two exhibits were received. A list of these submissions and exhibits can be found in Appendices A and B.

1.10 The Committee held 13 public hearings, and conducted one site visit. Details of these meetings can be found in Appendix C and transcripts for all public hearings can be found on the Committee's website.[6]

COVID-19

1.11 The Committee's public hearing and site visit program was significantly interrupted by COVID-19 travel and gathering restrictions across the country, as well as changes to the Parliamentary sitting calendar. As a result, the Committee was unable to travel interstate for public hearings or visit

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5 Mr Dean Knudson, Deputy Secretary, Department of the Environment and Energy, *Committee Hansard*, Canberra, 4 December 2019, p. 2.

6 Standing Committee on Industry, Innovation, Science and Resources, *Public Hearings*, <www.aph.gov.au/Parliamentary_Business/Committees/House/Industry_Innovation_Science_and_Resources/WasteandRecycling/Public_Hearings>, accessed 18 March 2020.

waste management and resource recovery facilities. It was also unable to travel overseas to examine initiatives and infrastructure in other countries. This limited the Committee's ability to receive in-person and on-site evidence.

1.12 All public hearings were held in Canberra, and in most cases, by teleconference. The Committee held one site visit at the Woodlawn Eco-precinct in Tarago, New South Wales, prior to the COVID-19 shutdown.

Commonwealth waste management and recycling reforms

1.13 The Committee's inquiry progressed as a series of Commonwealth policies, strategies, and investment funds to support Australia's waste management and resource recovery industries were developed. The most significant of these announcements included:

November 2019:	National Waste Policy Action Plan
December 2019:	Australian Recycling Investment Fund
February 2020:	National Plastics Summit
March 2020:	Response strategy to implement the COAG waste export ban
	Commonwealth Procurement Guidelines
July 2020:	Recycling Modernisation Fund
	Recycling and Waste Reduction Bill
	Product Stewardship Investment Fund

1.14 The Committee notes recent Commonwealth reports which have examined aspects of waste management and recycling. For example:

- In June 2018, the Senate Standing Committee on Environment and Communications released its report into the waste and recycling

industry in Australia, *Never Waste a Crisis*, which made 18 recommendations.[7]

- In July 2020, the Department of Agriculture, Water and the Environment released its first review of the *Product Stewardship Act 2011* (Cth), which made 26 recommendations.[8]
- In October 2020, the Senate Standing Committee on Environment and Communications released its report into the *Recycling and Waste Reduction Bill 2020 [Provisions] and Related Bills* which made four recommendations, including that the bill be passed.[9]

1.15 Several submitters drew the Committee's attention to the similarities between these reviews, recent work by state and territory governments, and the Committee's inquiry.[10] In particular, submitters encouraged the

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7 Senate Environment and Communications References Committee, *Never Waste a Crisis: the Waste and Recycling Industry in Australia,* June 2018, pp. ix–xi, <www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/WasteandRecycling/~/media/Committees/ec_ctte/WasteandRecycling/Report/report.pdf > accessed 20 October 2020.

8 Department of Agriculture, Water and the Environment, *Review of the Product Stewardship Act 2011, Including the National Television and Computer Recycling Scheme*, July 2020, <www.environment.gov.au/protection/waste-resource-recovery/publications/product-stewardship-act-review-report>, accessed 20 October 2020. These are required by s109 of the Act to take place as soon as possible every five years after the commencement of the Act (8 August 2011: s 2).

9 Senate Environment and Communications Legislation Committee, *Recycling and Waste Reduction Bill 2020 [Provisions] and Related Bills*, October 2018, p. vii, <parlinfo.aph.gov.au/parlInfo/download/committees/reportsen/024546/toc_pdf/RecyclingandWasteReductionBill2020[Provisions]andrelatedbills.pdf;fileType=application%2Fpdf > accessed 20 October 2020. This bill is discussed in more detail in Chapter 3.

10 For example see New South Wales Legislative Council, Portfolio Committee No. 6 – Planning and Environment, *Energy from Waste Technology,* March 2018, <www.parliament.nsw.gov.au/lcdocs/inquiries/2436/Final%20-%20Report%2028%20March%202018.pdf> accessed 20 October 2020; Victorian Legislative Council, Environment and Planning Committee, *Inquiry into Recycling and Waste Management, Final Report*, November 2019, <www.parliament.vic.gov.au/images/stories/committees/SCEP/Recycling_and_Waste_Mgmt/Report/Inquiry_into_recycling_and_waste_management.pdf > accessed 20 October 2020 and Infrastructure Victoria, *Advice on Recycling and Resource Recovery Infrastructure*, April 2020, <www.infrastructurevictoria.com.au/wp-content/uploads/2020/03/Advice-on-recycling-and-resource-recovery-FINAL-REPORT.pdf> accessed 20 October 2020.

Committee to consider the body of work already completed and any relevant recommendations and findings.[11]

1.16 For example, the Western Australia Local Government Association noted in its submission, dated November 2019:

> There is a considerable amount of activity at a National level currently. The National Waste Policy Action Plan was recently released, there are two Senate inquiries and a Discussion Paper on Export Bans currently out for comment…it is imperative that any changes need to be progressed in a cohesive way to avoid fragmentation and duplication of effort. Clear leadership from the Federal Government, working with States and Territories and Local Government will be essential.[12]

1.17 The Commonwealth Government's recent policy announcements and initiatives are part of a broader plan to transform Australia's waste and recycling industries. This plan involves supporting industry and households to transition to the waste export bans, better manage the increased volume of waste, and maximise the opportunities presented by waste as a resource.

1.18 The Committee acknowledges a degree of overlap in these activities and the inquiry. Namely, in the stakeholders who contributed to the different reviews and consultations, the themes and issues raised, and in the many identified actions, strategies and policy changes required to support change. It is likely that this overlap contributed to some stakeholder fatigue, duplication of ideas, and similar recommendations.

1.19 Notwithstanding the work currently underway, the focus of the Committee's inquiry was on innovative solutions to waste management and recycling. Much of the evidence presented to the Committee related to current impediments to innovation. It emphasised the policy and systemic settings needed to better support innovation in waste management and resource recovery, and in particular, to upscale and commercialise facilities and operations. It is this theme that is central to the Committee's report.

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11 For example, National Waste and Recycling Industry Council, *Submission 197*, p. 1; Australian Energy Council, *Submission 153*, pp. 1–2; and Law Council of Australia, *Submission 165*, pp. 1–2.

12 Western Australian Local Government Association, *Submission 27*, p. 1.

Structure of the report

1.20 This report is structured into nine chapters:

- Chapter one is this introduction.
- Chapter two provides a brief overview of the waste management and recycling industry, and introduces two key concepts — the waste management hierarchy, and the circular economy.
- Chapter three discusses the role of the Commonwealth Government in waste management and resource recovery and its recent policy announcements.
- Chapter four sets out key impediments to innovation. In particular, it discusses system and policy issues identified by stakeholders to better support innovation.
- Chapters five to eight focus on specific areas of interest including waste-to-energy technology, rural and regional Australia, and the textiles industry. Other areas examined include waterways and oceans, food and garden organic waste, medical waste and solar panels.
- Chapter nine summarises a group of submissions that predominantly highlight practical ways for people to reduce, reuse and recycle domestic waste.

1.21 Case studies of waste management and recycling innovation are included throughout the report.

Acknowledgements

1.22 The Committee would like to thank everyone who provided written submissions, appeared at public hearings and briefed the Committee for its inquiry.

2. Waste management and resource recovery

What is waste?

2.1 Waste refers to anything that is thrown out. The *National Waste Report 2018* defines waste as:

> materials or products that are unwanted or have been discarded, rejected or abandoned, including materials or products that are recycled, converted to energy or disposed.[1]

2.2 There are various types of waste in Australia. For the purpose of this inquiry, waste refers to 'core waste', which is generally managed by the waste management and resource recovery sector.[2]

2.3 Core waste is classified into three streams:

- Municipal solid waste: generated by households or council operations (including waste collected in public places like parks and beaches);[3]

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1 Blue Environment Pty Ltd, *National Waste Report 2018*, report prepared for the Department of the Environment and Energy, p. ix. <www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf > accessed 23 October 2020.

2 Blue Environment Pty Ltd, *National Waste Report 2018*, p. vii.

3 Blue Environment Pty Ltd, *National Waste Report 2018*, p. viii; Senate Standing References Committee on Environment and Communications, *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 5, para. [2.1], <www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/WasteandRecycling/~/media/Committees/ec_ctte/WasteandRecycling/Report/report.pdf > accessed 23 October 2020.

- Commercial and industrial waste: produced by institutions and businesses (including coal ash but generally excluding waste from primary production);[4] and
- Construction and demolition waste: produced by construction and demolition activities.[5]

2.4 In addition to these three streams, waste may be classified as 'hazardous'. Generally, this refers to waste that poses a threat to public safety or the environment.[6]

Waste statistics

2.5 Of the estimated 67 million tonnes of waste produced in 2016-17, approximately half (49 percent) or 32.7 million tonnes was commercial and industrial waste (including ash).[7] Construction and demolition waste made up 30 per cent or 20.4 million tonnes, followed by municipal solid waste which equated to 13.8 million tonnes or 21 per cent of waste.[8]

2.6 Between 2006–07 and 2016–17, overall waste production in Australia grew by 6 per cent.[9] During that period, municipal solid waste increased by 7 per cent, construction and demolition waste increased by 19 per cent, and commercial and industrial waste decreased by 1 per cent.[10]

2.7 On a per capita basis, total waste decreased by 1.1 per cent, from 3.05 tonnes in 2006–07 to 2.74 tonnes in 2016–17.[11] In other words, over the last decade the amount of waste generated by each person has decreased.

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4 Blue Environment Pty Ltd, *National Waste Report 2018*, p. vii.

5 Blue Environment Pty Ltd, *National Waste Report 2018*, p. vii.

6 For further information about hazardous waste see Blue Environment Pty Ltd, *Hazardous Waste in Australia 2019*, report prepared for the Department of Environment and Energy, p 128. <www.environment.gov.au/system/files/resources/b4335773-4e09-4d87-8648-592b2b94d2d9/files/hazardous-waste-australia-2019.pdf> accessed 23 October 2020.

7 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 91.

8 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 91.

9 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 91.

10 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 91. The decline in commercial and industrial waste was due to ash production, which fell by 14 per cent over the period, following a decline in coal-fired power generation: *National Waste Report 2018*, p. 30.

11 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 91.

2.8 What happens to waste that is generated is described as its 'fate'. Waste may be recycled, converted to energy, put into long-term storage (that is, for longer than 10 years) or disposed of.[12] Hazardous waste often requires treatment before it can be safely allocated to a final fate.[13]

2.9 Table 2.1 illustrates the fate of waste in Australian in 2016–17 (including treatment).

Table 2.1 Waste Fate 2016-17

Fate	Amount of Waste (million tonnes)	Proportion of total waste (per cent)
Recycling	37.03	55.45
Energy recovery	1.97	2.95
Treatment	0.82	1.23
Long-term storage	0.02	0.03
Disposal	26.94	40.34
Total	**66.78**	**100.00**

Source: National Waste Report 2018, pp. 92, 94.

2.10 Table 2.1 shows over half of all waste generated in 2016–2017 was recycled (55 per cent) while 40 per cent was disposed of, predominantly in landfill.

Waste management and resource recovery industry

2.11 The most recent comprehensive economic assessment of the waste management and resource recovery industry, undertaken by the Centre for International Economics, found the value of the industry's activities to be $15.5 billion.[14] Further analysis found:

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12 Blue Environment Pty Ltd, *National Waste Report 2018*, p. ix.

13 Blue Environment Pty Ltd, *National Waste Report 2018*, p. ix.

14 The Centre for International Economics, *Headline Economic Value for Waste and Materials Efficiency in Australia*, report prepared for the Department of Environment and Energy, October 2017, p. 1, <www.environment.gov.au/system/files/resources/2cb83be1-2352-484e-b176-bd4328a27c76/files/headline-economic-values-waste-final-report-2017.pdf> accessed 23 October 2020.

- $12.6 billion (81.3 per cent) of this was from service provision;
- $2.9 billion (18.7 per cent) was from the sale of recovered materials;
- industry activities contributed $6.9 billion, or 0.43 per cent of Gross Domestic Product, and
- the industry employed the equivalent of 49 160 full time workers.[15]

2.12 The Centre for International Economics found that 'private and public trading waste management enterprises' conducted 56.3 per cent of 'waste related activities', local councils conducted 19.9 per cent and companies in other industries conducted the remaining 23.8 per cent.[16] In other words, approximately 80 per cent of waste management and resource recovery in Australia is undertaken by the private sector.

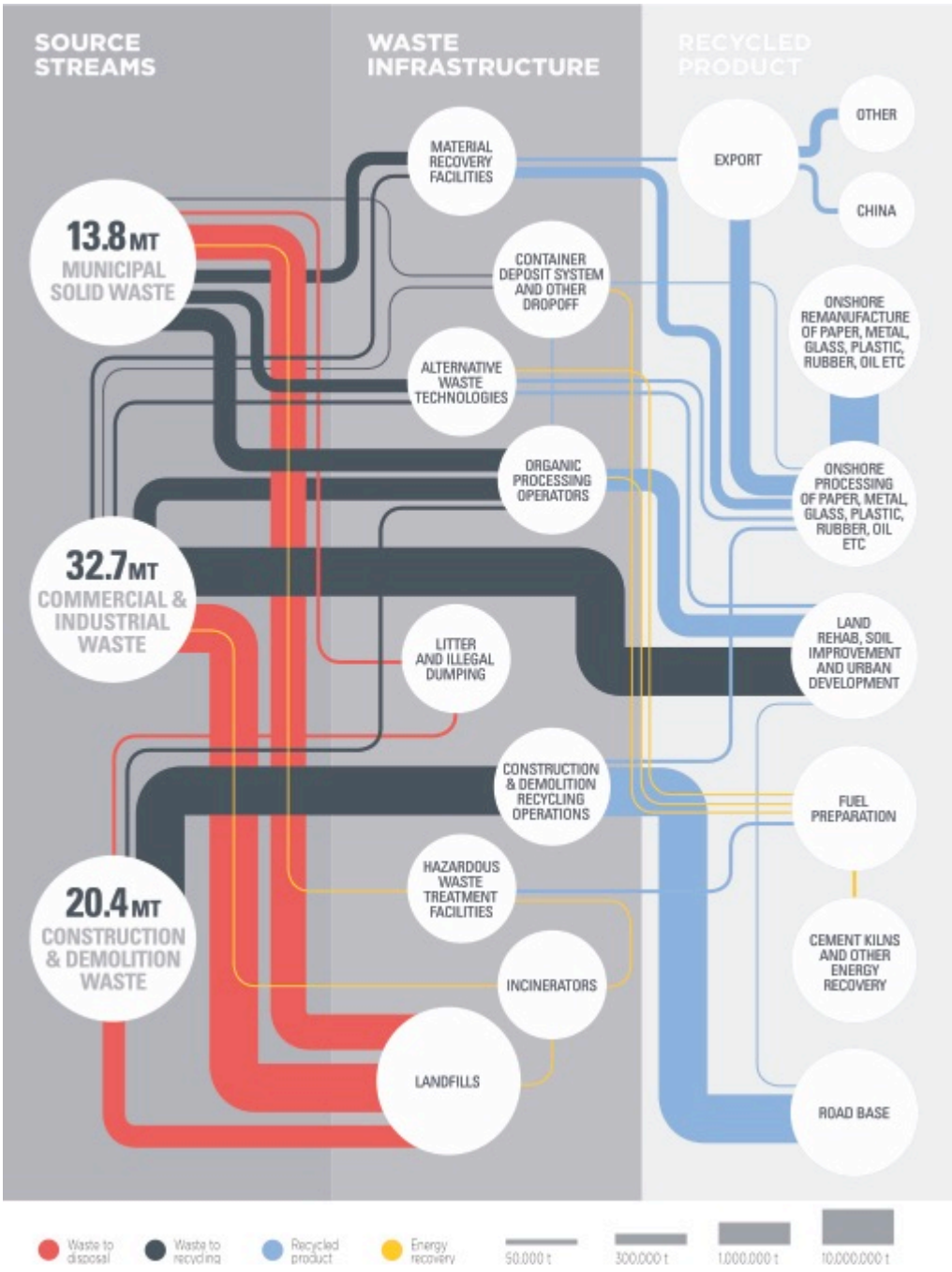
The industry's activities

2.13 The *National Waste Report 2018* provides a useful overview of the waste management and resource recovery industry in Australia. The flow of waste through this industry is depicted in Figure 2.1.

15 The Centre for International Economics, *Headline Economic Value for Waste and Materials Efficiency in Australia*, October 2017, p. 1.

16 The Centre for International Economics, *Headline Economic Value for Waste and Materials Efficiency in Australia*, October 2017, p. 1.

Figure 2.1 Australian Waste Flows



Source: National Waste Policy 2018: Less Waste, More Resources, p. 6.

2.14 Briefly, the waste management and resource recovery industry engages in four main fields of activity:

- Waste collection and transfer;
- Waste sorting;
- Re-use of waste and recycling; and
- Final disposal of waste.[17]

2.15 Municipal waste collection services are generally provided by local councils, either directly or through contractors, with the latter more common.[18] To achieve economies of scale, some councils have formed regional groups to co-ordinate their waste management activities.[19] In addition to collecting household waste, some councils collect waste for small businesses and institutions.[20]

2.16 Many businesses and institutions contract directly with waste management companies to arrange collection of their waste.[21] In the case of larger businesses and institutions, these contracts are often long-term and on a regional or national scale, but many smaller businesses and institutions rely on more ad hoc and short-term arrangements.[22] This waste tends to make up the commercial and industrial and construction and demolition waste streams.

2.17 Waste sorting primarily occurs at facilities known as Materials Recovery Facilities (MRFs). These facilities sort waste, most commonly municipal solid waste that has been collected from recycling bins, into 'marketable grades of materials'.[23] Most MRFs are operated by private companies but some are owned by local councils.[24]

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17 *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 7, para [2.10].

18 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 55.

19 *National Waste Report 2018*, p. 55; Project 24 Working Group, *Submission 214*, p. 1. The Project 24 Working Group, for example, is made up of five South Western Sydney and Southern Highlands councils: Campbelltown City Council, Camden Council, Wollondilly Shire Council, Liverpool City Council and Wingecarribee Shire Council: Project 24 Working Group, *Submission 214*, p. 1.

20 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 55.

21 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 56.

22 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 56.

23 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 57.

24 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 57.

2.18 Specialised facilities may be used to sort particular types of waste, such as organic waste.[25] Sorting can be more problematic for the municipal solid waste stream than other streams as municipal solid waste is more diverse and less well sorted at the source (that is, prior to collection).[26] It is therefore more at risk of contamination.

2.19 Waste re-use and recycling infrastructure is primarily owned and operated by private companies, with different infrastructure required for different types of materials.[27] These companies range in the size and scope of their operations, from those handling a wide variety of materials to those specialising in a particular material.

2.20 Nearly all (99.9 per cent) of Australia's core waste disposal occurs through landfill, with most of the remainder (particularly medical waste) being destroyed thermally.[28] Landfills in urban areas are primarily operated by the private sector but in regional and remote areas they are largely run by local governments, either directly or through contractors.[29] It is estimated that there are approximately 600 officially registered landfill sites in Australia, and as many as 2,000 unregulated sites, most of these being small.[30]

2.21 There is opportunity to innovate at each stage of the waste management and resource recovery process, including before something becomes waste. As explained by the National Waste and Recycling Industry Council (NWRIC):

> to reduce waste and pollution and make better use of our resources, innovation is required across the whole system. From what materials and resources we are using to produce goods and materials to how they are collected, reused and recirculated through the economy, or finally disposed of if a recovery solution is unavailable.[31]

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25 Australian Local Government Association (ALGA), *Submission 91*, p. 2; Infrastructure Victoria, *Advice on Recycling and Resource Recovery Infrastructure*, April 2020, p. 76, <www.infrastructurevictoria.com.au/wp-content/uploads/2020/03/Advice-on-recycling-and-resource-recovery-FINAL-REPORT.pdf> accessed 23 October 2020.

26 ALGA, *Submission 91*, p. 2.

27 Blue Environment Pty Ltd, *National Waste Report 2018*, pp. 56–57.

28 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 22.

29 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 56.

30 B. McCabe and W. Clarke, Explainer: How Much Landfill Does Australia Have? *The Conversation*, <theconversation.com/explainer-how-much-landfill-does-australia-have-78404> accessed 23 October 2020.

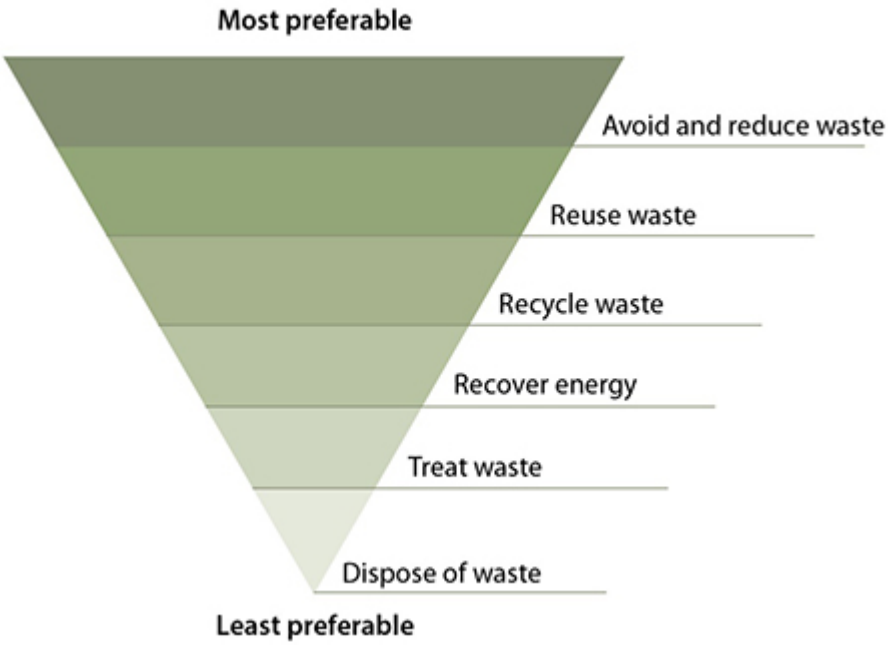
31 National Waste and Recycling Industry Council, *Submission 197*, p. 2.

2.22 The waste management hierarchy and the circular economy are fundamental to identifying these opportunities.

The waste hierarchy

2.23 The waste hierarchy (also referred to as the waste management hierarchy) ranks waste management solutions from most preferable to least preferable.[32] This model underpins waste management and resource recovery legislation in each state and territory. It is illustrated in Figure 2.2.

Figure 2.2 The Waste Hierarchy



Source: Submission 219, p. 5

2.24 The waste hierarchy stipulates that the best option for dealing with waste is to avoid or reduce it, followed by re-using waste materials or products. It is important to note that neither avoid and reduce nor re-use directly involve the waste management and resource recovery industry. This is because

[32] *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, pp. 5–6; *National Waste Report 2018*, p. 14.

neither option creates 'waste'.[33] In other words, both are designed to prevent the generation of waste in the first place.

2.25 The third alternative is recycling. Recycling is defined as the conversion of waste into raw materials to be used in the production of new products.[34] Historically much of the metal, plastic, paper and cardboard collected in Australia for recycling has been exported to overseas recyclers for processing.[35] This will significantly change with the introduction of Australia's waste export bans in 2021.

2.26 The fourth level of the waste hierarchy is energy recovery or the conversion of waste into energy. In Australia, waste to energy is in its infancy compared to other countries. This process primarily occurs through the collection of methane produced by the anaerobic decay of organic waste from landfills, which is burnt to generate electricity for sale onto the grid.[36]

2.27 The fifth preference is the treatment of waste. Treatment can refer to a number of different processes, including processes to recover recyclable material from waste, and processes to recover energy from waste (thermal treatment).[37] Generally, treatment refers to the processing of waste prior to disposal so as to minimise the potential for harm to human health or the environment.[38] Consequently, treatment is particularly important for hazardous waste, although it is often possible for such waste to be recycled after it has been properly treated instead of disposed.[39]

2.28 The last and least preferred option in the waste hierarchy is disposal. Most commonly, disposal refers to landfill.

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33 *Never Waste a Crisis: the Waste and Recycling Industry in Australia,* p. 5, para. [2.1]

34 Blue Environment Pty Ltd, *National Waste Report 2018*, p. viii.

35 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 17.

36 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 19.

37 Victorian Legislative Council Environment and Planning Committee, *Inquiry into Recycling and Waste Management: Final Report*, 2019, p. 220, <www.parliament.vic.gov.au/images/stories/committees/SCEP/Recycling_and_Waste_Mgmt/Report/Inquiry_into_recycling_and_waste_management.pdf > accessed 23 October 2020; NSW Legislative Council Portfolio Committee No. 6 — Planning and Environment, *Energy from Waste Technology*, 2018, p. 4, <www.parliament.nsw.gov.au/lcdocs/inquiries/2436/Final%20%20Report%2028%20March%202018.pdf> accessed 23 October 2020.

38 *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 7, para [2.9].

39 *Hazardous Waste in Australia 2019*, pp. 9–10.

2.29 The Australian Industrial Ecology Network (AIEN) submitted that while the waste hierarchy is normally framed in terms of social or environmental good only, it can be applied as a representation of the notional commercial value of waste.[40] It described this concept as 'Highest Net Resource Value'. Under this model, a negative value is placed on resources at the lower end – that is, disposal to landfill. Conversely, 'full commercial value' is placed upon resources at the higher end – those that can be avoided or reused.[41]

2.30 The AIEN suggested that adopting such a model would encourage greater focus on 'recycled product markets' and the 'market/product end of the resource management system' more generally, which have traditionally received 'insufficient attention' in Australia.[42] This accorded with what the Committee heard from several other stakeholders about the need for more focus on end markets, an issue that is discussed more fully in Chapter 4.

2.31 Conversely, Mr Steve Robertson argues that the waste management hierarchy should not be a hierarchy at all.[43] Rather, it should be constructed as a 'selection of different waste management options that need to be considered on their merits and in the context of meeting a set of objectives'.[44] Specifically, Mr Robertson stated:

> There is great scope to improve upon our current methods to consider solutions to manage our current and future waste management challenges and the use of the hierarchy is one that needs to be nuanced and not used in isolation but with other tools and data to ensure that the solutions proposed provide the best on balance solution to the problem to be solved.[45]

2.32 Furthermore, Mr Robertson stated that before a technique to manage waste is selected, it is necessary to understand the basis for selecting that technique, and these solutions should be considered in the context of broader environmental, social, public health or economic outcomes.[46]

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40 Australian Industrial Ecology Network (AIEN), *Submission 202*, p. 6.

41 AIEN, *Submission 202*, p. 6.

42 AIEN, *Submission 202*, p. 6.

43 Mr Steve Robertson, *Submission 219*, p. 5

44 Mr Steve Robertson, *Submission 219*, pp. 5-6.

45 Mr Steve Robertson, *Submission 219*, p. 6.

46 Mr Steve Robertson, *Submission 219*, p. 6.

Circular economy

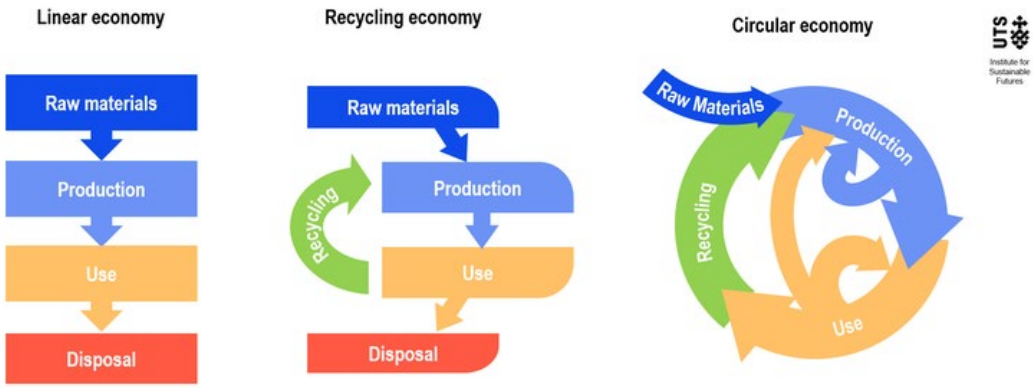
2.33 Perhaps the most fundamental concept relevant to waste management and resource recovery policy is the circular economy. The circular economy is not actually about waste. Rather, it is about design, and the consideration of materials and products as valuable resources.

2.34 The Ellen MacArthur Foundation defines a circular economy as follows:

> A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.[47]

2.35 The circular economy contrasts with the more linear waste economy as illustrated by Figure 2.3.

Figure 2.3 Circular Economy



Source: Submission 163, p. 5.

2.36 A circular economy seeks to remove the 'disposal' stage entirely. For example, one submission stated:

> Right now, our mostly linear economy means manufacturers expect their products to create waste and pollution. A circular economy means that all products are designed for end of life, where waste and pollution become design flaws to be eliminated.[48]

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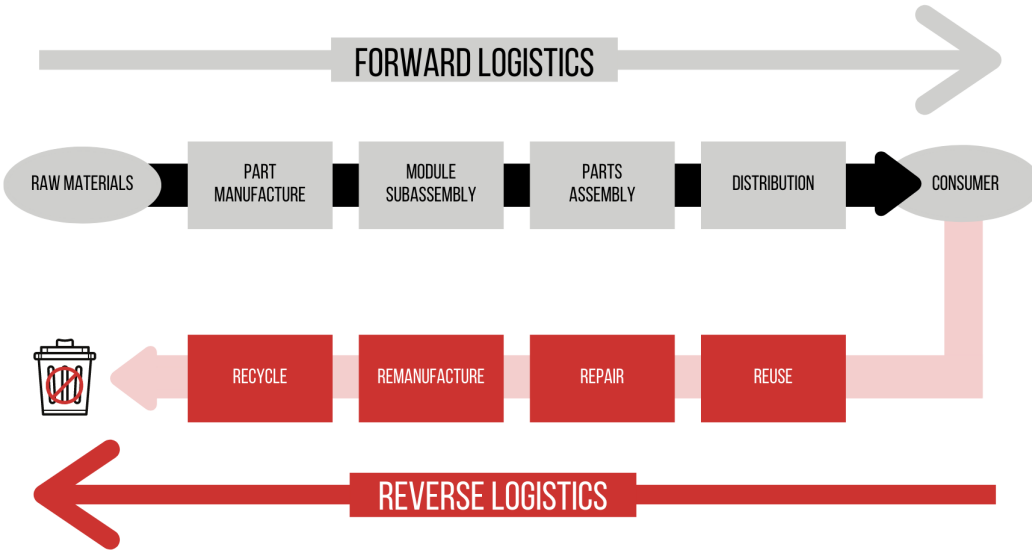
47 Waste Management and Resource Recovery Association Australia (WMRR), *Submission 81*, p. 3.

48 Name withheld, *Submission 163*, p. 5.

2.37 Discussions of a circular economy often focus on the management and reduction of waste at the end of a product or resource's lifecycle. It is important to recognize however that there are two critical points for waste management and resource recovery. The first is the front end, that is, the materials used to create products. The second is the back end, that is, what is done with these products after use or consumption.

2.38 The World's Biggest Garage Sale (WBGS), a community based organization that seeks to commercialise the circular economy by 'capturing and diverting goods before they become landfill', framed this issue as a matter of forward and reverse logistics.[49] This is depicted in Figure 2.4.

Figure 2.4 Forward and Reverse Logistics



Source: WBGS, Submission 96, p. 2.

2.39 Under this model, forward logistics refers to the better design and manufacture of products to remove waste and extend a product's lifecycle.[50] Reverse logistics is concerned with the post-consumer stage where reuse, repair and repurposing of products are encouraged.[51]

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49 The World's Biggest Garage Sale (WBGS), *Submission 96*, p. 1.

50 The WBGS, *Submission 96*, p. 3.

51 The WBGS, *Submission 96*, p. 2.

Shift to a circular economy

2.40 The Committee repeatedly heard that Australia must shift from its current linear economy that uses and disposes of goods to a circular one that seeks to keep products or components in use.

2.41 The Waste Management and Resource Recovery Association of Australia (WMRR) stressed the need for greater emphasis in Australia on the 'front end' management of resources. It argued there needs to be greater innovation in relation to the redesigning of products to encourage greater reuse, repair and recycling and a national emphasis on waste avoidance strategies for the community, retailers and product manufacturers.[52]

2.42 RMIT made a similar point in its submission. It asserted that the 'biggest innovation challenge facing the waste and recycling industries is the recognition of their inevitable transformation to being key drivers of a circular economy'.[53] Furthermore, RMIT stated that the circular economy 'can be seen as a design challenge as much as it is a materials handling challenge' and emphasized the importance of product design for disassembly and ease of repair.[54] Specifically RMIT argued:

> As a starting point, products should be designed to reduce wastage at production, facilitate ease of repair and support ease of recycling (e.g easy dissembling and single-type materials). This is a first step towards supporting circularity and understanding a product's lifecycle impact on the environment.[55]

2.43 Design for reuse and repair was a constant theme throughout the inquiry. The Moreland City Council stated that innovation in the waste industry must come from manufacturers and importers who need to shift their focus from creating single use products to products which remain within the circular economy through repair and reuse before they end up in landfill.[56]

2.44 This view was shared by Ms Karen Ellis, who with Mr Danny Ellis runs 'Mend It, Australia', a community group that organises repair events in Victoria.[57] Ms Ellis stated that there is a strong need for manufacturers to

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52 WMRR, *Submission 81*, p. 4.

53 RMIT University, *Submission 116*, p. 1.

54 RMIT University, *Submission 116*, p. 2.

55 RMIT University, *Submission 116*, p. 2.

56 Moreland City Council, *Submission 107*, p. 2.

57 Mrs Karen Ellis, *Submission 98*, p. 1.

design their products for repair rather than planned obsolescence.[58] Furthermore, Ms Ellis stressed the need for funding for community reuse and repair events, stating there are over 2000 repair cafes around the world, showing there is a clear community interest in these events.[59]

2.45 The importance of 'design for repair' was raised by Ms Erin Lewis-Fitzgerald, a clothes mending practitioner and author. Ms Lewis-Fitzgerald argued that although funding repair cafes and other community efforts are important, it was not a long term solution as this model relied too heavily on volunteers.[60] Ms Lewis-Fitzgerald said that many products not designed for repair created issues for those attempting to resolve these problems. For example:

> At Bright Sparks we often spent more time figuring out how to open up an appliance than we did diagnosing or repairing it. Two common barriers to repair success were broken plastic – we tried various industrial-strength glues but the repairs were never as strong as when new – and unopenable appliances. I remember a stick blender that took three of us to work out how to open, only to discover we couldn't remove the parts we needed to repair.[61]

2.46 Ms Lewis-Fitzgerald recommended that the Government legislate that all electrical products in Australia should be made of recyclable components and designed for repair, that they be easily able to be disassembled, and that spare parts be made readily available by the manufacturer.[62]

2.47 The Australian Academy of Technology and Engineering (ATSE) emphasised the significant economic opportunities that can arise from better design and collection of raw materials:

> we need to go back and think very carefully about how we regulate the product design in the first place so that it can be disassembled; then how we collect that material; and then how we get the logistics right to get it back to the manufacturers, where they can reprocess, make new products and sell those products throughout the world. It's a fantastic economic opportunity to

58 Mrs Karen Ellis, *Submission 98*, p. 2.

59 Mrs Karen Ellis, *Submission 98*, p. 2.

60 Ms Erin Lewis-Fitzgerald, *Submission 156*, p. 1.

61 Ms Erin Lewis-Fitzgerald, *Submission 156*, p. 2.

62 Ms Erin Lewis-Fitzgerald, *Submission 156*, pp. 1-2.

increase exports, increase jobs and stimulate productivity throughout the nation.[63]

2.48 The ATSE considers regulation to be the key issue in shifting the mindset of waste as a problem to waste as an opportunity.[64]

2.49 The Committee notes the announcement that the Productivity Commission will look into the issue of right to repair in 2021, and looks forward to its report.[65]

National policy

2.50 The National Waste Policy 2018 and the National Waste Policy Action Plan 2019 are based on the principles of a circular economy.[66] Notwithstanding, submissions to the inquiry called for the development and implementation of a specific national circular policy – one that considers the lifecycle of a product and encourages the use of it and its materials for as long as possible.

2.51 The WMRR identified several benefits to transferring to a circular economy, including:

- modernising Australia's economy to enable sustainability;
- preserving resources;
- encouraging and accelerating the decoupling of economic growth from the use of fossil fuels;
- creating investment, local jobs and growing local economics; and
- achieving national and international climate change goals. [67]

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63 Mr Philip Butler, Co-chair, Expert Working Group on Technology Readiness in the Waste and Resource Recovery Sector Australian, Academy of Technology and Engineering (ATSE), *Committee Hansard*, Wednesday 12 August 2020, p. 14.

64 Mr Philip Butler, ATSE, *Committee Hansard,* Wednesday 12 August 2020, p. 14.

65 The Hon Michael Sukkar MP, Minister for Housing and Assistant Treasurer, Productivity Commission Inquiry, *Media Release*, 29 October 2020. Further details about the inquiry are available on the Productivity Commission's website: Right to Repair, <www.pc.gov.au/inquiries/current/repair>, accessed 2 November 2020.

66 Department of the Environment and Energy, *National Waste Policy 2018,* p. 1. <www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf> and *National Waste Policy Action Plan 2019*, p. 1, <www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-08bbc69da240/files/national-waste-policy-action-plan-2019.pdf> accessed 27 October 2020.

67 WMRR, *Submission 81*, p. 1.

2.52 The WMRR stated that Australia has seen some slow progress in moving towards a circular economic model, and still largely operates on a linear model.[68] It attributes a lack of understanding of what a circular economy looks like and an absence of a shared vision for the country as contributing factors to this lack of progress. Furthermore, the WMRR states that, as a result, the Commonwealth Government has not been able to lead the transition away from a linear economy.[69]

2.53 Several submissions drew comparisons with the progress made by European countries in transitioning to a circular economy. For example, the Southern Sydney Regional Organisation of Councils (SSROC) stated:

> Australia is behind other countries, particularly in the European Union, which has established policies and made investments in infrastructure and technology to support circular economies to ensure secondary materials are used onshore, creating jobs and wealth.[70]

2.54 Similarly, Ms Gayle Sloan, Chief Executive Officer, WMRR told the Committee that 'other OECD countries have moved towards circular through sustainable design legislation, which makes it very clear about what you use and how use it'.[71] In other words, other countries have emphasized design solutions. This includes the materials selected for products to ensure that the product or its components can be reused. If a product cannot be reused, the producer is responsible for the cost of managing the waste.

2.55 The WMRR further said that national consistency in policy, strategy and regulation was required to encourage a transition to a circular model, and considered that the National Waste Policy 2018 and Action Plan were missed opportunities in this regard.[72]

2.56 The Lake Macquarie City Council supports a national circular policy and implementation framework. It stated:

> European case studies demonstrate innovative recycling and end markets readily emerge within a circular economy with the right policy settings. The resource recovery industry's current position as 'end of pipe' problem solvers

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68 WMRR, *Submission 81*, p. 3.

69 WMRR, *Submission 81*, p. 3.

70 Southern Sydney Regional Organisation of Councils, *Submission 82*, p. 4.

71 Ms Gayle Sloan, Chief Executive Officer, WMRR, *Committee Hansard*, Canberra, Wednesday 26 August 2020, p. 8.

72 WMRR, *Submission 81*, p. 3.

> is not viable, as evidenced by the current global recycling crisis. However, the recycling industry has the potential to be transformed into critical resource producers in the economic supply chain within a circular economy.[73]

2.57 It further recommends that such a policy be supported by state and territory circular economy plans, and then by regional implementation plans. MRA Consulting Group, Dr Niina Kautto and the City of Adelaide also support the introduction of a national circular economy policy.[74]

Innovation road map

2.58 The Commonwealth Scientific and Industrial Research Organisation (CSIRO) summarised five principles from the scientific literature about how innovation may assist governments and industry to address waste and recycling issues in a circular economy. It highlighted that:

- An Australian circular economy would need to focus on creating value from and reducing waste for both the domestic and foreign markets.
- Government investment in innovation for new circular economy friendly businesses offers not just economic benefits but may become an export opportunity. Businesses that create secondary materials from existing waste also require investment in order to deal with existing waste stockpiles.
- Although there are many economic opportunities in the short term in shifting to a circular economy, in the medium and long term there are investment opportunities in the areas of waste minimization and resource efficiency.
- Investing in innovation in the emerging 'bioeconomy' could replace Australia's existing economic reliance on commodities. It is important that the digital economy underpins the movement towards a circular economy.[75]

2.59 In May 2019, the CSIRO convened an international symposium, *Waste Innovation for a Circular Economy* to discuss the opportunities, barriers and strategy for transitioning Australia from a linear to a circular economy. In its submission, the CSIRO states that several opportunities identified at the

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73 Lake Macquarie City Council, *Submission 218,* p. 4.

74 Mike Ritchie and Associates, *Submission* 207, p. 2; Dr Niina Kautto, *Submission 190*, p. 1; City of Adelaide, *Submission 57*, p. 5.

75 The Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Submission 215*, pp. 6-7.

symposium have the potential to yield significant economic, employment and environmental benefits.[76] A summary report of the symposium is available on the CSIRO's website.[77]

2.60 The CSIRO is in the final stages of developing a set of circular economy, industry and technology road maps that cover each of the key banned export waste streams. It is expected that these road maps will help inform decision making by government and industry regarding waste management and recycling.[78]

Committee comment

2.61 The Committee recognises the need to shift from a linear to circular economy. This is necessary to not only improve health, social and environmental outcomes related to waste management and resource recovery but to create important economic opportunities and growth of industries.

2.62 The Commonwealth Government's National Waste Policy, Action Plan and Response Strategy are based on the principles of a circular economy. The Committee supports these initiatives, and in particular the specific actions set out to 'encourage sustainable design', 'improve reuse and reparability' and 'support consumer choices'.

2.63 While acknowledging the important inroads made by the Commonwealth, the Committee sees value in placing more responsibility on the manufacturers, importers, and distributors of goods to strongly emphasise a shift towards a circular economy. This includes a greater focus on the design and composition of products, and consideration of regulation and incentives to encourage greater repair, reuse, recycling and recovery of materials.

2.64 The Committee recognises that much of the evidence it received relates to the management of municipal waste. However, waste statistics show that

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76 CSIRO, *Submission 215*, p. 10.

77 NJ Boxall, S King, A Kaksonen et al, *Waste Innovation for a Circular Economy: a Summary Report for the CSIRO Cutting Edge Science and Engineering Symposium* 27–29 May 2019, Clayton, Victoria, Australia', August 2019, CSIRO, < www.publications.csiro.au/rpr/download?pid=csiro:EP195506&dsid=DS4 > accessed 23 October 2020.

78 Mr David Williamson, Deputy Secretary, Department of Agriculture, Water and the Environment, *Committee Hansard*, Wednesday 5 August 2020, p. 1.

approximately 80 per cent of waste is from the commercial and industrial, and construction and demolition sectors. This requires closer examination.

Recommendation 1

2.65 The Committee recommends that the Commonwealth Government in consultation with state and territory governments implement a pathway to a predominantly national circular economy. This should pay attention to the design and composition of products to enable the greatest capacity for end of life recycling, and consider regulation and incentives to encourage greater repair, reuse, recycling and recovery of materials.

Recommendation 2

2.66 The Committee recommends that the Commonwealth Government undertake further research to identify and examine waste management and resource recovery opportunities related to commercial and industrial, and construction and demolition waste.

3. Role of the Commonwealth

3.1 Waste management and recycling in Australia involves all levels of government. Local governments are primarily responsible for household waste collection and recycling services, the management and operation of landfill sites, delivering education and awareness programs, and providing and maintaining litter infrastructure.[1]

3.2 State and territory governments are primarily responsible for domestic policy and regulation of waste management and recycling.[2] Each jurisdiction has its own legislation, regulatory instruments and policies which form a complex framework governing waste management and recycling in Australia.[3]

3.3 The Commonwealth Government has two key responsibilities in this space. The first is to implement Australia's international treaty obligations and support global environmental outcomes through cooperation and engagement. The second is to provide national leadership and co-ordination, including addressing national market failures and organising national data collection.[4]

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1 Department of Agriculture, Water and the Environment (DAWE), *Submission 228,* p. 2.

2 Senate Standing References Committee on Environment and Communications, *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 21, para [2.68], <www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/WasteandRecycling/~/media/Committees/ec_ctte/WasteandRecycling/Report/report.pdf > accessed 23 October 2020.

3 *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 23, para [2.74].

4 *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 24, para [2.77]; Mr Dean Knudson, Deputy Secretary, Environment Protection Group, Department of the Environment and Energy (DEE), *Committee Hansard*, Canberra, 4 December 2019, p. 1.

3.4 The Department of Agriculture, Water and the Environment (DAWE) is the lead Commonwealth Department responsible for waste management and resource recovery, while the Department of Industry, Science, Energy and Resources (DISER) is responsible for innovation in recycling and remanufacture.[5]

3.5 Delivery of the Commonwealth Government's waste management and resource recovery policies is overseen by a whole-of-government National Waste and Recycling Taskforce, which is chaired by DAWE.[6]

3.6 Various Commonwealth agencies are also engaged with aspects of waste management and resource recovery policy, including the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Clean Energy Finance Corporation (CEFC) and the Australian Renewable Energy Agency (ARENA).[7]

3.7 Australia's international treaty obligations and Commonwealth legislation relevant to waste management and resource recovery primarily relate to managing hazardous waste and the environmental impacts of waste.[8] A list of these treaties and Acts can be found in Appendix D. State and territory governments assist the Commonwealth in ensuring that Australia meets its obligations.[9]

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5 Mr David Lawrence, General Manager, Sectoral and Place-based Policy, Industry Growth Division, Department of Industry, Innovation and Science (DIIS), *Committee Hansard*, Canberra, 27 November 2019, p. 1. These responsibilities were held by the DEE and the DIIS respectively until 1 February 2020. The Hon. Scott Morrison, Prime Minister and Minister for the Public Service, New Structure of Government Departments, *Media Release*, 5 December 2019.

6 The Taskforce includes representatives from the Department of Industry, Science, Energy and Resources (DISER), Treasury, Department of Infrastructure, Transport, Regional Development and Communications, Department of Defence and the Department of Finance. See Mr Knudson, DEE, *Committee Hansard*, Canberra, 4 December 2019, p.1; Ms Kristen Tilley, First Assistant Secretary, Environment Protection Division, DEE, *Committee Hansard*, Canberra, 4 December 2019, p. 10.

7 Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Submission 215;* Mr David Lawrence, DIIS, *Committee Hansard*, Canberra, 27 November 2019, p. 4; Australian Renewable Energy Agency, *Submission 15*.

8 *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 24 para [2.78]

9 *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 24 para [2.79]

Current Commonwealth programs

3.8 As listed in the introduction to this report, the Commonwealth Government is currently undertaking significant reform of the waste management and resource recovery sectors in Australia. Key policies and programs announced as part of this reform are described below.

Ban on waste exports

3.9 On 9 August 2019, the Council of Australian Governments (COAG) agreed that Australia should establish a timetable to ban the export of waste plastic, paper, glass and tyres and build Australia's capacity to generate high value recycled commodities.[10]

3.10 The ban on waste exports is largely a response to China's *National Sword* and *Blue Sky* policies which restrict the importation of solid and recyclable waste. Specifically, the policy sets a 0.5 per cent contamination rate on imported recyclable waste to reduce the negative impact of waste on China's processing facilities and the environment.[11]

3.11 The timetable for the waste export bans was initially released on 8 November 2019 and updated on 26 May 2020.[12] Commencing on 1 January 2021, certain waste types are expected to be banned by 30 June 2022 under a phased approach.

3.12 The DAWE has established a multi-departmental taskforce to manage this transition and engage with key stakeholders affected by the waste export bans.[13]

3.13 The significance of the Commonwealth's commitment to ban waste exports was highlighted by Mr Dean Knudson, Deputy Secretary of the (former) Department of the Environment and Energy:

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10 Council of Australian Governments (COAG), *Meeting of the Council of Australian Governments: Cairns – 9 August 2019: Communiqué,* p. 3, <www.coag.gov.au/sites/default/files/communique/coag-communique-august-9-2019.pdf > accessed 27 October 2020. On 29 May 2020, the Prime Minster announced that COAG will cease and a new National Federation Reform Council will be formed. See <www.coag.gov.au/> accessed 28 October 2020.

11 Dr Kirrily Peters, Manager, DIIS, *Committee Hansard*, Canberra, 27 October 2020, p. 3.

12 The Hon Sussan Ley MP, Minister for the Environment and the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, Industry Update on Export Ban of Waste Glass, *Media Release*, 26 May 2020.

13 Mr David Lawrence, DEE, *Committee Hansard*, Canberra, 27 November 2019, p. 2.

> What we do know is that even signalling this commitment is a pretty significant signal into the market and a game changer for the recycling industry. What this is going to drive — and we're already seeing it — is innovation in how we design, make and use plastics and packaging, how we turn old tyres and glass into valuable new products, and how we better manage paper and cardboard.[14]

3.14 Mr Knudson foreshadowed the significant job creation opportunity associated with the ban. In particular, Mr Knudson told the Committee, 'as a rough estimate, taking the 60 or 70 million tonnes that currently goes into waste, 60,000 jobs would be created'.[15]

National Waste Policy Action Plan

3.15 In November 2019, the Commonwealth Government released a National Waste Policy Action Plan. This plan sets out seven targets and 80 actions to implement the 2018 National Waste Policy.

3.16 The 2018 National Waste Policy is the most recent policy agreed by Australia's Environment Ministers and the Australian Local Government Association. The policy provides a 'framework for collective action by businesses, governments, communities and individuals until 2030'.[16]

3.17 The National Waste Policy was designed to shift away from the traditional 'take, make, use and dispose' approach to waste to one that maintains the value of resources for as long as possible.[17]

3.18 The National Waste Policy Action Plan complements and supports the respective waste management plans and strategies of state and territory governments, local governments and industry. The seven targets under the National Waste Policy Action Plan are:

- ban the export of waste plastic, paper, glass and tyres, commencing in the second half of 2020;
- reduce total waste generated in Australia by 10 per cent per person by 2030;

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14 Mr Knudson, DEE, *Committee Hansard*, Canberra, 4 December 2019.

15 Mr Knudson, DEE, *Committee Hansard*, Canberra, 4 December 2019.

16 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 7, <www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf > accessed 23 October 2020.

17 Blue Environment Pty Ltd, *National Waste Report 2018*, p. 3.

- 80 per cent average resource recovery rate from all waste streams following the waste hierarchy by 2030;
- significantly increase the use of recycled content by governments and industry;
- phase out problematic and unnecessary plastics by 2025;
- halve the amount of organic waste sent to landfill by 2030; and
- make comprehensive, economy-wide and timely data publicly available to support better consumer, investment and policy decisions.[18]

3.19 The Government has announced that $35 million over four years has been 'earmarked' to implement its commitments under the plan.[19] The DAWE told that Committee that it comprises:

- $7 million for food and organic waste;
- $5.3 million for plastics and packaging waste;
- $2.7 million for sustainable Commonwealth Government procurement;
- $1.8 million for infrastructure investment support;
- $7.9 million for waste reduction and harmonisation approaches across states and territories;
- $5.2 million for product stewardship initiatives;
- $3.3 million for chemical and hazardous waste; and
- $1.8 million for reporting and data.[20]

3.20 In addition to this $35 million, the Government announced $24.6 million to improve national waste data (one of the targets of the National Waste Policy Action Plan).[21] This funding aims to create a platform on which data on waste generation, flows and fate is available to the public as well as to industry and policymakers.[22]

3.21 A copy of National Waste Policy Action Plan 2019 can be found on the Department's website.[23]

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18 DEE, *National Waste Policy Action Plan 2019*, p. 2.

19 The Hon Sussan Ley MP, Minister for the Environment and the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, $1 Billion Waste and Recycling Plan to Transform Waste Industry, *Media Release*, 6 July 2020. See Ms Kristin Tilley, DAWE, *Committee Hansard*, Wednesday 21 October, pp 1 and 5.

20 Ms Kristin Tilley, DAWE, *Committee Hansard*, Canberra, 21 October 2020, p. 5.

21 Ms Kristin Tilley, DAWE, *Committee Hansard*, Canberra, 21 October 2020, p. 1.

22 Ms Kristin Tilley, DAWE, *Committee Hansard*, Canberra, 21 October 2020, p. 8.

23 DEE, *National Waste Policy Action Plan 2019*, <www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-

Australian Recycling Investment Fund

3.22 On 15 December 2019, the Commonwealth Government announced a $100 million Australian Recycling Investment Fund to be managed by the CEFC. The fund is designed to support projects that increase recycling rates, turn waste into valuable products and encourage innovation to prevent resources from landfill.[24]

3.23 As one of four Ministers who announced the fund, the (former) Minister for Finance, Senator the Hon Mathias Cormann said:

> The Australian Recycling Investment Fund will provide the CEFC with the capacity to support waste and recycling technologies by making investments which attract private sector support and by working with strategic financing partners to attract additional investments into this sector.[25]

3.24 Through the fund, the CEFC expects to provide 'debt and/or equity finance to eligible larger-scale commercial and industrial requiring $10 million or more of CEFC debt or equity capital'.[26] A key focus of the fund will be larger-scale projects which use clean energy technologies to support the recycling of waste plastics, paper, glass and tyres.[27]

National Plastics Summit

3.25 On 2 March 2020, a National Plastics Summit was held in Canberra and hosted by the Minister for the Environment, the Hon Sussan Ley MP, and

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08bbc69da240/files/national-waste-policy-action-plan-2019.pdf
>, accessed 23 October 2020.

24 Senator the Hon Mathias Cormann, Minister for Finance, the Hon. Angus Taylor MP, Minister for Energy and Emissions Reduction, the Hon. Sussan Ley MP, Minister for the Environment and the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, Backing Australia's Recycling Industry, *Media Release*, 15 December 2019.

25 Senator the Hon Mathias Cormann, Minister for Finance, the Hon. Angus Taylor MP, Minister for Energy and Emissions Reduction, the Hon. Sussan Ley MP, Minister for the Environment and the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, 'Backing Australia's Recycling Industry', *Media Release*, 15 December 2019.

26 Clean Energy Finance Corporation (CEFC), *Australian Recycling Investment Fund*, <www.cefc.com.au/where-we-invest/about-our-finance/investment-programs/australian-recycling-investment-fund/>, accessed 23 October 2020.

27 CEFC, *Australian Recycling Investment Fund*, <www.cefc.com.au/where-we-invest/about-our-finance/investment-programs/australian-recycling-investment-fund/>, accessed 23 October 2020.

the Assistant Minister for Waste Reduction and Environmental Management, the Hon Trevor Evans MP.[28]

3.26 The forum brought together over 200 leaders and technical specialists from government, industry, research and the community to showcase and identify new solutions to managing plastic waste. The summit identified new opportunities to address the targets set under the National Waste Policy Action Plan.

3.27 It is expected that the outcomes of the summit will help inform the development of the National Plastics Plan which the Commonwealth Government has committed to delivering by the end of this year. A copy of the summit's outcomes can be found on the DAWE's website.[29]

Response Strategy to COAG Export Bans

3.28 On 13 March 2020, the Commonwealth Government released its Response Strategy to the COAG export bans.[30] The response strategy sets out the waste challenges and opportunities at a system-level and material-specific level for paper, plastic, glass and tyres. Identified by government and industry, these challenges and opportunities are designed to frame specific actions to support the waste export ban, drive long term change and build capacity in the sector.[31]

3.29 Ten system-level objectives are included in the strategy:

- address waste origins and generation;
- reduce contaminated kerbside collection;
- drive domestic demand for recycled products;

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28 The Hon Sussan Ley MP, Minister for the Environment, the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management and the Hon Warren Entsch, Special Envoy for the Great Barrier Reef, National Plastics Summit Signals Changes for Plastic Recycling, *Media Release*, 2 March 2020.

29 DAWE, National Plastics Summit 2020 <www.environment.gov.au/protection/waste-resource-recovery/national-plastics-summit>, accessed 12 November 2020.

30 DAWE, *Phasing Out Exports of Waste Plastic, Paper, Glass and Tyres: Response Strategy to Implement the August 2019 Agreement of the Council of Australian Governments*, March 2020, p. 12., <www.coag.gov.au/sites/default/files/communique/phasing-out-waste-exports-response-strategy.pdf>, accessed 23 October 2020.

31 DAWE, *Phasing Out Exports of Waste Plastic, Paper, Glass and Tyres: Response Strategy to Implement the August 2019 Agreement of the Council of Australian Governments*, March 2020, p. 12., <www.coag.gov.au/sites/default/files/communique/phasing-out-waste-exports-response-strategy.pdf>, accessed 23 October 2020.

- understand resource volumes, values and movement;
- invest in new technologies and infrastructure;
- coordinate regional recycling capacity;
- drive international cooperation;
- streamline approval processes and requirements;
- consider waste levy settings; and
- drive product stewardship.

3.30 Following the release of the strategy, it is expected that Commonwealth and state and territory governments will announce their own commitments and actions to complement the strategy and support the export ban.

Commonwealth Procurement Guidelines

3.31 In March 2020, the Commonwealth Government announced it will be strengthening the Commonwealth Procurement Guidelines to make sure every procurement undertaken by a Commonwealth agency considers environmental sustainability and the use of recycled content as a factor in determining value for money. The changes are designed to help create demand and markets for products made from recycled content, encourage industry to invest in waste and recycling, and help drive innovation as industry seeks to lower the cost of these goods.[32]

Recycling Modernisation Fund

3.32 On 6 July 2020, the Commonwealth Government announced a $190 million Recycling Moderation Fund (RMF) to support 'innovative investment in new infrastructure to sort, process and remanufacture materials' including mixed plastic, paper, tyres and glass. Funding from the RMF is contingent on co-funding from state and territory governments and industry.[33] Approximately $6 million of the RMF funding is earmarked for use in rural and regional areas.[34]

3.33 It is expected that the RMF will generate $600 million of recycling investment. In announcing the RMF, the Assistant Minister for Waste Reduction and Environmental Management, the Hon Trevor Evans MP said:

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32 DAWE, *Submission 228*, pp. 2-3.

33 The Hon Sussan Ley MP, Minister for the Environment and the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, $1 Billion Waste and Recycling Plan to Transform Waste Industry, *Media Release*, 6 July 2020.

34 Ms Kirsten Tilley, the DAWE, *Committee Hansard*, Canberra, 21 October 2020, p. 5.

> Our targeted investment will grow Australia's circular economy, create more jobs and build a stronger onshore recycling industry.[35]

3.34 The ACT Government is one of the first jurisdictions to benefit under the RMF with the announcement of a $21 million upgrade to its MRF.[36]

3.35 This upgrade, which aims to improve separation, reduce contamination, and improve the quality of recycled products, will include:

- optical scanning equipment to identify and separate different types of plastics;
- better screening technology to reduce contamination in paper and cardboard recycling;
- glass washing facilities to provide better quality crushed glass 'sand' products that can be used in a wider range of products; and
- plastic washing and 'flaking' facilities.[37]

3.36 It is expected the upgraded MRF facility 'will have the capacity to improve the quality and marketability of 23,000 tonnes of paper and mixed cardboard, 1,800 tonnes of mixed plastics and 14,000 tonnes of glass from the ACT and five regional NSW councils annually'. In addition, it is expected to contribute to the 'creation of around 100 direct and indirect jobs for the ACT and surrounding regions'.[38]

3.37 A planned Committee site visit to the ACT MRF did not precede due to COVID-19 travel restrictions.

Recycling and Waste Reduction Bill

3.38 On 27 August 2020, the Commonwealth Government introduced its Recycling and Waste Reduction Bill into the House of Representatives.[39] The

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35 The Hon Sussan Ley MP, Minister for the Environment and the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, $1 Billion Waste and Recycling Plan to Transform Waste Industry, *Media Release*, 6 July 2020.

36 The Hon Sussan Ley MP, Minister for the Environment, Senator the Hon Zed Seselja, Senator for the Australian Capital Territory and Chris Steel MLA, Minister for Recycling and Waste Reduction, $21 Million for Better Recycling for the ACT, *Media Release*, 15 July 2020.

37 The Hon Sussan Ley MP, Minister for the Environment, Senator the Hon Zed Seselja, Senator for the Australian Capital Territory and Chris Steel MLA, Minister for Recycling and Waste Reduction, $21 Million for Better Recycling for the ACT, *Media Release*, 15 July 2020.

38 The Hon Sussan Ley MP, Minister for the Environment, Senator the Hon Zed Seselja, Senator for the Australian Capital Territory and Chris Steel MLA, Minister for Recycling and Waste Reduction, $21 Million for Better Recycling for the ACT, *Media Release*, 15 July 2020.

39 Parliament of Australia, *Votes and Proceedings*, 2019–2020–66/1088 (27.8.2020).

bill has two main aims: implementing the waste export bans and replacing the *Product Stewardship Act 2011* (Cth).[40]

3.39 The section of the bill covering product stewardship is part of the Government's response to the recommendations made by the *Review of the Product Stewardship Act 2011*.[41] It largely replicates the existing product stewardship scheme, although it makes a number of changes to encourage industries to establish voluntary product stewardship schemes, to make it easier for the government to regulate schemes, and to promote the concept of product stewardship.[42]

3.40 The bill was examined by the Senate Environment and Communications Legislation Committee (October 2020).[43] The Committee made four recommendations including that the bill be passed, although the Labor and Greens senators included additional comments calling for the legislation to be strengthened.

3.41 The bill is currently before Parliament. Second reading speeches of Members can be found on the Parliament House website.[44]

National Product Stewardship Investment Fund

3.42 In July 2020, the Commonwealth Government launched its $20 million National Product Stewardship Investment Fund.[45] That aim of the Fund is 'to accelerate work on new industry-led recycling schemes, including for

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40 The Hon Sussan Ley MP, Minister for the Environment, *House of Representatives Hansard*, 27 August 2020, p. 5751.

41 The Hon Sussan Ley MP, Minister for the Environment, *House of Representatives Hansard*, 27 August 2020, p. 57512.

42 The Hon Sussan Ley MP, Minister for the Environment, *House of Representatives Hansard*, 27 August 2020, pp. 57515752.

43 Senate Standing Legislation Committee on Environment and Communications, *Recycling and Waste Reduction Bill 2020 [Provisions] and related bills*, 1 October 2020. <www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/RecyclingandWasteBills/Report> accessed 2 December 2020.

44 Parliament of Australia, Second Reading Speeches, *Recycling and Waste Reduction Bill 2020*, See www.aph.gov.au/Parliamentary%20Business/Bills%20Legislation/Bills%20Search%20Results/Result/Second%20Reading%20Speeches?BillId=r6573 , accessed 12 November 2020.

45 The Hon. Sussan Ley MP, Minister for the Environment, and the Hon. Trevor Evans MP, *Turbo-Charging a Recycling Nation*, Media Release, 9 July 2020. The Fund was first announced prior to the 2019 general election: the Hon Scott Morrison MP, the Hon. Josh Frydenberg MP and the Hon. Melissa Price MP, A Cleaner Environment for All Australians, *Media Release*, 3 May 2019.

batteries, electrical and electronic products, photovoltaic systems and plastic oil containers'.[46] Applications for the fund's first, $14 million grants round – between $300,000 and $1 million to support either the establishment of new product stewardship schemes or the expansion of existing ones – were open between July and August 2020.[47]

Research

3.43 In addition to these key initiatives, the Commonwealth Government has announced a number of other initiatives including:

- approximately $19.85 million for nine Cooperative Research Centre Projects grants;[48]
- two challenges in the July 2020 round of the Business Research and Innovation Initiative each worth up to $100,000 initially, with the potential for $1 million more to:
  - develop a pilot energy recovery facility for an office building (run by ARENA); and
  - utilise farm crops as a renewable hydrogen source (run by the Grains Research and Development Corporation);[49]
- $4.5 million of funding for a joint research project with India to reduce plastic waste.[50]

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46 The Hon Scott Morrison MP, The Hon. Josh Frydenberg MP and The Hon. Melissa Price MP, *A Cleaner Environment for All Australians*, Media Release, 3 May 2019; The Department of Agriculture, Water and the Environment, *Answers to Questions on Notice*, Senate Estimates, Senate Standing Committee on Environment and Communications Legislation Committee, 16 March 2020, Question Number 122.

47 DISER and the DAWE, *National Product Stewardship Investment Fund: Grant Opportunity Guidelines*, July 2020, pp. 1, 6–7 <www.business.gov.au/-/media/Grants-and-programs/NPSIF/National-Product-Stewardship-Investment-Fund-grant-opportunity-guidelines-PDF.ashx?sc_lang=en&hash=3EABFEAAF23D4CB52E189DF547E6A6DB > accessed 14 October 2020.

48 Mr David Williamson, DISER, *Committee Hansard*, Canberra, 5 August 2020, p. 1; The Hon. Karen Andrews MP, Minister for Industry, Science and Technology and the Hon. Sussan Ley MP, Minister for the Environment, *Funding Projects to Boost Plastics Recycling*, Media Release, 9 February 2020

49 Mr David Williamson, DISER, *Committee Hansard*, Canberra, 5 August 2020, p. 1; The Hon. Karen Andrews MP, *Backing Businesses to Solves Key Environmental Challenges*, Media Release, 16 July 2020.

50 Mr David Williamson, DISER, *Committee Hansard*, Canberra, 5 August 2020, p. 1.

Committee comment

3.44 The Committee fully supports the programs and initiatives announced as part the Government's plan to transform Australia's waste and recycling industries. It welcomes the most recent announcement in the 2020–21 Budget of $249.6 million over four years to modernise recycling infrastructure, reduce waste and recycle more within Australia. This funding is expected to drive a $1 billion transformation of Australia's waste and recycling industry, and create more than 10,000 jobs.[51]

3.45 The Committee would like to see more emphasis on rural, regional and remote communities, and the inclusion of measures designed to improve the transportation and processing of waste within regions and across state and territory borders. The capacity of rural and regional areas to manage the movement of waste – either into or out of communities – in a way that is economically viable presents significant opportunities for employment, industry development, and improved health and environmental outcomes.

3.46 There was a degree of overlap between the Committee's inquiry and the body of work already underway by the Commonwealth. In particular, many of the recommendations put to the Committee for supporting innovation in the waste management and resource recovery industry such as investment in infrastructure, Commonwealth procurement, national coordination and better access to data are well in progress. To ensure the momentum of this reform agenda continues, the Committee makes the following recommendations.

Recommendation 3

3.47 The Committee recommends that the Commonwealth Government update the National Waste Policy Action Plan to include measures focused on the transportation and infrastructure requirements to manage national waste across regions and state and territory borders.

Recommendation 4

3.48 The Committee recommends that waste management and resource recovery be included as a standing item on the National Federation Reform Council agenda to monitor federal and state and territory progress

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51 DAWE, *Budget 2020–21*, <www.minister.awe.gov.au/sites/default/files/documents/budget-infographic-overarching.pdf>, accessed 27 October 2020.

against the National Waste Policy Action Plan 2019 and Response Strategy.

Recommendation 5

3.49 The Committee recommends that the responsible Minister report annually to Parliament on the progress of the targets and actions set out in the National Waste Policy Action Plan 2019.

Recommendation 6

3.50 The Committee recommends that recipients of Commonwealth waste management and recycling funding be required to report on the waste management and resource recovery outcomes as a result of that funding.

4. Impediments to innovation

Innovation framework

4.1 The majority of evidence received by the Committee related to current impediments to innovation and what is required to better support the sector; that is, to upscale and expand existing operations. The Committee heard that technology and solutions are not really the missing link in developing Australia's waste management and recycling industries, particularly as there are already technological solutions available domestically and overseas.

4.2 Rather, what is needed is a national framework within which regulation, incentive-based actions, taxes and levies, and long-term policy certainty are key features. For example, Mr Danny Conlon, Chief Executive Officer and Managing Director of Veolia Australia and New Zealand, stated:

> …when it comes to treating waste, diverting waste, recovering recyclables and recovering energy from particular materials, I don't think technology is the risk. Whether it's a group like Veolia or others in our industry, the technology, the solutions and the recovery techniques have been established elsewhere in the world. So technology is not the risk and the solution is not the risk; it's really about making sure that we have the framework in place to facilitate a good solution and a good framework all round.[1]

4.3 Similarly, the National Waste and Recycling Industry Council (NWRIC) said:

> The key challenges facing the waste and recycling industry is not so much the lack of technological innovation, but instead the need for systemic innovation

[1] Mr Danny Conlon, Chief Executive Officer and Managing Director, Veolia Australia and New Zealand, *Committee Hansard*, Canberra, 10 June 2020, p. 1.

> that will create confidence and certainty across the sector to invest in advance solutions.[2]

4.4 The Australian Academy of Technology and Engineering (ATSE), who is undertaking a major research project examining the technological readiness of the Australian waste management and resource recovery sector over the next decade, came to the same conclusion. Mr Philip Butler, Co-chair of the Expert Working Group for this project, told the Committee:

> This is a key statement: the core issue appears to be that Australia doesn't have the right frameworks to support investment and innovation in the waste and resource recovery sector. It's clear that economic and commercial feasibility and policy and regulatory readiness are the areas for greatest improvement to enable the uptake and deployment of new technology. There is a little bit of work to be done on infrastructure but this is not the game changer. This is not the block which is going to stop progress. We need a national framework — it's a very important point —which includes regulation, incentive based actions and longer-term certainty. Of course, we also need to support research and development applications in that technology by defining what skill sets are still needed.[3]

4.5 Ms Gayle Sloan, Chief Executive Officer of the Waste Management and Resource Recovery Association of Australia (WMRR) stated that 'technology and innovation are not in fact our challenges in Australia; rather it's about policy and approach'.[4]

4.6 The Commonwealth Government has a crucial role in developing this framework, most importantly in leading and coordinating national approaches, and removing the impediments to innovation. In addition to shifting to a circular economy, key areas identified for reform include:

- Product stewardship;
- Markets and end users of recycled products;
- Infrastructure investment;
- National coordination;
- Research and data; and

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2 National Waste and Recycling Industry Council (NWRIC), *Submission 197*, p. 2.

3 Mr Philip Butler, Co-chair, Expert Working Group on Technology Readiness in the Waste and Resource Recovery Sector, Australian Academy of Technology and Engineering (ATSE), *Committee Hansard*, Canberra, 12 August 2020, p. 12.

4 Ms Gayle Sloan, Chief Executive officer, Waste Management and Resource Recovery Association of Australia (WMRR), *Committee Hansard*, Canberra, Wednesday 26 August, p. 6.

- Education and awareness.

4.7 These key areas for reform are similar to those identified by the Department of Agriculture, Water and the Environment (DAWE) as being characteristic of 'top-performing' countries when it comes to waste management and recycling.[5]

4.8 The DAWE identified countries such Germany, South Korea, Slovenia and Austria as being strong performers in their management of municipal waste and recycling.[6] Other countries cited included Japan, Wales, England, Switzerland and the Netherlands.

4.9 When considering 'what makes these countries top performers', the DAWE listed the following factors:

- started a circular economy on waste materials and placed a high value on waste;
- made infrastructure improvements and developed facilities;
- built product stewardship and formed a culture of shared responsibility with manufacturers;
- encouraged a change in consumer behaviour implementing container deposit schemes, food and organics recovery systems and other incentives to recycle;
- invested in research and development and waste technologies; and
- harmonised national waste policies between their underlying jurisdictions (for example, states and territories, and provinces etc).[7]

4.10 Similar evidence was received by the Committee, calling for Australia to adopt the same strategies.

Product stewardship

4.11 Product stewardship is described as 'an approach to reducing the environmental and other impacts of products by encouraging or requiring manufacturers, importers, distributors and other persons to take responsibility for those products.'[8] Based on the 'polluter pays' principle, the

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5 Department of Agriculture, Water and the Environment (DAWE), *Submission 228.1*, Answer to Question on Notice, p. [10].

6 DAWE, *Submission 228.1*, Answer to Question on Notice, pp. [9-10].

7 DAWE, *Submission 228.1*, Answer to Question on Notice, p. [10].

8 *Product Stewardship Act 2011* (Cth) s 3.

aim of product stewardship is to shift waste management costs to those who benefit from the production and consumption of products that cause waste.[9]

4.12 In Australia, product stewardship is governed by the *Product Stewardship Act 2011* (Cth) which provides for three types of schemes: mandatory, co-regulatory and voluntary accredited.[10] The Committee notes that the majority of schemes currently operating in Australia are not covered by this Act and fall into a separate category of 'voluntary unaccredited schemes' (see Table 1).

4.13 The Product Stewardship Act will soon be replaced by the Government's *Recycling and Waste Reduction Bill 2020*, which is currently before the Parliament. The bill essentially retains the same product stewardship framework, while updating some of the details of how it operates.[11]

4.14 The *Product Stewardship (Oil) Act 2000* (Cth) governs the compulsory Product Stewardship for Oil Scheme, while the *National Environment Protection (Used Packaging Materials) Measure 2011* (Cth) and the *Product Stewardship (Televisions and Computers) Regulations 2011* (Cth) support two co-regulated schemes — the Australian Packaging Covenant and the National Computer and Television Recycling Scheme (NCTRS) respectively.[12]

4.15 Table 4.1 provides a breakdown of active product stewardship schemes in Australia as of June 2020.[13]

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9 Moreland City Council, *Submission 107*, p. 5; Western Australian Government, *Submission 210*, p. 12.

10 DAWE, *Product Stewardship*, < www.environment.gov.au/protection/waste-resource-recovery/product-stewardship> accessed 28 October 2020.

11 The Hon Sussan Ley MP, Minister for the Environment, *House of Representatives Hansard*, 27 August 2020, p. 5751.

12 DAWE, *Product Stewardship*, <www.environment.gov.au/protection/waste-resource-recovery/product-stewardship> accessed 5 November 2020.

13 Western Australia introduced a Container Deposit Scheme in October 2020: Department of Water and Environmental Regulation, WA Container Deposit <www.dwer.wa.gov.au/cds> accessed 2 November 2020.

Table 4.1 Product Stewardship Schemes in Australia

Scheme Type	Schemes	Notes
National mandatory regulated[14]	1	The Product Stewardship for Oil Scheme.
Container deposit schemes	6	ACT, NSW, NT, Queensland, SA and WA
Co-regulated	2	Australian Packaging Covenant, NCTRS
Voluntary accredited	1	MobileMuster
Voluntary unaccredited	18	For full list with brief descriptions see the Department of Agriculture, Water and the Environment's *Review of the Product Stewardship 2011*, pp. 29–31[15]

Source: DAWE, Review of the Product Stewardship Act 2011, June 2020, pp. 28-32.

4.16 In addition to the active schemes there are 13 schemes in development, including container deposit schemes for the two states that do not already have them.[16] On 4 September 2020, the Australian Competition and Consumer Commission (ACCC) granted approval for the Battery Stewardship Council's proposed Battery Stewardship Scheme, which will be a voluntary national scheme.[17]

4.17 In recent years, the Commonwealth Government's role in product stewardship has been closely scrutinised. The Senate Environment and Communications References Committee considered the issue in its 2018 report *Never Waste a Crisis: the Waste and Recycling Industry in Australia* and recommended significant changes to Australia's regime including that:

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14 The Product Stewardship for Oil Scheme is Australia's only mandatory product stewardship scheme. It is enacted under the *Product Stewardship (Oil) Act 2000* not the *Product Stewardship Act 2011.*

15 DAWE, *Review of the Product Stewardship 2011*, June 2020, pp. 29–31.

16 DAWE, *Review of the Product Stewardship Act 2011*, June 2020, pp. 31—32.

17 Australian Competition and Consumer Commission (ACCC), *Battery Stewardship Council*, <www.accc.gov.au/public-registers/authorisations-and-notifications-registers/authorisations-register/battery-stewardship-council> accessed 13 October 2020. As of October 2020 it is unclear whether the Battery Stewardship Council will seek to have the scheme accredited under the *Product Stewardship Act* 2011 (Cth).

- schemes under the *Product Stewardship Act 2011* (Cth) be mandatory;
- mandatory schemes be established for tyres, mattresses, e-waste and photovoltaic panels;
- the Product Stewardship Advisory Committee be re-established to recommend the listing of products under the *Product Stewardship Act 2011* (Cth); and
- a national container deposit scheme be established.[18]

4.18 Most recently, the DAWE released its first *Review of the Product Stewardship Act 2011*. The review made 26 recommendations, 13 of which related to the National Computer and Television Recycling Scheme.[19]

4.19 The review largely supports the current operation of the Act, including the role of voluntary schemes within the current framework, and recommended relatively minor adjustments, with the most noteworthy being more use of co-regulatory schemes 'where significant free-rider problems exist' (Recommendation 5) and consideration of the creation of an industry-led 'central clearinghouse' to manage product stewardship as a whole under government oversight (Recommendation 7).[20] In response, the Commonwealth Government supported all 26 recommendations.[21]

Evidence to inquiry

4.20 Evidence to the Committee's inquiry was received before the findings of the Commonwealth's review were released. The Committee heard strong support for product stewardship schemes in Australia. In particular, it was asserted that product stewardship should play a central role in Australia's approach to waste management and that the Commonwealth is best placed

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18 Senate Environment and Communications References Committee, *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, June 2018, pp. 139–140, < www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/WasteandRecycling/~/media/Committees/ec_ctte/WasteandRecycling/Report/report.pdf > accessed 5 November 2020.

19 DAWE, *Review of the Product Stewardship Act 2011*, June 2020, pp. v – vii. These are required by s109 of the Act to take place as soon as possible every five years after the commencement of the Act (8 August 2011: s 2).

20 DAWE, *Review of the Product Stewardship Act 2011*, June 2020, p. vi.

21 DAWE, *Australian Government Response to the Review of the Product Stewardship Act 2011*, July 2020, pp. 5 –7, < www.awe.gov.au/sites/default/files/2020-07/product-stewardship-act-review-govt-response.pdf > accessed 5 November 2020.

to take the lead on this. For example, the Western Australian Local Government Association (WALGA) stated:

> Ensuring effective national product stewardship schemes are in place, governed by the Product Stewardship Act, is a role which only the Federal Government can undertake. The Association considers it vital that the Federal Government act to ensure effective Schemes are in place for key products including packaging and tyres.[22]

4.21 The role of government in these schemes was the key issue addressed in submissions. Broadly, three views emerged: maintaining the status quo, encouraging more industry-led programs, and establishing more mandatory schemes.

Status quo

4.22 Some stakeholders favoured the current framework to product stewardship, primarily for its flexibility. The most comprehensive defence of the status quo came from CropLife Australia, the national body for the agricultural chemical and biotechnology industry, which operates two voluntary unaccredited schemes – drum*MUSTER* and ChemClear – for disposing of, and recycling farm chemical waste.[23]

4.23 Specifically, CropLife Australia argued:

> The voluntary, industry-led approach to the stewardship of waste management facilitates a proactive environment in which the programs can be updated and improved without requiring government oversight, which can be costly and move at a very slow pace.[24]

4.24 CropLife Australia asserted that flexibility in these programs is important as there is 'not one 'correct' approach to product stewardship'.[25] Furthermore, if regulatory compliance were to be imposed on its voluntary stewardship programs it may have a number of perverse consequences. These include:

- diverting collections from rural and remote areas where containers and unwanted chemicals could accumulate to more urban areas;

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22 Western Australian Local Government Association (WALGA), *Submission 27*, p. 4.

23 CropLife Australia, *Submission 105*.

24 CropLife Australia, *Submission 105*, p. 3.

25 CropLife Australia, *Submission 105*, p. 4.

- diverting resources from actual waste management and resource recovery to complying with 'rigid, bureaucratic monitoring and reporting provisions'; and
- potential withdrawal of ACCC program authorisation, if the benefits to the community are outweighed by the compliance costs.[26]

4.25 Finally, CropLife argues that its schemes are already sufficiently regulated as the industry levy by which they are funded is regulated by the ACCC.[27]

4.26 The Australian Packaging Covenant Organisation (APCO) which was established to administer the Australian Packaging Covenant – a compulsory, co-regulatory product stewardship framework – is supportive of the current arrangements. In its submission, APCO states that its co-regulatory model for managing sustainable packaging gives it:

> a unique insight, ability and responsibility to support the objectives of governments, industry and the community on packaging waste. The ability of the Covenant to engage industry in designing more sustainable packaging and support better waste management and the transition to a circular economy is unique amongst product stewardship approaches.[28]

4.27 However, the Committee heard specific criticism of the Australian Packaging Covenant and subsequent calls for greater government involvement and regulation.[29] For example the WMRR told the Committee that it will:

> continue to advocate for a genuine mandatory and enforceable packaging product stewardship scheme to be introduced in Australia, that moves from an ethic of shared responsibility, to a mandated responsibility and financial obligation for end-of-life of a product, including minimising its impact on the environment.[30]

4.28 The WMRR argued that the current scheme is 'not really a polluter or a generator pays model' when compared to overseas schemes such as those

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26 CropLife Australia, *Submission 105*, p. 4.

27 CropLife Australia, *Submission 105*, pp. 3–4.

28 Australian Packaging Covenant Organisation, *Submission 5*, p. 26.

29 WALGA, *Submission 27*, p. 4; Moreland City Council, *Submission 107*, p. 5; Local Government Association of Queensland (LGAQ), *Submission 128*; pp. 11–12; National Waste and Recycling Industry Council (NWRIC), *Submission 197*, pp. 2–3; Waste Management and Resource Recovery Association Australia (WMRR), *Submission 81*, p. 4; Plastic Free Foundation, *Submission 115*, p. 1; BYO Containers, *Submission 167*, pp. 3–4.

30 WMRR, *Submission 81*, p. 4.

operating in Europe and England, with the costs of collecting and recycling waste still falling to councils, the waste industry and the community.[31]

Industry-lead schemes

4.29 Some submitters advocated a middle road of industry-led schemes. For example, the Victorian Government suggested that the Commonwealth should encourage 'industry-initiated product stewardship arrangements' but that it should consider 'mandatory schemes or providing stronger incentives for participation, where voluntary approaches are not effective in delivering a net community benefit'.[32]

4.30 The Australian Battery Recycling Initiative suggested the introduction of 'a new "industry-led scheme" category that require[s] industry to act by addressing the free-rider issue but allow[s] industry to then have full responsibility for scheme design, operation, performance management and reporting.'[33]

Mandatory schemes

4.31 There was strong support for significant increases in mandatory product stewardship in Australia. This could be achieved by creating more schemes, bringing more products into existing schemes, and introducing clear and binding targets.[34] In particular, it was argued that voluntary and sometimes even co-regulatory schemes are ineffective because they make it too easy for some businesses within an industry to escape the costs of the scheme, which in turn puts those businesses that are funding it at a competitive disadvantage.

4.32 It was further argued that mandatory schemes are needed to create a 'level playing field'.[35] This problem is illustrated by an example cited in the recent review of the *Product Stewardship Act 2011*. Here, the former Used Oil Bottle Collection and Recycling Scheme, operated by the Australian Institute of Petroleum, became caught in a downward spiral of member withdrawals driving up costs for remaining members. This increase in costs contributed

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31 Ms Gayle Sloan, Chief Executive Officer, WMRR, *Committee Hansard*, Canberra, 26 August 2020, p.7.

32 Department of Environment, Water, Land and Planning (DEWLP), *Submission 224*, p. 15.

33 Australian Battery Recycling Initiative, *Submission 220*, p. 3.

34 WMRR, *Submission 81*, p. 2 (of cover letter); Geoff Pryor, *Submission 221*, p. 7; Australian Local Government Association (ALGA), *Submission*, p. 3; Moreland City Council, *Submission 107*, p. 5.

35 ALGA, *Submission 91*, p. 3.

to more withdrawals, leading to the collapse of the scheme in 2016 after 12 years of operation.[36]

4.33 At a public hearing in Canberra, Dr Heinz Schandl, Research Group Leader, CSIRO noted that product stewardship works better when the schemes are 'not just voluntary'.[37] Dr Schandl told the Committee:

> We have a very positive experience with product stewardship schemes. They work better when they're not just voluntary and there is a higher level of commitment around them. In our consultation with industry, there was a sense that we need to move from voluntary schemes to finding solutions. People are also bringing up the other concept of extended producer responsibility, which would ensure that products or materials are designed in such a way that they can more easily be disassembled and recycled when they come to the end of their life. I think there's a really good opportunity here for combining product stewardship with extended producer responsibility and thereby contributing to innovation in the marketplace.[38]

4.34 The ATSE drew the Committee's attention to the product stewardship scheme that operates in the UK, describing it as 'pretty close to best practice'.[39] It highlighted that the scheme requires manufacturers or importers — at the end of a product's life — to recycle it within a certain period of time. The advantage of this (soon to be) mandatory regulation is that it enables manufacturers to 'rejig their formulations and rejig their processes and produce materials where they have a social responsibility to ensure that they can be recycled'.[40] In other words, the regulation forces change on the part of manufacturers.

4.35 Among those stakeholders who supported the expansion of mandatory schemes, there was a broad range of views as to which products should be included, from only a handful to 'all products'.[41] Several submitters proposed extensive lists of products which they believed should be captured

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36 DAWE, *Review of the Product Stewardship Act 2011*, June 2020, p. 2.

37 Dr Heinz Schandl, Research Group Leader, CSIRO, *Committee Hansard*, Canberra, 5 August 2020, p. 4.

38 Dr Heinz Schandl, CSIRO, *Committee Hansard*, Canberra, 5 August 2020, p. 4.

39 Mr Philip Butler, Co-Chair, Expert Working Group in Technology Readiness in the Waste and Resource Recovery Centre, ATSE, *Committee Hansard*, Canberra, 12 August 2020, p. 13.

40 Mr Philip Butler, ATSE, *Committee Hansard*, Canberra, 12 August 2020, p. 13.

41 For example see Ipswich Residents Against Toxic Waste, *Submission 137*, p. 15 (tyres, mattresses, e-waste and photovoltaic panels); and Moreland City Council, *Submission 107*, p. 5.

by new or expanded schemes.[42] Plastics in general and packaging in particular were the most popular suggestions,[43] while there was substantial support for mandatory schemes for tyres, e-waste, photovoltaic panels and mattresses,[44] and for aligning product stewardship arrangements with the bans on export waste (plastics, paper and cardboard, glass and tyres).[45]

4.36 Other suggestions put forward for improving product stewardship in Australia included:

- having a 'user-centred approach';[46]
- putting more emphasis in scheme design on avoiding waste in the first place,[47] including a ban on planned obsolescence[48] and legislation requiring products to be easy to disassemble and repair;[49]
- improving dialogue between manufacturers and recyclers; [50]
- raising community awareness of both the general concept of product stewardship and specific schemes, with the aim of improving their functioning and boosting confidence in the recycling system as a whole;[51]
- improving certification and labelling in relation to product stewardship schemes;[52]
- improving monitoring of existing schemes;[53]

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42 ALGA, *Submission 91*, p. 3; Zero Waste Victoria, *Submission 216*, pp. 7–8.

43 For example see Department of Environment, Land, Water and Planning, *Submission224*, p. 21; Zero Waste Victoria, *Submission 216*, pp. 7–8.

44 Ipswich Residents Against Toxic Environments, *Submission 137*, p. 15; Law Council of Australia, *Submission 165*, p. 6; ALGA, *Submission 91*, p. 3; NWRIC, *Submission 197*, p. 2.

45 LGAQ, *Submission 128*, p. 9.

46 DELWP, *Submission224*, p. 15.

47 DELWP, *Submission224*, p. 15.

48 Name Withheld, *Submission 163*, p. 6.

49 DELWP, *Submission 224*, p. 18; ATSE, *Submission 109*, p. 2; Zero Waste Victoria, *Submission 216*, p. 10.

50 DELWP, *Submission 224*, p. 15.

51 Ms Erin Lewis-Fitzgerald, *Submission 156*, p. 2; Moreland City Council, *Submission 107*, p. 3.

52 City of Adelaide, *Submission 57*, p. 4.

53 RMIT University, *Submission 116*, p. 5.

- ensuring that there are appropriate 'resource utilisation facilities and technologies' in place to process the products collected through the schemes, so they do not just all end up in landfill anyway;[54]
- excluding energy from waste and incineration as options to achieve targets for product stewardship schemes;[55]
- adapting schemes to ensure that they cover 'parallel imports' (products that are imported into Australia without the specific permission of the manufacturer, typically through online shopping)[56]; and
- introducing a 'packaging deposit scheme' similar to the container deposit scheme on all packaged items.[57]

4.37 RMIT recommended a number of policy and legislative changes to remove barriers to innovation and support product stewardship and the circular economy.[58] Some of these recommendations included:

- enact product stewardship for a wider range of materials;
- reclassify waste materials to enable better product stewardship handling processes; and
- monitor for compliance in transport and tracking use back into new materials to ensure that product stewardship and material return works efficiently.[59]

4.38 Finally, there were calls to better define the roles and responsibilities of each layer of government when it comes to product stewardship. For example, the Western Sydney Regional Organisation of Councils (WSROC) noted that 'even for federal and state initiatives such as product stewardship and container deposit schemes, there is high community expectation for local government to provide education on and facilitate these'.[60] The City of Adelaide also submitted that the roles of respective governments be clarified.[61]

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54 Australian Industrial Ecology Network (AIEN), *Submission 202*, p. 8.

55 Plastic Free Foundation, *Submission 115*, p. 2.

56 Australian Battery Recycling Initiative; *Submission 220*, p. 3; ACCC, Selling Parallel Imports, <www.accc.gov.au/business/treating-customers-fairly/selling-parallel-imports>, accessed 21 July 2020.

57 CanBiz Consultants, *Submission 86*, p. 2.

58 RMIT University, *Submission 116,* p. 5.

59 RMIT University, *Submission 116,* p. 5.

60 WSROC, *Submission 78,* p. 7.

61 City of Adelaide, *Submission 57,* p. 3.

4.39 Container deposit schemes (CDS) are a specific type of product stewardship scheme. Typically, these are industry-funded schemes in which the public can return used beverage containers for a small refund. The returned containers are then collected and recycled.[62] Container deposit schemes are currently operating in all states and territories except Tasmania and Victoria, which both have plans to introduce them in the near future.[63]

4.40 The Moreland City Council described the benefits of container deposit schemes in its submission:

> CDS has multiple benefits, it shifts the cost to manage beverage container waste back to the producers; it provides an incentive to consumers to recycle beverage containers thereby reducing litter and increasing recovery of this material; and it ensures a clean, source separated waste stream with higher value to manufacturers.[64]

4.41 There was overwhelming support for container deposit schemes from stakeholders. Several submitters called for the expansion of these schemes, particularly to cover other forms of plastic packaging or glass, and for these schemes to be combined into a national scheme or at least be nationally harmonised.[65]

4.42 In contrast, Australian Grape and Wine called for wine containers (principally glass bottles) to remain exempt from such schemes. It argued that container deposit schemes are designed to reduce litter and very few wine containers end up as litter, the rate of recycling of wine containers is already high, and the cost to the industry that would result from including wine containers in the scheme would be out of proportion to any benefit gained.[66]

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62 Planet Ark, Container Deposit Schemes, < www.recyclingnearyou.com.au/containerdeposit/> accessed 5 November 2020.

63 Planet Ark, Container Deposit Schemes, < www.recyclingnearyou.com.au/containerdeposit/> accessed 5 November 2020.

64 Moreland City Council, *Submission 107*, p. 4.

65 ALGA, *Submission 91*, p.3; Zero Waste Victoria, *Submission 216*, p. 9; NWRIC, *Submission 197*, p. 2.

66 Australian Grape and Wine, *Submission 108*, pp. 5–6.

Markets and end users

4.43 A fundamental component of innovative waste management is ensuring that there is a market for recycled and recovered products. Without such a market, the recovery and value of waste is lost, generally to landfill.

4.44 The Committee heard that the lack of markets is a current impediment to innovation. As described by the NWRIC:

> There is a lack of markets for recovered materials — plastics, glass, paper, aggregate, organic material and so on — locally and overseas. There's a real lack of those markets. Where there are markets, these materials are recovered and add value and create more jobs. Where there are no markets, you get poor practice and loss of materials to landfill.[67]

4.45 Similarly, Ms Clare Sullivan, Chief Executive, Local Government Professionals Australia stated:

> Again it goes to the market for the output — if there's a viable price that you can get for your recycled pellets, whatever grade they are, then you can attract the money to invest in the processing plant or set up various modes of public-private partnerships, however you do it. But at the moment there are just not viable markets to sell the output.[68]

4.46 The importance of markets for recycled products was a key focus of AIEN's submission to the inquiry. It noted that 'Australia has afforded insufficient attention to recycled product markets'.[69] In particular, AIEN said:

> the entire concept of creating a circular economy is dependent upon the preparedness of industry to utilise recyclates as their raw materials. In turn, the appetite of industry for change will be governed by consumer acceptance regarding the aesthetics and efficacy of the products they produce.[70]

4.47 Furthermore, AIEN asserted that this all relies on recycled material values remaining competitive with virgin raw material equivalents. To address these challenges, AIEN recommends investment in resource recovery

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67 Ms Rose Read, Chief Executive Officer, NWRIC, *Committee Hansard*, Canberra, 10 June 2020, p. 6.

68 Ms Clare Sullivan, Chief Executive, Local Government Professionals Australia, *Committee Hansard*, Canberra, 4 March 2020, p. 8.

69 AIEN, *Submission 202*, p. 6.

70 AIEN, *Submission 202*, p. 9.

infrastructure and product manufacture, and the marketing of recycled content products within Australia.[71]

4.48 Similar issues were discussed in the University of Tasmania's submission which highlighted market failure compounding the limited capacity of Australia to recycle plastic.[72] Recycled plastic is more expensive than new plastic therefore there is no incentive for manufacturers to use recycled materials.[73] In this situation, the market and circular economy is undermined by the availability of cheaper virgin products.

4.49 Government procurement policies and the development of national standards for recycled products were promoted as two ways to improve recycled markets in Australia.

Box 4.1 CSIRO Advisory System for Process innovation and Resource Exchange (ASPIRE)

Developed by the CSIRO and Data61, ASPIRE is 'an online marketplace which intelligently matches businesses with potential remanufacturers, purchasers or recyclers of waste resources'.[74] It adopted a commercial operating model in 2019 and launched its current platform in March 2020.[75]

ASPIRE offers subscriptions to businesses and councils. Subscribers receive access to its online marketplaces for waste and (in the case of businesses) products containing recycled materials, as well as a number of other benefits including statistical analysis of their activity and marketing and networking opportunities.[76]

71 AIEN, *Submission 202*, pp. 11–12.

72 University of Tasmania, *Submission 18*, p. 4.

73 University of Tasmania, *Submission 18*, p. 4.

74 CSIRO, *Submission 215*, p. 8; Advisory System for Processing Innovation and Resource Exchange (ASPIRE), One Businesses [sic] Trash is Another Businesses [sic] Treasure <www.aspiresme.com/the-aspire-story/> accessed 15 September 2020.

75 ASPIRE, One Businesses [sic] Trash is Another Businesses [sic] Treasure <www.aspiresme.com/the-aspire-story/> accessed 15 September 2020.

76 ASPIRE, Take, Make, Waste —Rethink the Process, <www.aspiresme.com/whatsincluded/> accessed 15 September 2020.

Procurement policies and standards

4.50 All Commonwealth Government procurement is governed by the *Commonwealth Procurement Rules*, issued by the Department of Finance, which include two general references to waste and recycling: officials conducting procurement must consider environmental sustainability (including energy efficiency, environmental impact and use of recycled products) and waste should be avoided where possible.[77]

4.51 The DAWE publishes a non-binding *Sustainable Procurement Guide*, which was last updated in 2018 to correspond with the *National Waste Policy: Less Waste, More Resources*.[78] The *Guide* does not include targets for use of recycled products or similar specific measures.

4.52 The significance of Commonwealth procurement in creating markets for recycled products was highlighted by Mr Peter Rimmer, Waste Service Coordinator, Campbelltown City Council:

> I think government at all levels has a role to play in their procurement policies as well. They can absolutely address the market demand issue in a lot of areas using recycled organics, using crushed glass sand, rubber crumb in tyres and those sorts of things. The technology is there to produce those products. The question is those products entering the markets.
>
> The standards are there to ensure that they can be used in construction works, but there appears not to be a strong demand from the government sector, which would certainly address a lot of those issues. We think that the government has a role to play in that as well and that there should definitely be a focus on the community and consumer choice areas as well in terms of promoting buying recycled and buying local products.[79]

4.53 The WMMR made a similar point regarding the significance of government procurement to drive recycled markets and create jobs. Specifically it stated:

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77 *Commonwealth Procurement Rules 20 April 2019*, r. 4.5(e), 6.4; Department of Finance, Commonwealth Procurement Rules, <www.finance.gov.au/government/procurement/commonwealth-procurement-rules>, accessed 4 June 2020.

78 Department of the Environment and Energy, *Sustainable Procurement Guide*, 2018; DAWE, *Sustainable Procurement Guide*, <www.environment.gov.au/protection/waste-resource-recovery/publications/sustainable-procurement-guide>, accessed 4 June 2020.

79 Mr Peter Rimmer, Domestic Waste Service Coordinator, Campbelltown City Council, *Committee Hansard*, Wednesday 17 June 2020, p. 4.

> We know that, when we purchase local Australian product, we're creating 9.2 jobs for every 10,000 tonnes compared with 2.8 if we landfill that. So I think the Commonwealth and all levels of government should be required to utilise local Australian recycled materials—be it white paper that goes in photocopiers that is made from recycled or water bottles that are made from Australian recycled PET. We should be preferencing that because they are jobs that are going to be grown in Australia.[80]

4.54 Lake Macquarie Council put its support behind ensuring all levels of government are equipped to provide base level procurement to help de-risk the forthcoming export ban. For example, by providing a base level of procurement of recycled glass and plastics content in civil construction materials and supporting the development of end markets for recycled organic compost products and recyclate recovered through kerbside recycling systems.[81] Bingo Industries advocated for government to 'identify a number of major shovel-ready projects upon which they can mandate the use of recycled products'.[82]

4.55 Mr Victor Bivell from Eco Investor suggested an examination of the types of products that can be commercially manufactured from Australia's plastic waste and the potential of state and federal governments to purchase these products. As Mr Bivell explained:

> Significant and perhaps complete uptake of recycled plastics could be achieved if state and local governments favoured the purchase of suitable recycled plastic products. Among these, state governments and utilities may be able to utilize sign posts and power poles, and local governments utilize footpaths, walkways, bollards, park fences, park benches and other products.
>
> The study could examine how targeted government procurement for specific products would work in practise if widely adopted across Australia and provide a better understanding of the environmental and economic costs and benefits.[83]

4.56 In his evidence, Mr Cory McArdle, Manager, Waste and City Presentation, Camden Council flagged the idea of a national framework to generate and find markets for recycled products. This is in contrast to the pockets of

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80 Ms Gayle Sloan, WMRR, *Committee Hansard*, Wednesday 26 August, p. 9.

81 Lake Macquarie City Council, *Submission 218,* p. 3.

82 Bingo Industries, *Submission 76*, p. 5.

83 Mr Victor Bivell, *Submission 4,* p. 4.

available markets across states and territories, and the general inconsistency across the country. In particular, Mr McArdle said:

> I think what an opportunity would be is to see a national framework to generate and find markets that want the product and want to pull that product into the sector…
>
> …definitely something at the national level that would ensure consistency. I think we heard from South Australia saying that those pull markets already exist, whereas in New South Wales probably not as much. We're looking for markets to take the product. I think ensuring that we had markets nationally to pull those products would be a great positive outcome.[84]

4.57 Closely tied to markets for recycled products, are the standards to which these products are made. As explained by the Australian Local Government Association (ALGA):

> The development of a broad range of new standards for products with recycled content is needed to support new markets for recovered material. For example, using tyre crumbs, soft plastics, printer cartridges and glass in new road bases, pavements and construction is hampered by a lack of standards. Without standards, concerns around safety and liability impede innovation.[85]

4.58 The ALGA noted that 'new standards take time and funds to develop' and called for greater investment in the development of standards to expedite the process.[86]

Auditing and accreditation

4.59 Some submissions to the inquiry considered auditing and accreditation of reprocessed waste and recycled products as an important means to improve transparency, accountability and confidence in the content of recycled products. For example, the Local Government Association of South Australia (LGASA) recommended the introduction of a national accreditation system for circular products to improve consistency and transparency in government procurement.[87] In particular, the Association stated:

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84 Mr Cory McArdle, Manager, Waste and City Presentation, Camden Council, *Committee Hansard,* Wednesday 17 June 2020, p. 5.

85 ALGA, *Submission 91,* p. 5.

86 ALGA, *Submission 91,* p. 5.

87 Local Government Association of South Australia (LGASA), *Submission 120,* p. 14.

> a consistent approach through a credible national accreditation system would enable all levels of government and industry to undertake the evaluation of social and environmental impacts of goods, services and materials with confidence. The accreditation system could require, for example, verification of claims of recycled content contained in goods/products and verification of the location of where that recycled content was sourced from. This would enable the meeting of any targets set to be independently verified. This would also help increase transparency in the industry and provide confidence to businesses in their investment and decision making.[88]

4.60 Bingo Industries advocated for 'third party auditing of recovery rates and regulating minimum standards of recovery' to help promote greater scrutiny and the production of better quality recovered materials.[89]

4.61 As noted in Chapter 3, the Commonwealth Government has announced it will update its procurement policy with the aim of generating demand and markets for recycled products and addressing some of the concerns raised by industry. The Committee was advised at its public hearing on 5 August 2020 that the Commonwealth Government is also undertaking a body of work on developing standards and specifications for recycled content in products.[90]

Infrastructure investment

4.62 With the imminent introduction of the national waste export bans, the Committee heard that greater investment in waste management and recycling infrastructure is critical to process the waste and resources that will now remain onshore.

4.63 In particular, it was identified that there is a need to fund gaps in our existing infrastructure capacity, and for reform of current funding programs to adequately capture the type of technology and innovation being developed in Australia. This is to prevent such technology from being lost to other countries.

4.64 The need for long term policy and regulatory certainty to drive confidence in infrastructure investment was another consistent theme.

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88 LGASA, *Submission 120,* p. 14.

89 Bingo Industries, *Submission 76,* p. 6.

90 Mr Jason Mundy, First Assistant Secretary, Environmental Protection Division, DAWE, *Committee Hansard*, 5 August 2020, p. 8.

Infrastructure gaps and capacity short-falls

4.65 There was general agreement that Australia does not currently have the infrastructure capacity to process and recycle waste, and that this problem will be compounded with the introduction of the waste export bans. For example, in its submission, the Victorian Department of Environment, Land, Water and Planning (DELWP) stated:

> The national ban on waste exports and the ambitious resource recovery targets included in the National Waste Policy Action Plan means that we will be recovering more materials and will need to process more in Australia. Australia currently lacks the infrastructure to reprocess all our recovered materials domestically.[91]

4.66 The WMRR highlighted shortcomings in Australia's capacity to process waste. It said:

> China's National Sword policy in 2018 highlighted a number of issues to the broader community governance that, to be fair, we knew about as industry. However, we've had real challenges getting necessary change and support to address these. Specifically, it's Australia's linear approach to material management and the lack of onshore domestic market demand for recycled materials. As a result there is a lack of onshore remanufacturing capacity.[92]

4.67 The LGASA also noted the implications of the waste export bans on resource recovery citing:

> The impacts of the China Sword Policy present a significant opportunity to re-shape Australia's recycling industry by developing local markets for recyclable materials and establishing a truly circular economy. However, this industry transition is a complex process and it will require both investment in reprocessing/remanufacturing infrastructure and action to develop local end market demand.[93]

4.68 The WSROC modelled waste and resource recovery growth for its region and found that not only is waste generation currently increasing at a rate outstripping population growth, but the amount of waste generated in Western Sydney is projected to double in 30 years.[94] Furthermore, the WSROC cited research which estimates that by 2021, Sydney will need an

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91 DELWP, *Submission 224,* p. ii.

92 Ms Gayle Sloan, WMRR, *Committee Hansard*, Canberra, 26 August 2020, p. 6.

93 LGASA, *Submission 120,* p. 5.

94 WSROC, *Submission 78,* p. 2.

additional 16 waste processing facilities to cope with an additional 1.4 million tonnes of waste. This includes two energy recovery facilities to service metropolitan Sydney, (totalling four facilities for the state) and three additional alternate waste treatment facilities for mixed waste treatment.[95]

4.69 In its submission, Project 24 noted the 'significant lack of processing infrastructure capacity and limited waste management solutions available to the Sydney metropolitan area'.[96]

4.70 The WSROC argued that without additional waste processing and resource recovery capacity, even more landfill space will be required.[97] However, this issue itself is compounded by difficulties securing landfill sites. As explained by the WSROC:

> Added to this issue are the challenges arising from the lack of suitable lands available for waste processing infrastructure, due to encroaching urban development and strict planning requirements for such sensitive infrastructure.[98]

4.71 WSROC called on the federal and state governments to work together to plan for and deliver essential waste and resource recovery infrastructure to address population growth and drive innovation and resource recovery outcomes.[99]

4.72 Some stakeholders who expressed concern about current infrastructure capacity called for a national assessment of the current situation to determine what is needed in the future. For example, the WMRR told the Committee that:

> … a robust assessment of current material flows across jurisdictions and a corresponding review of present and future infrastructure needs must be done in order to accurately ascertain both the market capacity required to process additional materials as well as the type and location of infrastructure needed.[100]

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95 WSROC, *Submission 78,* p. 2.

96 Project 24 Working Group, *Submission 214,* p. 1.

97 WSROC, *Submission 78,* p. 2.

98 WSROC, *Submission 78,* p. 3.

99 WSROC, *Submission 78,* p. 3.

100 WMRR, *Submission 81,* p. 6.

4.73 The WALGA, Zero Waste Victoria, the DEWLP, Mike Ritchie and Associates and Southern Sydney Regional Organisation of Councils made similar recommendations.[101]

Commonwealth funding

4.74 Difficulties accessing Commonwealth funding and investment was an early theme in the Committee's inquiry. In short, the Committee was told that challenges to commercialising innovative technologies arise when the innovation does not meet the criteria for Commonwealth funding, and 'falls through the cracks'. Furthermore, problems with accessing adequate funding have contributed to a 'valley of death' in Australia, resulting in companies seeking opportunities and support overseas.

4.75 Licella Holdings shared with the Committee its experience of trying to commercialise its Cat-HTR technology which processes mixed and multilayer plastic to high quality oil:

> As an Australian company that has gratefully received support from the Federal Government, which has helped us to progress through our R&D phase, we are indeed at that "Valley of Death". By this we mean, having proved the technology at pilot scale, we now need to make the leap to commercial scale. To do this, we need to commission a so called "Pioneer Plant" (a first of its kind facility that typically cannot be financed using traditional capital markets) so that we can deliver this solution to the Australian market. To get a Pioneer Plant built in Australia will cost in the order of $40M-$50M. The support we are seeking from the Government is half of this.
>
> To date, ARENA [has] supported Licella's pilot scale Cat-HTR development activities for biomass. The challenge Licella faces is that we cannot access ARENA funding for the commercial scale pioneer plant for plastic, as ARENA [is] governed by the ARENA Act and plastics are not classified within "renewable energy".
>
> Licella [has] received support through DIIS's Accelerating Commercialisation Program to help prove the technology for non-recyclable plastics, but the maximum funding available is $1M.

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101 WALGA, *Submission 27*, p. 4; Zero Waste Victoria, *Submission 216*, p. 4, DEWLP, *Submission 224*,p. 20 ; Mike Ritchie and Associates, *Submission 2017*, p. 1; Southern Sydney Regional Organisation of Councils (SSROC), *Submission 82*, p. 3.

> …The CEFC (Clean Energy Finance Corporation)…[is] able to support low emission technologies but [isn't] able to assist Licella, as under the existing CEFC mandate [it has] a requirement that the technology must be commercial somewhere (i.e. a reference facility using the same technology at a similar scale and with a similar feedstock). As our Cat-HTR technology is a first-of-kind technology within a new category (hydrothermal liquefaction), we are unable to satisfy this application criteria.[102]

4.76 In its submission, Licella sets out the potential benefits of its technology to Australia which includes diverting 20,000 tonnes of plastic from landfill and oceans, producing 17,000 tonnes of recycled oil which is a direct substitute for fossil oil in many applications, and generating 45 per cent less carbon emissions compared to incineration based energy-from-waste technology.[103] Furthermore, Licella estimates that with 40 of its plants, Australia can become 'plastic neutral' and create at least 720 jobs.[104]

4.77 Licella identified two ways in which the Commonwealth can better support it to bring its technology to the Australian market:

1. By aligning the ARENA and CEFC mandate. This would enable ARENA to support and assist companies with low emission technological innovation to move through R&D, pre-commercial demonstration activities and to market in Australia. This would also provide a pipeline for other CEFC projects.
2. By ensuring the investment mandate given to the CEFC for the Australian Recycling Investment Fund also includes support for innovative technologies.[105]

4.78 Lake Macquarie Council cited the example of Licella's Cat-HTR technology and called for the removal of barriers within the CEFC Australian Recycling Investment Fund for innovative recycling technology.[106] Regarding CEFC eligibility criteria, Lake Macquarie Council stated:

> This criterion, while well-intended to reduce risks, is actually undermining innovation. The CEFC needs a Recycling Innovation stream within the Australian Recycling Investment Fund that has an investment mandate to

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102 Licella, *Submission 4*, p. 2.

103 Licella, *Submission 4*, p. 2.

104 Licella, *Submission 4*, p. 2.

105 Licella, *Submission 4*, p. 2.

106 Lake Macquarie Council, *Submission 218,* p. 3.

> bridge the gap between technologies with a proven research and development history but that are not yet proven at a commercial-scale. Alternatively the CEFC funding criteria could be amended to exempt proponents from having a commercialised reference facility.[107]

4.79 The Committee notes that a new CEFC Mandate was issued in May 2020, after these submissions were received.[108]

4.80 Full Cycle Bioplastics Australia shared its vision for building its first commercial-scale facility which converts organic waste into bioplastic material. After acquiring the patent for technology developed in the United States, Full Cycle Bioplastics is attempting to build a plant in Australia.[109] Its submission explains:

> Our primary challenge and roadblock to innovation at this stage is the need for Full Cycle Bioplastics Australia to build its first commercial-scale facility to demonstrate the ability to deliver material to meet the demand.[110]

4.81 The company noted that 'development of a commercial-scale facility requires alignment across a number of stakeholders, including the Australian Government who can provide essential capacity building for the commissioning of a stand-alone Full Cycle Bioplastics Australian facility operating at commercial scale'.[111] It is seeking at least $22 million of Commonwealth funding to construct this facility.[112]

4.82 Professor Veena Sahajwalla, Director of the Centre for Sustainable Materials Research and Technology (SMaRT Centre) gave evidence to the Committee about the challenges facing the commercialisation of the 'green steel' technology she has developed.[113] This technology, formally known as

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107 Lake Macquarie Council, *Submission 218,* p. 7.

108 *Clean Energy Finance Corporation Investment Mandate Direction 2020* (Cth). Available at: www.legislation.gov.au/Details/F2020L00552.

109 Lake Macquarie Council, *Submission 218,* p. 7.

110 Full Cycle Bioplastics Australia, *Submission 212,* p. 4.

111 Full Cycle Bioplastics Australia, *Submission 212,* p. 4.

112 Full Cycle Bioplastics Australia, *Submission 212,* p. 4.

113 The Committee notes that 'green steel' is an umbrella term that is used to describe different processes for improving the environmental friendliness of steelmaking. Organisations that have used the term in different contexts include the Council of Australian Governments (COAG) Energy Council (*Australia's National Hydrogen Strategy*, November 2019, p. 69), the CSIRO (Dr Mark Cooksey, Global Vision for "Green Steel', *Resourceful*, 7, June 2015, p. 17 <www.csiro.au/en/Research/MRF/Areas/Resourceful-magazine/Issue-07/green-steel

Polymer Injection Technology, allows for the partial replacement of coking coal with waste tyres and plastics in electric arc furnace (EAF) steelmaking.[114] Professor Sahajwalla explained that the SMaRT Centre has provided an exclusive global license for this technology to Molycop, a steelmaker with operations in Newcastle. However, Professor Sahajwalla noted that Molycop would struggle with the scale of the investment required to commercialise the technology.[115] She stated:

> But the challenge is going to be: how would a company like that have enough money to invest and take that risk on its own to be able to set up a piece of infrastructure that can create some of these new technological advances into a commercially viable solution.[116]

4.83 The Committee acknowledges a number of infrastructure proposals set out in submissions to the inquiry. For example the construction of an energy from waste plant using the 'Entherm Energy from Waste System' put forward by retired engineers Dr John Smeed and Mr Roger Wilkinson.[117] Their submission explains in detail the operation of that system and the specifics of their proposal, which they suggest '…offers a cost-effective and environmentally-acceptable solution for municipal solid waste management, both in capital cost and total annual cost terms compared with alternative solutions.'[118] The authors are seeking 'a younger generation team' to take their concept and develop it into an operational plant.[119]

> accessed 12 October 2020) and the Grattan Institute (Tony Wood and Guy Dundas, *Start with Steel: a Practical Plan to Support Carbon Workers and Cut Emissions*, Grattan Institute Report No. 2020–06, May 2020 <www.grattan.edu.au/wp-content/uploads/2020/05/2020-06-Start-with-steel.pdf> accessed 12 October 2020).

114 Professor Veena Sahajwalla, Director, Centre for Sustainable Materials Research and Technology (SMaRT Centre), University of New South Wales (UNSW), *Committee Hansard*, Canberra, 12 August 2020, p. 4; UNSW, Green Steel Technology Saves Two Million Tyres from Landfill, <www.newsroom.unsw.edu.au/news/science-technology/%E2%80%98green-steel%E2%80%99-technology-saves-two-million-tyres-landfill > accessed 12 October 2020.

115 Professor Sahajwalla, SMaRT Centre, *Committee Hansard*, Canberra, 12 August 2020, p. 5.

116 Professor Sahajwalla, SMaRT Centre, *Committee Hansard*, Canberra, 12 August 2020, p. 5.

117 Dr John Smeed and Mr Roger Wilkinson, *Submission 95*.

118 Dr John Smeed and Mr Roger Wilkinson, *Submission 95*, p. 1.

119 Dr John Smeed and Mr Roger Wilkinson, *Submission 95*, p. 1.

National coordination

4.84 One of the most commonly cited impediments to innovation in the waste management and resource recovery sectors is the regulatory inconsistency across state and territory governments. Evidence to the inquiry called on the Commonwealth Government to use its leadership and coordination capacity to harmonise relevant regulation, legislation, standards and specifications.

4.85 The importance of this consistency was highlighted by the NWRIC:

> Where federal, state and local regulations are clear, consistent and enforced, waste is better managed, quality resources are recovered and reused, and industry is more confident to invest in advance solutions.[120]

4.86 The ATSE encouraged the Committee to consider the waste and resource recovery industry as a national industry that requires better coordination.[121]

4.87 Key areas singled out for greater consistency and coordination across states and territories include:

- Kerbside recycling collection and processing;
- Container deposit schemes;
- Standards for recycled content in products;
- Planning, approval and processing requirements for infrastructure; and
- Solid waste or landfill levy fees.

4.88 Lake Macquarie City Council argued that the lack of centrally harmonised policies and regulations pose significant impediments to innovation and investment in the recycling sector in three major ways. It:

- discourages and undermines investment in the recovery and value-adding of recycled materials due to the risk of rapidly changing regulatory goal posts;
- increases compliance costs and risk for producers and consumers thereby undermining consumer and institutional confidence in buying and using recycled products; and
- creates negative externalities, like transporting waste between jurisdictions to avoid paying levies, costs to store/stockpile material, exporting contaminated recyclate to developing countries, and

120 NWRIC, *Submission 197*, p. 2.

121 ATSE, *Committee Hansard,* 12 August 2020, p. 13.

orphaned recyclate stockpiles that often fall to government to clean up (typically with poor waste management outcomes).[122]

4.89 These views were shared by other submissions to the inquiry.[123]

Local councils

4.90 Many of the inconsistencies identified across states and territories are related to inconsistencies across local council areas. As described above, local councils are responsible for managing a broad range of waste management services, programs and infrastructure. They are on the front line in dealing with the ill effects of waste, such as the dumping of hazardous waste, the illegal dumping of other waste materials and public litter.[124]

4.91 Keeping waste streams clean is fundamental to resource recovery and the quality of the product that follows. For local councils, crucial points in this process are source separation prior to domestic waste collection and the processing of waste. The effectiveness of these waste flows is largely shaped by the cost of managing waste, and local council service contracts with waste management providers.

4.92 Differences in geographic areas, population, revenue, and access to economically-viable waste management and recycling infrastructure all contribute to service disparity between local government areas.[125] In addition, differences in consumer behavior, the provision of domestic bins, the types of waste that can be disposed of in each bin, and how this waste is ultimately managed by service providers contribute to disparity in the quality of waste resources and how it can be recovered and processed, if at all.

4.93 The difference in operating costs associated with collecting municipal solid waste across local government areas was shared by Local Government Professionals Australia.[126] Its benchmarking work showed that in South Australia, the median annual operating expense per resident for collecting

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122 Lake Macquarie Council, *Submission 218,* p. 6.

123 For example LGAQ, *Submission128*, p. 11; Australian Energy Council (AEC), *Submission 153*, p. 1; Infrastructure Victoria, *Submission 201*, p. 27.

124 Mr Ian Cowie, Director, Local Government Professionals Australia (LGPA), *Committee Hansard,* 4 March 2020, p. 1.

125 LGPA, *Submission 88,* p. 1 and ALGA, *Submission 91,* p. 5.

126 Mr Ian Cowie, LGPA, *Committee Hansard*, 4 March 2020, p. 1.

waste is $120. In Western Australia, this increases to $142, while in New South Wales it rises to $195. As a comparison, for the City of Gosnells in Western Australia, it is $92.[127]

4.94 The ALGA described the increasing financial pressure placed on local councils to manage waste, which is estimated to be $3.5 billion a year.[128] Specifically, the ALGA said:

> Local government must bear the cost within the context of greatly diminished general funding from the Commonwealth, rate capping in some jurisdictions and the need to provide a plethora of other local, community services and infrastructure. Furthermore, the waste levies that local government are charged by the states (which are aimed at making recycling more cost effective) amount to over $800 million per annum nationally. Next to none of this sum, however, is reinvested in the capacity and capability of recycling infrastructure, which would assist local government in avoiding the levies. Waste levies, as they are currently managed, have little potential to drive further improvements to the recycling rate.[129]

4.95 Landfill levies and the limited use of these funds for waste management and recycling initiatives were raised as problematic areas for local councils.

Landfill levies

4.96 Landfill levies are paid to dispose of waste. These levies, which are set by respective state and territory governments, are usually based on the weight of waste disposed at a landfill site. The main objective of landfill levies is to divert waste from landfill and encourage resource recovery and recycling of waste.

4.97 The WMRR noted that the landfill levy system offers enormous benefits to the waste and resource recovery sector including financially underpinning 'market development, evolution and continual improvement in processes, programs, education, and more'.[130] However the Committee heard that the increasing cost of landfill levies is putting pressure on local councils. For example, the City of Adelaide shared its experience of rising costs:

> The Solid Waste Levy is costly to councils. In 2015–2016, the City of Adelaide sent over 5,946 tonnes of kerbside collection waste to landfill which would

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127 Mr Ian Cowie, LGPA, *Committee Hansard,* 4 March 2020, p. 1.

128 Mr Ian Cowie, LGPA, *Committee Hansard,* 4 March 2020, p. 1.

129 ALGA, *Submission 91,* p. 2.

130 WMRR, *Submission 81*, p. 6.

> equal to about $369,000 in levy fees. In 2018–2019, although there was a slight decrease in tonnage sent to landfill, the Solid Waste Levy increased, costing the city about $549,000. This cost excludes the collection and other associated costs of delivering this essential public health service to our community. If the city assumes a similar amount of waste sent to landfill in 2019–2020, the cost to send waste to landfill would increase to $745,000 for the Solid Waste Levy alone. Council would either need to absorb this fee or pass it on to ratepayers.[131]

4.98 Given the current capacity shortfalls of MRFs, the ALGA noted that it is likely that Australia's impending waste export bans will result in more waste going to landfill and even greater landfill management costs.[132] The ALGA cited research which estimates that this cost could amount to $416 million per year nationally.[133]

4.99 In addition to the increasing cost of disposing waste at landfill, the Committee was told that landfill levels vary across jurisdictions resulting in perverse outcomes and impeding innovation. As stated by the Australian Food and Grocery Council (AFGC):

> The wide variations in landfill levies, hypothecation rates and state storage conditions can cause increased transportation of waste and variations in recycling infrastructure and services between the states.[134]

4.100 The AFGC provided two examples to support its argument. One, a lack of composting infrastructure or a common timeline to introduce composting services nationally, impedes a brand owners' ability to plan transitions to compostable packaging solutions. Two, stricter recyclate storage controls in NSW has resulted in glass being transported to, stored and beneficiated in Victoria.[135]

4.101 The Environment and Planning Law Group of the Law Council of Australia acknowledged that 'inconsistency in landfill levies and over-aggressive waste management regulations can create increases in illegal and environmentally irresponsible activities'.[136]

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131 City of Adelaide, *Submission 57*, p. 2.

132 ALGA, *Submission 91*, p. 2.

133 ALGA, *Submission 91*, p. 2.

134 Australian Food and Grocery Council, *Submission 89*, p. 8.

135 Australian Food and Grocery Council, *Submission 89*, p. 8.

136 Law Council of Australia, *Submission 165*, pp. 3–4.

4.102 Not surprisingly, stakeholders called for uniformity across state and territory landfill levies.[137] In addition, stakeholders advocated for greater hypothecation of these fees. That is, more funds raised through the landfill levy being used to fund waste management, recycling and resource recovery initiatives, rather than general government revenue.

4.103 The Committee was told that less than 20 per cent of the levy moneys collected is reinvested into waste mitigation.[138] In its submission, the Local Government Association of South Australia specifically advocated for greater hypothecation of these levies to local councils:

> The LGASA is advocating for a freeze to the solid waste levy at the 2018/19 rate and for at least half of the total levy paid by local government to be made available to councils for worthwhile waste and recycling initiatives. In particular, investment in waste and recycling infrastructure is required to respond to the current industry transition and to reduce Australia's reliance on overseas markets.[139]

4.104 The AFGC estimated that if landfill levies were harmonised nationally the incremental levy revenue would increase by almost $1 billion.[140] The WMRR asserted however that a national approach to landfill levies does not necessarily mean that each state and territory must implement the same levy rate.[141] Rather, it recommended that:

- a levy portability element be introduced across all jurisdictions to stop waste being transported across states and territories;
- levy rates should be upwards of $100/tonne to maximise the benefits of having a levy in the first place; and
- a minimum of 50 per cent of landfill levy revenue should be hypothecated back to the waste management and resource recovery industry to support investment and improvements.[142]

4.105 In its 2019 white paper, *Review of Waste Levies in Australia*, the NWRIC recommended that a national levy pricing strategy and national waste levy protocols be developed, as well as more transparency and accountability

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137 For example see submissions NWRIC, *Submission 197,* and Bingo Industries, *Submission 76.*

138 Mr Ian Cowie, LGPA, *Committee Hansard, 4 March 2020*, p. 2.

139 LGASA, *Submission 120,* p. 6.

140 Australian Food and Grocery Council, *Submission 89*, p. 8.

141 WMRR, *Submission 81*, p. 8.

142 WMRR, *Submission 81*, p. 8.

around the levies collected by each state and territory, how they are spent, and the outcomes achieved.[143]

Waste management contracts

4.106 As set out in Chapter 2, local councils generally contract private companies to deliver waste management and recycling services. Submissions to the inquiry called for greater flexibility and transparency in these arrangements, with many suggesting that these contractual arrangements can contribute to consumer confusion, source contamination, and inhibit innovation.

4.107 For example, the Moreland City Council stated:

> …the few large operators we have in Victoria operate under a veil of secrecy. Reform is desperately needed to improve transparency and accountability within the industry. Access to robust and credible data on market conditions, and costs and revenue within the recycling sector is essential to achieve best value for the community. More transparency on destinations for material streams, reprocessing and recyclability of products and reasons for non-acceptance of certain items is necessary for credible communication from local government to residents.
>
> … Changing the rules of recycling across council boundaries, mid contract or even between contracts is confusing for residents. It causes uncertainty and reduces confidence in the system which results in increased recycling contamination and resource loss.[144]

4.108 The SMaRT Centre identified the need to reconsider how waste management services are currently procured by local councils.[145] In particular, Professor Veena Sahajwalla, Director of the SMaRT Centre emphasized the need for flexibility and for councils to be able to take advantage of innovation as it arises:

> Procurement of waste management services needs to be done in a way that allows sufficient flexibility for councils to pursue new and innovative solutions when they are developed. At present, councils are locked into lengthy contracts with waste management businesses with no scope to

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143 NWRIC, White Paper: Review of Waste Levies in Australia, October 2019, p. 4. See <www.nwric.com.au/wp-content/uploads/2019/10/NWRIC-White-Paper-Review-of-Waste-levies-9Oct19.pdf>.

144 Moreland City Council, *Submission 107*, p. 3.

145 The SMaRT Centre, *Submission 80*, p. 2.

> consider new waste management solutions to recycle waste during the term of those contracts.[146]

4.109 On the other hand, the Committee heard from the Project 24 Working Group, a collaboration of five South Western Sydney and Southern Highlands councils formed to procure waste management services for their region for the next 15 to 20 years.[147] It pointed out that councils need long term certainty in contracts in order to build innovative infrastructure, and commented:

> In aiming to meet landfill reduction targets, councils enter long-term contracts with waste processors who, as a condition of their contracts, are required to construct and operate expensive technology-specific infrastructure over the contract term….a change of government policy during the term of a waste processing contract can render an entire waste processing facility's operation redundant.[148]

National body

4.110 In its submission, the WMRR proposed the introduction of an independent national body, similar to WRAP UK (Waste Resource Action Plan), to lead the national development and implementation of strategies to address priority waste management and resource recovery areas.[149]

4.111 WRAP UK is a non-government organisation established in 2000 and works with governments, businesses and communities to deliver practical solutions to improve resource efficiency. It aims to 'accelerate the move to a sustainable, resource-efficient economy' by re-inventing how products are designed, produced and sold; re-thinking how products are used and consumed, and re-defining what is possible through re-use and recycling.[150] The work of WRAP is focused on research, brokering voluntary agreements with organisations and community groups regarding sustainable practises, and consumer campaigns designed to change behaviours.[151]

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146 The SMaRT Centre, *Submission 80*, p. 2.

147 Project 24 Working Group, *Submission 214*, p. 1.

148 Project 24 Working Group, *Submission 214*, p. 2.

149 WMRR, *Submission 81,* p. 5.

150 See Waste Resource Action Plan (WRAP): <www.wrap.org.uk/about-us/about>, accessed 12 November 2020.

151 See WRAP, *What We Do*, <www.wrap.org.uk/about-us/what-we-do>, accessed 12 November 2020.

4.112 The WMRR suggested that an equivalent agency could be established in Australia to merge a number of existing bodies and schemes, bring the 'right players across the whole value chain to the table' and develop a national plan.[152] In particular, the WMRR stated:

> Having that independent body that's supported and trusted by the entire supply chain and working across all those material streams would give Australia a real opportunity to look at everything from food waste avoidance right through to recycling, back through to design to actually start to solve some of these material streams that we know we've got real challenges in and to move a lot faster, I think, towards that 10 per cent avoidance of waste per head by 2030 and 80 per cent diversion by 2030, which is in the national waste action plan.[153]

4.113 WMRR identified the following responsibilities for the agency:

- national research and development;
- national recycling programs and projects, including in areas such as infrastructure;
- mandated National Extended Producer Responsibility schemes;
- consumer campaigns and education;
- grants and financial support;
- national specifications and certification to use recycled content; and
- sustainable design of products.[154]

Research and data

4.114 The Committee received a number of submissions from research organisations and institutions currently examining waste management and recycling. These include the CSIRO, the University of Tasmania, RMIT University, the UNSW SMaRT, the ATSE and the AIEN. Each submission set out an impressive program of research and inquiry.

4.115 As noted, the ATSE is undertaking a major research project examining the 'readiness of the Australian waste management and resource recovery sector to adapt, adopt, or develop technologies that will enable it to meet three key challenges' over the next decade.[155] These challenges include:

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152 WMRR, *Submission 81,* p. 5.

153 Ms Gayle Sloan, WMRR, *Committee Hansard*, Canberra, Wednesday 26 August, p. 8.

154 WMRR, *Submission 81,* p. 5.

155 ATSE, *Submission 109,* p. 1.

- Using waste as a resource;
- The domestic capacity to process core waste; and
- Emerging waste streams.[156]

4.116 Preliminary findings shared with the Committee identified four key solutions to these emerging challenges. They include improved product stewardship, products designed for disassembly, smart waste management systems, and advanced resource recovery solutions – that is, using technology to recover energy from waste.[157] A final report was released in November 2020.[158]

Box 4.2 RMIT University — The Transformation of Reclaimed Waste into Engineered Materials and Solutions (TREMS)[159]

Researchers from RMIT University, the University of Melbourne and other Australian and international universities have taken advantage of their industry connections to form the TREMS network. The network explores new ways to engineer materials from recycled waste, and is a forum to attract research funding into solutions that can be commercialised by industry partners.

The network has five focus areas:

- Smart product design
- Separation at source and behavioural change
- Treatment and processing technologies and biofuels
- Products incorporating reclaimed materials and smart manufacturing
- Commercialisation, procurement decisions, standards and market drivers.

Examples of RMIT's research and collaborations are set out in its submission.

156 ATSE, *Submission 109*, p. 1.

157 ATSE, *Submission 109.1*, p. 2.

158 ATSE, *Towards a Waste Free Future, Technology Readiness in Waste and Resource Recovery*, November 2020. <www.atse.org.au/research-and-policy/big-issues/helping-australia-get-technology-ready/waste-and-resource-recovery-report/> accessed 23 November 2020.

159 RMIT University, *Submission 116*, pp. 2–3.

4.117 The Committee received evidence which highlighted the need for more research, development and data collection to support innovation. Two central themes emerged:

- Greater investment in research and development regarding waste management and recycling innovation and technology; and
- Centralised coordination and management of waste sector data.

4.118 Fundamental to each was the need for more research and data to inform policy and investment decision making by government, industry and stakeholders.

Investment in research and development

4.119 In its submission, Veolia set out two ways the Commonwealth can better support industry-led research and development (R&D); by providing direct research grants to industry, and through a revised R&D tax incentive.[160]

4.120 Specifically, Veolia advocated for the direct funding of industry to facilitate industry-led R&D, rather than the current approach which is to fund research organisations. It argued that funding industry directly:

> … would support more industry-focussed research which will translate more easily into commercial scale adaptation and ultimately a more attractive return profile for speculative research that will drive more long-term outcomes for business and the economy.[161]

4.121 While Veolia supports partnerships with specialised research initiatives targeting specific environmental challenges, it emphasized that the research should be governed by industry bodies and working groups rather than be led by the research industry.[162]

4.122 Research and development tax incentives are available to large entities to help offset some of the costs invested into R&D. Veolia argued that the tax incentive program 'puts a significant burden of evidence gathering and reporting on the claimant'.[163] In particular, it stated:

> The administrative burden, paired with consultant fees [to collate the requisite information and prepare and submit the tax reports] and the marginal benefit

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160 Veolia, *Submission 226,* pp. 3–4.

161 Veolia, *Submission 226,* p. 4.

162 Veolia, *Submission 226,* p. 4.

163 Veolia, *Submission 226,* p. 4.

gained from the tax offset itself can ultimately act as a disincentive for many prospective R&D projects where return outcomes may be perceived as already marginal or uncertain at the outset.[164]

4.123 To combat this, Veolia suggested increasing the R&D offset and reducing the administrative burden on claimants to increase the impact of the incentive program and drive R&D.[165] As an example of how to reduce the administrative burden, Veolia suggested that AusIndustry could provide a series of customisable tools and templates that facilitate organisations creating their own R&D activity reports and expenditure documentation.[166]

Industry growth centre

4.124 The Western Australian Government noted that the Commonwealth Government currently operates six industry growth centres for priority sectors under its Industry Growth Centres Initiative.[167] It suggested that the addition of an industry growth centre for waste and recycling technology would enable Western Australia to utilise its existing waste and recycling capability as effectively as possible, and to take the greatest possible advantage of emerging opportunities.[168]

4.125 The Committee notes that the Commonwealth Government's 2020–21 Budget announced on 6 October 2020 included the *Modern Manufacturing Strategy* with $1.5 billion in attached funding.[169] The Strategy focuses on six national manufacturing priorities, one of which is recycling and clean energy.[170] The centrepiece of the Strategy is the $1.3 billion *Modern*

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164 Veolia, *Submission 226,* p. 4.

165 Veolia, *Submission 226,* p. 4.

166 Veolia, *Submission 226,* p. 4.

167 Western Australian Government, *Submission 210*, p. 10. The current industry growth centres cover: Advanced Manufacturing, Cyber Security, Food and Agribusiness, Medical Technologies and Pharmaceuticals, Mining Equipment, Technologies and Services (METS), and Oil, Gas and Energy Resources, DISER, *Industry Growth Centres* <www.industry.gov.au/strategies-for-the-future/industry-growth-centres> accessed 13 October 2020.

168 Western Australian Government, *Submission 210*, p. 10.

169 DISER, *Manufacturing a New Future for Australia* <www.industry.gov.au/news-media/manufacturing-a-new-future-for-australia> accessed 13 October 2020.

170 Commonwealth Government, *Make It Happen: the Australian Government's Modern Manufacturing Strategy*, October 2020, p. 3 <www.industry.gov.au/sites/default/files/October%202020/document/make-it-happen-modern-

Manufacturing Initiative, which 'will provide co-funding for large manufacturing projects that have broad sectoral benefits across the national manufacturing priorities.'[171]

Centralised data coordination and management

4.126 Improving the quality and availability of waste data is Target 7 of the *National Waste Policy Action Plan 2019* and various steps have been taken towards this goal in recent years.[172] As noted in Chapter 3, the Government has recently committed $24 million to improve data collection. This national waste data will be used to measure recycling outcomes and track the progress of the national waste targets.

4.127 Several submissions to the inquiry highlighted the importance of centralised and coordinated waste data for planning purposes, particularly to inform infrastructure investment. For example, the WSROC told the Committee that:

> The federal government is best placed to facilitate a centrally coordinated and consistent approach (for example, the former National Waste Account compiled by the Australian Bureau of Statistics) that captures data from the public as well as private sector to understand baseline waste and recycling infrastructure capacity constraints, improve planning for increased population growth and resource recovery, and accelerate necessary infrastructure to support recycling and resource recovery markets.[173]

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manufacturing-strategy.pdf
> accessed 13 October 2020.

171 DISER, *Modern Manufacturing Initiative and National Manufacturing Priorities Announced* <www.industry.gov.au/news-media/modern-manufacturing-initiative-and-national-manufacturing-priorities-announced>, accessed 13 October 2020.

172 See Commonwealth Government, Governments of NSW, Queensland, South Australia, Tasmania, Victoria, Western Australia, the ACT and the Northern Territory, and the ALGA, *National Waste Policy Action Plan 2019*, pp. 28–29. <www.environment.gov.au/system/files/resources/5b86c9f8-074e-4d66-ab11-08bbc69da240/files/national-waste-policy-action-plan-2019.pdf>; Blue Environment Pty Ltd, *Improving National Waste Data and Reporting: 30 March 2018*, prepared for the Department of the Environment and Energy <www.environment.gov.au/system/files/resources/de91c360-1995-475c-bc9f-f0c4c85b7692/files/improving-national-waste-data-and-reporting.pdf>; Australian Bureau of Statistics (ABS), *4602.0.55.005 – Waste Account, Australia, Experimental Estimates, 2016–17: Explanatory Notes*, <www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4602.0.55.005Explanatory%20Notes12016-17?OpenDocument> accessed 20 May 2020.

173 WSROC, *Submission 78*, p. 5.

4.128 The WSROC further noted that timely and reliable data is essential for fostering community trust and social licence in technologies, and can provide the context for necessary collaboration.[174]

4.129 The ALGA made a similar point, highlighting the advantage of research and data to appreciate the bigger picture when it comes to infrastructure needs. It stated:

> Research into the costs and benefits of new infrastructure and its most appropriate location is fundamental. Research can give confidence to the recycling industry's willingness to invest in new plant. National coordination and planning, based on hard data and sound peer-reviewed analysis, would ensure that there is no duplication of resources and that benefits flow equitably to both metropolitan and regional populations.[175]

4.130 The Local Government Association of Queensland (LGAQ) highlighted the importance of accurate, consistent and reliable waste data across government and the sector.[176] In particular, the LGAQ advocated for data sharing arrangements across the three levels of government in order to:

- reduce the burden of waste reporting;
- improve performance monitoring and benchmarking;
- enable waste data aggregation at both a regional and local level;
- better target education campaigns; and
- promote infrastructure investment and waste value through evidence-based insights.[177]

4.131 Furthermore, the LGAQ called on the Commonwealth to 'investigate the harmonisation of waste data across all jurisdictions' to develop a national waste data framework.[178]

4.132 In its submission, Everledger provided an overview of its innovative digital traceability solution to bring more accountability to waste management and recycling practices.[179] In particular, Everledger provided an example of how the use of data is used to prove the recycled content of plastic products:

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174 WSROC, *Submission 78,* p. 6.

175 ALGA, *Submission 91,* p. 6.

176 LGAQ, *Submission 128*, p. 14.

177 LGAQ, *Submission 128*, p. 14.

178 LGAQ, *Submission 128*, p. 15.

179 Everledger Australia, *Submission 94,* p. 1.

> Under this CE labs' project recycled PET plastic sourced from the Queensland container refund scheme was digitally traced, and data gathered at each stage was lodged to the block chain. Data was captured as the plastic material was transported and transformed from bales of crushed containers into bags of processed flake, and finally into a batch of food trays that were returned to the Queensland marketplace. This data provided a fundamental foundation for any proof claims around the recycled content of the food trays and evidence around the chain of custody.[180]

4.133 According to Everledger, governments in Australia and internationally have a role in promoting efficient waste management through sponsorship and green procurement practices, incentivising data sharing from government agencies to support waste management practices and material traceability, and supporting the creation of industry relevant data capture and sharing standards to enable transparency across all industry participants.[181]

Box 4.3 Trax – Data management system[182]

The ACT uses a waste regulatory management system called Trax that collects and reports data on waste transporters.

Trax consists of an online portal and smartphone app that allow users to enter data while in the field. It allows users to report on the types, volumes and locations of waste being collected, and to meet their reporting obligations under the *Waste Management and Resource Recovery Act 2016* (ACT).

The data collected by data is used to inform policy and process decision making by government. It is expected that the system will be rolled out to waste management facilities in the future.

The ACT is the only jurisdiction that requires all waste transporters to be registered and to report regularly on the movement of waste.

180 Everledger Australia, *Submission 94*, p. 2.

181 Everledger Australia, *Submission 94*, p. 5.

182 ACT Government, *Submission 213*, p. 4.

Education and awareness

4.134 Fundamental to all efforts to stimulate innovation within the waste management and recycling industries is consumer education and awareness. Submissions to the inquiry suggested that social norms related to waste management and recycling need to be reset. This includes rethinking the product choices we make, the way we use our goods, and the way we ultimately dispose of goods or preferably, give them a new lease of life.

4.135 State and territory governments are engaged to varying degrees in conducting education and awareness campaigns, as are local governments. Nonetheless, the Committee heard repeated calls for the Commonwealth to develop and fund a national consumer education and behaviour change campaign targeting attitudes and perceptions of waste, to minimise packaging consumption and to boost demand for recycled products.[183]

4.136 Professor Steven D'Alessandro and his colleagues discussed behaviour change as a solution to landfill issues. In particular, they noted that 'landfill waste problems are rooted in human behaviour' and asserted it is the consumer who has a fundamental role in instigating change.[184] Specifically, it was stated:

> Waste management solutions, however, often overlook the essential role that households' behaviour play, tending to focus instead on technological breakthroughs and structural changes within our society.[185]

4.137 The authors explained that policies to bring about behaviour change can be based on price or behavioural insights. The former utilises traditional market-based instruments, such as taxes and subsidies to induce economically rational changes in behaviour. The latter applies behavioural insights to address behaviours that deviate from rational economic predictions.[186]

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183 For example, Lake Macquarie City Council, *Submission 218,* p. 3, Australian Packaging Covenant Organisation, *Submission 5*, p. 4, SCRgroup, *Submission 227,* p. 12, and Zero Waste Victoria, *Submission 216,* p. 5.

184 University of Tasmania, *Submission 18*, p. 10.

185 University of Tasmania, *Submission 18*, p. 10.

186 University of Tasmania, *Submission 18*, pp. 9–10.

4.138 A range of practical solutions, grounded in behavioural economic theory, are suggested to encourage behaviour change by consumers and ultimately reduce waste in landfill.[187] Some of these solutions include:

- changing the physical environment to make recycling convenient and salient, for example placing recycling bins in busy places with heavy traffic or designing eye-catching recycling bins;
- changing people's cognition so that they automatically associate waste with negative mental pictures such as overflowing landfills;
- providing feedback to households on the amount of waste they produce, particularly relative to a meaningful benchmark;
- providing feedback on the externalities and consequences of households' behaviours in a vivid, tangible and relatable manner;
- using labels such as 'landfill' on bins to make clear where the rubbish will end up;
- using labels to signal the expected lifespan of a given product to influence purchasing decisions; and
- incentivising immediate acts of reducing, reusing and recycling, to offset the upfront costs of these actions. For example, discounts on council rates for households who have generated less waste or subsiding the purchase of longer-life products or modular products.[188]

4.139 Behaviour change was a central theme of a set of submissions received by the Committee. These submissions are discussed in Chapter 9.

Committee comment

4.140 The consistency of evidence presented to the Committee is worth noting. While the focus of this inquiry was innovative approaches to waste management and resource recovery, the Committee overwhelming heard that what needs greater attention is the policy and regulatory framework to support innovation. Evidence to the Committee suggested that this is inhibiting innovation. Stakeholders emphasised the importance of changing the policy and regulatory settings to provide industry with confidence and certainty to invest, to innovate and to expand operations.

4.141 The Committee acknowledges that the issues considered to be stifling innovation by industry are largely the same issues being addressed through the National Waste Policy Action Plan, the Response Strategy to implement

187 University of Tasmania, *Submission 18*, pp. 9–15.

188 University of Tasmania, *Submission 18*, pp. 9–15.

the waste export bans, and recent Government funding announcements. The Committee supports the principles underpinning these actions, initiatives and investment decisions.

4.142 Product stewardship schemes are necessary to drive change and shift the responsibility for waste to manufacturers, importers and producers. Markets for — and end users of — recycled products are fundamental to strengthening the value of waste. Accessible funding and greater investment in infrastructure will not only diversify onshore operations and markets but allow recycled products to be exported overseas. Available information and investment in research and development will drive innovation and inform policy and investment decisions. Finally, community awareness and education will help reset social norms regarding how we avoid, manage and value waste.

4.143 Notwithstanding that state and territory and local governments are primarily responsible for waste management and resource recovery in Australia – in particular waste collection services, waste processing, and landfill management – the Commonwealth has an important leadership and coordination role. Essentially, it must bring together and harmonise eight different jurisdictions to create a more seamless waste management and resource recovery industry as well as a competitive domestic and international market for recycled products.

4.144 It was suggested that the Committee consider the introduction of a specific national agency to address waste management and resource recovery in Australia. The Committee does not support this proposal. The Committee considers that these issues can be effectively coordinated and managed within existing Commonwealth departments and agencies.

4.145 The Committee makes the following recommendations to support the work currently underway by the Commonwealth.

Recommendation 7

4.146 The Committee recommends that the Commonwealth Government, in consultation with industry, identify and consider the inclusion of additional waste streams under the Product Stewardship Act 2011, particularly emerging or complex waste streams such as e-waste, solar panels, medical waste and textiles.

Recommendation 8

4.147 The Committee recommends that the Commonwealth Government undertake stakeholder consultations to better align the existing waste management and recycling funding and investment programs with industry's needs.

Recommendation 9

4.148 The Committee recommends that the Commonwealth Government undertake an assessment of Australia's current and future waste management and resource recovery infrastructure capacity, with particular emphasis on the volume of waste to be managed and potential markets.

Recommendation 10

4.149 The Committee recommends that the Commonwealth Government, in consultation with the state and territory governments work towards identifying and harmonising relevant waste management and resource recovery policies and legislation to enable a seamless, coordinated and integrated industry across the country.

Recommendation 11

4.150 The Committee recommends that the Commonwealth Government work with state and territory governments to improve access to container deposit facilities and collection points, particularly for people who use these facilities to earn extra money or fundraise.

Recommendation 12

4.151 The Committee recommends that the Commonwealth Government design and implement a national public education and awareness campaign that emphasises avoiding waste, the impact of waste, and how it can be better managed by consumers.

5. Waste to energy

5.1 Waste-to-energy (WtE) technology also referred to as Energy-from-waste (EfW) and Energy Recovery (ER) refers to a range of technologies that convert waste that would otherwise go to landfill into energy sources such as electricity, heat and fuel.[1] Waste-to-energy technologies vary according to the type of waste used, how it is processed and the type of energy it generates.

5.2 The main types of WtE processes include:

- Capturing methane from landfill emissions for use in electricity generation;
- Biological processes such as anaerobic digestion which effectively manages clean streams of food waste, with any residual waste streams being used as an agricultural application; and
- Thermal processes including incineration, gasification, pyrolysis and plasma arc technologies.[2]

5.3 Waste-to-energy technology is a contentious area of waste management and resource recovery. Debate surrounds the environmental friendliness of these technologies and whether they undermine other waste management and recycling strategies. Those who support this technology consider it to be the 'missing link in Australia's waste management hierarchy'.[3]

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1 Zero Waste Victoria, *Submission 216,* p. 12. Infrastructure Partnerships Australia, *Putting Waste to Work: Developing a Role for Energy from Waste*, June 2020, p. 3.

2 Zero Waste Victoria, *Submission 216,* p. 12. Infrastructure Partnerships Australia, *Putting Waste to Work: Developing a Role for Energy from Waste*, June 2020, p. 13, <www.inform.infrastructure.org.au/energy-from-waste> accessed 20 October 2020.

3 SUEZ Australia & New Zealand, *Submission 58*, p. 2.

5.4 In Australia, WtE facilities predominantly comprise small-scale bioenergy plants.[4] That is, they generate energy from organic waste streams. There are two large-scale facilities currently under construction in Western Australia and proposals in development for other large scale facilities across the country.[5] These facilities, which will convert municipal solid waste (MSW) to electricity using a high-efficiency incineration process, will be the largest of their type in Australia.[6]

5.5 ARENA has invested $98 million in 25 WtE projects.[7] This funding has focused on innovative approaches to biofuel production from agricultural waste and wastewater, as well as diverting MSW from landfill.[8]

Advantages

5.6 Compared to other countries, WtE is relatively new in Australia. Veolia — which operates around 60 ER plants across the world — notes that across Europe, the United States, and the United Kingdom WtE is a 'well utilised option' in waste management and resource recovery.[9]

5.7 A key advantage of WtE technology is that it can divert waste from landfill. In its submission, Bingo Industries stated:

> Australia currently sends approximately 60% of its waste to landfill. In order to achieve the 100% diversion rates now achieved by a number of countries – including Germany, Switzerland and Sweden – waste-to-energy must be part of the mix and Government policy must reflect this.[10]

5.8 A report on WtE prepared by Infrastructure Partnerships Australia calls for WtE technology to be part of the waste management mix. It identifies three advantages of this technology:

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4 Infrastructure Partnerships Australia, *Putting Waste to Work, Development a Role for Energy from Waste*, p. 3.

5 Infrastructure Partnerships Australia, *Putting Waste to Work, Development a Role for Energy from Waste*, p. 3.

6 Australian Renewable Energy Agency (ARENA), Submission 15, p. 4.

7 ARENA, *Submission 15*, p. 3.

8 ARENA, *Submission 15*, Attachment A: Summary of ARENA-funded EfW projects, pp. 5-7.

9 Veolia, *Submission 226,* p. 1.

10 Bingo Industries, *Submission 76,* p. 3.

- Less pollution compared to landfill: well managed landfills use WtE technology to capture methane emissions which is used to generate renewable energy. These processes can produce few greenhouse gas emissions compared to waste disposed in landfill.
- Reliable source of renewable energy: waste to energy is considered a 'reliable source of renewable energy' when the feedstock is produced using natural resources that can be consistently replenished and non-finite. The Clean Energy Regulator identifies these natural feedstocks as wood waste, agricultural waste, food and food processing waste, and biomass components of municipal solid waste and sewage.
- A localised waste management solution: energy from waste can provide local waste solutions that meet the proximity principle; that is, that waste is managed close to the point of generation to minimise the cost of transportation.[11]

5.9 Suez, which operates 55 WtE plants across the world, discussed energy from non-recyclable waste.[12] It noted that this technology ensures renewable energy (electricity, heat/steam, fuels etc.) is generated from non-fossil sources and contributes to the protection of the environment, preservation of natural resources, and a significant reduction in greenhouse gas emissions.[13] Furthermore, Suez stated that when part of a broad range of waste management and recycling options, WtE can have positive flow on effects. Specifically, Suez said:

> …where EfW forms one part of the wider waste management strategy, all levels of the waste hierarchy function more effectively –rates of recycling increase, diversion rates from landfill increase and the economy moves to a more circular model as resources are being put back into the economy.[14]

5.10 Waste-to-energy technology recognises the current reality that some waste cannot be recycled or reused in any way.[15] In other words, it will end up in landfill. The Vinyl Council of Australia, who is supportive of this technology as part of an overall waste management solution with appropriate safeguards and standards, advanced:

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11 Infrastructure Partnerships Australia, *Putting Waste to Work: Developing a Role for Energy from Waste* p. 15.

12 SUEZ Australia and New Zealand, *Submission 58,* p. 3.

13 SUEZ Australia and New Zealand, *Submission 58,* p. 3.

14 SUEZ Australia and New Zealand, *Submission 58,* p. 3.

15 Vinyl Council of Australia (VCA), *Submission 205,* p. 5.

> …in the present environment there are a plethora of composite products for which recycling solutions do not exist. Whilst to some extent this can be addressed through improved design for sustainability it is likely that composite products will form part of the waste stream for some years to come. Many of these products have a high calorific value (given they contain plastics, timber and rubber) and are at present landfilled due to the absence of recycling options. It would be preferable to see this diverted to WtE solutions.[16]

5.11 The Vinyl Council of Australia therefore considers WtE facilities as a logical destination for residual waste that has passed through a materials recovery facility.[17]

Disadvantages

5.12 The Committee acknowledges that while some debates regarding WtE are particular to specific technologies, others fail to differentiate between WtE feedstock, processes and outputs.

5.13 Objections to WtE raised in evidence to this inquiry predominantly related to thermal processes and the perceived pollution that arises from this technology. For example, in its submission, the Ipswich Residents Against Toxic Environments listed a range of social and environmental disadvantages it considers arise from mixed WtE incineration including that it:

- is primarily about getting rid of waste as it produces only a very small percentage of a society's energy needs and the energy is expensive when compared to alternatives;
- is not sustainable, renewable or environmentally friendly and will not assist Australia to meet its greenhouse gas emissions targets, as it immediately releases CO_2 into the atmosphere which then takes many decades to re-sequester;
- is not resource recovery as incinerators only make use of materials for their calorific value and once burnt, the resources are out of the economic loop;
- is voracious, requiring long-term municipal supply contracts for large quantities of waste in order to recoup investment. It therefore

16 VCA, *Submission 205,* p. 5.

17 VCA, *Submission 205,* p. 5.

undermines efforts to move society towards waste education, recycling and a circular economy;
- perversely encourages production of more waste and transportation of waste over long distances to maintain economic viability;
- produces concentrated hazardous waste and releases toxic air pollution and is therefore no better than landfill and probably worse;
- creates social, health and economic disadvantage in regions already experiencing disadvantage; and
- may not be effectively managed by the regulatory environment to protect communities – this has been the experience overseas.[18]

5.14 Similar objections to thermal WtE were raised by BYO Containers[19] and the National Toxics Network.[20] The Law Institute of Victoria (LIV) expressed concern that thermal WtE may be a source of harmful toxins that could pose greater challenges to the disposal and mitigation of waste.[21]

5.15 However, Lake Macquarie City Council countered these points by highlighting international developments in WtE technology and modern regulations governing its use.[22] It noted:

> EfW technology has and continues to advance at a rapid pace with ample world-class facilities in operation in densely populated areas across Europe, Japan, and the USA. Modern emissions controls and strict licence compliance conditions ensure that human and environmental health risks are negligible, and well under those generated by coal fired power plants.[23]

Feedstock

5.16 Zero Waste Victoria cautioned against the use of thermal technology and cited the volume of feedstock required to support a viable thermal WtE operation.[24] Local Government Professionals Australia (LGPA) made a similar point, taking issue with the recycled feedstock required for WtE

18 Ipswich Residents Against Toxic Environments, *Submission 137,* p. 3.

19 BYO Containers, *Submission 167,* p. 2.

20 National Toxics Network, *Submission 161,* pp. 3–4.

21 Law Institute of Victoria, *Submission 222*, p. 6.

22 Lake Macquarie City Council, *Submission 218,* p. 4.

23 Lake Macquarie City Council, *Submission 218,* p. 4.

24 Zero Waste Victoria, *Submission 216,* p. 12.

processes more generally and the potential for this technology to undermine other waste management efforts.[25] It said:

> Waste to Energy requires a large volume of waste to be sustainable, and councils would need to form regional collection partnerships in more populated areas to maintain an adequate and consistent supply to run such a plant. This could counteract measures to reduce household waste though and would not leave room for other green and FOGO waste programs, with food and green waste comprising roughly 50% of typical household waste.[26]

5.17 LGPA concluded that 'waste-to-energy plants that are fuelled by recycled materials are therefore not a favourable option for local government in Australia'.[27] The Moreland City Council expressed a similar view. It stated that while it does not support the development of thermal WtE technologies, it does support the development of technologies that do not create further environmental harm or undermine efforts to recover and recycle materials.[28]

5.18 ARENA noted that the 'waste-arising contractual structure' used in the East Rockingham WtE facility in Western Australia allows the local council to maintain or increase recycling rates for wastes to higher value purposes without financial penalty.[29] Furthermore, ARENA advanced that this commercial innovation illustrates how WtE can be integrated into broader waste management strategies for councils.[30]

Best fit

5.19 Many submissions argued the need for WtE technology to be appropriately considered in the context of the waste management hierarchy. Generally, those who support this technology concede that it is better than sending the waste to landfill provided other waste management strategies have been exhausted first.

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25 Local Government Professionals Australia (LGPA), *Submission 88,* p. 2.

26 LGPA, *Submission 88,* p. 2.

27 LGPA, *Submission 88,* p. 2.

28 Moreland City Council, *Submission 107,* p. 5.

29 ARENA, *Submission 15,* p. 4.

30 ARENA, *Submission 15,* p. 4.

5.20 In other words, it was argued that waste should only be converted to energy if it cannot be reused or recycled or used for any other purpose. This is to prevent WtE from 'cannibalising' useful waste resources.[31]

5.21 For example, the AIEN stated:

> Energy from waste should only be considered where HNRV alternatives have been fully saturated with the resources they require. This means energy recovery activities are restricted to 'residual' resources not required by the higher value adding processes; or where very unusual circumstances are such that energy recovery is the only feasible process for the recovery of economic value from resources that would otherwise be wasted in landfill.[32]

5.22 The Committee was told that while the whole point of WtE technology is to produce energy from waste, waste should not be considered a primary source of energy. In its submission, RMIT said:

> …waste conversion to energy should be a last resort for materials that can no longer re-enter a circular use cycle. Waste should not be seen as an energy source. Instead, energy should be seen as an alternative to landfilling only when higher order options of avoidance, re-use and recycling cannot be accessed.[33]

5.23 Similarly, the LIV stated that 'having regard to the waste management hierarchy, the recovery of energy shouldn't be the primary method of alleviating the increased demands of Australia's waste management system'.[34] The LIV urged caution about an over-reliance on these facilities, particularly where they substitute alternative methods of improving re-use and recycling efforts.[35]

Impediments

5.24 The absence of wide-spread WtE plants in Australia is not due to a lack of interest. Inconsistent regulations, dated legislation, and a lack of policy certainty have all inhibited progress in this space. The Waste Contractors

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31 See VCA, *Submission 205*, p. 5, and Bingo Industries, Submission 76, p. 3.

32 Australian Industrial Ecology Network (AIEN), *Submission 202*, p. 7.

33 RMIT University, *Submission 116*, p. 4.

34 Law Institute of Victoria, *Submission 222*, p. 5.

35 Law Institute of Victoria, *Submission 222*, p. 5.

and Recyclers Association of NSW encapsulated this sentiment regarding WtE technology in Australia:

> A lack of clarity around planning laws, outdated waste management laws and a poorly educated community has long stifled innovative solutions in energy from waste across Australia. The industry requires clearly defined, agreed and acceptable timelines for the processing of planning applications for new waste [and] recycling facilities. The industry also requires Government support to progress suitable, best practice applications.[36]

5.25 According to ARENA, the uptake of WtE technologies in Australia is impeded by a range of commercial readiness and regulatory factors.[37] Specifically, these include the relative inexperience of local supply chain stakeholders with these technologies compared to international markets, challenges in securing bankable supply arrangements for suitable waste feedstocks and the relatively low cost of landfill in Australia.[38]

5.26 Submissions to the inquiry noted the inconsistency between state and territory regulations as an impediment to WtE innovation, and recommended the introduction of a national WtE policy.

5.27 For example, the Lake Macquarie City Council lamented the absence of a national approach to WtE and called for the harmonisation of WtE policies and regulations between states and territories.[39] Specifically, Lake Macquarie Council said:

> Currently Western Australia is taking the lead in this sector but the disparity between jurisdictions is disadvantaging regions that could benefit from the sector while simultaneously increasing resource recovery.[40]

5.28 The disparity between Western Australia and New South Wales was highlighted by Mr Corey McArdle, Project Manager for the Project 24 Working Group, who told the Committee:

> I would look at… coordination between the federal and state governments to ensure there is consistency across the different jurisdictions. An example of

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36 Waste Contractors and Recyclers Association of NSW, *Submission 63*, p. 1.

37 ARENA, *Submission 15*, p. 1.

38 ARENA, *Submission 15*, p. 1.

39 Lake Macquarie City, *Submission 218*, p. 4.

40 Lake Macquarie City, *Submission 218*, p. 4.

> that is we've seen waste-to-energy plants already going ahead in Perth, but there's no certainty for New South Wales as to the direction forward.[41]

5.29 Similarly, Suez singled out the inconsistency regarding 'planning and approvals for recycling and waste management facilities, including WtE infrastructure'.[42] Suez believes that the 'ideal solution to this would be a national, unified approach to policy to deliver a consistent and competitive landscape nationally'.[43]

5.30 The NWRIC called on the federal government to formulate — with the states and territories — a national energy recovery from waste strategy to reduce greenhouse gas emissions, prevent illegal dumping and extend the life of existing landfills.[44]

Long term policy certainty

5.31 The absence of long term policy certainty was equally identified as inhibiting the uptake of WtE technology in Australia. This is because of the risk that changes to government policy or regulation may significantly impact on the viability and completion of projects. As Recovered Energy Australia, explained:

> …there are many challenges that are faced in bringing 'new' technology to market in Australia and at best it will be 5 years for similar projects to go from conception to operation, larger projects will take twice that time. During this period there are great risks from regulatory and commercial factors that can mean projects are delayed or abandoned.[45]

5.32 Mr Ian Cowie, Director, LGPA shared his experience of getting a WtE project off the ground. In particular, he highlighted the risks and challenges of securing investment for a WtE plant in Western Australia.

> It's been difficult. If you think about the waste to energy plant that we're in the process of establishing, we started the process in 2011. We committed in 2015, but it took many years to get financial closure, because for that nature of facility you really needed some major financial backers. Local government couldn't support that. We ended up with Macquarie Capital being a key

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41 Mr Corey McArdle, Project 24 Working Group, *Committee Hansard,* 17 June 2020, p. 8.

42 SUEZ Australia and New Zealand, *Submission 58,* p. 3.

43 SUEZ Australia and New Zealand, *Submission 58,* p. 3.

44 NWRIC, *Submission 197*, p. 3.

45 Recovered Energy Australia, *Submission 70*, p. 2.

> backer. One of the challenges for local government is that if you want to do these major capital facilities which require such a lot of money, you've got to be careful that the rules that are set by the Commonwealth or the state don't actually change on you, because if the rules start changing when you're trying to negotiate with bankers and financiers, that makes them very nervous about how things are going to come through.[46]

5.33 Project 24 made a similar point in its submission. It argued that industry is discouraged from developing infrastructure and technology options due to significant regulatory uncertainty.[47] Furthermore, that this uncertainly may be a potential impediment to the success of its own waste management plan for Western Sydney. It stated that 'industry is clearly seeking a firm position from the Government on waste to energy technology before investing in new processing systems'.[48]

5.34 Policy certainly is not just needed for stakeholders to feel confident in investing in WtE technology. The Committee heard that it is needed by the wider industry to make related infrastructure investment decisions. For example, the Australian Food and Grocery Council said:

> To provide industry with confidence to invest in recycling infrastructure, the AFGC believes a waste-to-energy policy framework must be developed. Industry is unlikely to invest while there is risk that waste-to-energy facilities may be built in the future, and potentially consume recycling feedstock. A waste-to-energy policy framework would eliminate this risk and provide industry with confidence to invest in recycling infrastructure.[49]

5.35 Given the significant investment required for WtE facilities, and waste management facilities more generally, Zero Waste Victoria recommends there should be a hold on the 'approval and construction of WtE facilities in Australia, while strategies for waste avoidance, reuse, recycling and managing residual waste are developed.[50] This is to reduce the risk of financial loss and potential over-capitalisation on WtE facilities when these facilities may not be needed.[51]

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46 Mr Ian Cowie, LGPA, *Committee Hansard*, 4 March 2020, p. 8.

47 Project 24 Working Group, *Submission 214*, p. 4.

48 Project 24 Working Group, *Submission 214*, p. 4.

49 Australian Food and Grocery Council, *Submission 89*, p. 7.

50 Zero Waste Victoria, *Submission 216*, p. 13.

51 Zero Waste Victoria, *Submission 216*, p. 13.

Policy considerations

5.36 Infrastructure Partnerships Australia made five key recommendations regarding WtE. These include:

1 Governments should define a role for EfW through their recycling and waste management plans and strategies. These documents should openly address energy recovery and the potential role it can play in improving waste management outcomes in Australia.

2 Governments at all levels should help to establish social licence for EfW – broadly and locally – by engaging community openly on the benefits of advanced forms of waste processing and addressing any concerns.

3 Governments through the National Federation Reform Council (NFRC) should develop nationally consistent guidelines for the development of EfW projects and other waste management technologies.

4 Governments through the NFRC should adopt EU emissions standards for EfW facilities, applied through nationally consistent regulation.

5 Governments through NFRC should seek to establish a national market for EfW, including nationally consistent regulation in relation to feedstock, and development of market opportunities for by-products.[52]

5.37 The WMRR identified similar outcomes in its *Energy from Waste Roadmap*.[53] In particular, it called for alignment of national and state WtE objectives, a clear understanding of best practice, standards for the reuse of residue, and the integration of anaerobic digestion technology in resource recovery and renewable energy.[54]

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52 Infrastructure Partnerships Australia, *Putting Waste to Work: Developing a Role for Energy from Waste*, June 2020, p. 5.

53 WMRR, *Submission 81.*

54 WMRR, *Submission 81.*

Box 5.1 Kwinana Waste to Energy Plant[55]

Avertas Energy is currently constructing a WtE plant in Kwinana, Western Australia, which is scheduled to begin operation in 2021–22. The plant will be able to process up to 400,000 tonnes of solid waste per year, producing 32 MW of baseload electricity as well as ash by-products for use in construction. Each year it will recover over 6000 tonnes of metal that would not otherwise be recycled.

The City of Kwinana and the Rivers Regional Council (a collective of seven local governments) have contracted with Avertas to supply waste to the facility for use as feedstock. Each agreement is for a term of 20 years. It is a requirement of the WA Government approval for the project that only residual waste can be used as feedstock.

Committee site visit

5.38 The Committee conducted a site visit of the Woodlawn Eco-Precinct which is owned and operated by Veolia. At this site visit, the Committee inspected three innovative waste management and treatment processes, including:

- the Woodlawn bioreactor which is one of the largest purpose built landfill projects in the world and generates electricity from decomposing waste;
- the Mechanical and Biological Treatment (MBT) facility which extracts organic content from household waste to produce compost which is then used to rehabilitate a local former mining site; and
- aquaculture and horticulture processes which capture waste heat from energy production for use in fish farming and hydroponic horticulture.

5.39 The Woodlawn bioreactor manages approximately 20 per cent of Sydney's putrescible waste. It is estimated that for every tonne of waste deposited at the facility, 1.33MW of clean electricity can be produced.[56] Veolia states that the bioreactor is capable of producing enough energy to supply power to up to 30,000 households.[57] The MBT facility on the other hand is capable of

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55 Western Australian Government, *Submission 210*, p. 6.

56 Veolia, *Woodlawn Bioreactor, NSW*, <www.veolia.com/anz/our-services/our-facilities/landfills/woodlawn-bioreactor-facility>, accessed 5 November 2020.

57 Veolia, *Woodlawn Bioreactor, NSW*, <www.veolia.com/anz/our-services/our-facilities/landfills/woodlawn-bioreactor-facility>, accessed 5 November 2020.

processing up to 144,000 tonnes of waste per year, and is expected to divert approximately 50-60 per cent of the waste it receives from landfill.[58]

Committee comment

5.40 In November 2019, the Minister for Energy and Emissions Reduction announced that ARENA would lead the development of a bioenergy roadmap to identify the role bioenergy can play in Australia's future energy mix. This roadmap will consider:

- the potential for biofuels to decarbonise the industrial and transport sectors,
- the role biofuels can play in contributing to Australia's liquid fuel security,
- opportunities to use biogas in the gas network,
- bioenergy's capacity to generate heat, steam and power, and
- the economic opportunities for Australia, including a focus on regional Australia.[59]

5.41 This work has yet to be finalised.

5.42 It was the intention of the Committee to travel overseas to inspect WtE infrastructure, and learn more about the benefits, risks, and processes associated with this technology. Due to Covid-19 travel restrictions, the Committee was unable to do this.

5.43 The Committee recognises the wide use of WtE technology internationally, and its potential in Australia. It recognises that there are opposing views regarding this technology although this mainly concerns thermal processes that incinerate waste. While some stakeholders consider WtE an important option in Australia's resource recovery, particularly for waste that cannot be reused or recycled, other stakeholders identify a number of health and environmental risks and hold concerns that WtE undermines other resource recovery efforts.

5.44 WtE involves different processes and different feedstocks and it is important that there be clarity around what a national WtE policy or strategy would include. A potential area of concern is that the technology might, in the long-term, be at odds with efforts to improve waste management and resource

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58 Veolia, *Woodlawn MBT*, NSW <www.veolia.com/anz/our-services/our-facilities/treatment-plants/solid-waste-treatment-plants/woodlawn-mbt-nsw>, accessed 5 November 2020.

59 ARENA, *Submission 15*, p. 4.

recovery and transition to a circular economy. In other words, if we transition to a society that designs out waste, there may be less waste to support the technology.

5.45 It is the Committee's view that a national policy be developed which clarifies the Commonwealth's position on this technology, the different feedstocks, processes and outputs, and how the energy will be used in communities. The policy should aim to ensure consistency across the states and territories.

Recommendation 13

5.46 The Committee recommends that the Commonwealth Government develop a national waste to energy policy in consultation with state and territory governments. Consideration should be given to where waste to energy fits into the waste management hierarchy.

5.47 In developing a national policy, the Committee recommends that the Commonwealth Government review current state and territory waste to energy regulation with a view to ensuring national consistency across planning, approval and operational processes.

Recommendation 14

5.48 The Committee recommends that the Commonwealth Government in consultation with state and territory governments develop a national methane-to-power program for landfill sites in cities and larger regional centres.

6. Rural and regional Australia

6.1 It is estimated that Australia's local governments collectively spend $3.5 billion on collecting, treating and disposing of municipal solid waste each year.[1] While each local government is responsible for delivering waste management and recycling services, the capacity of each council to do this differs.

6.2 The Committee heard that 23 per cent of local governments (123 councils) across Australia do not provide kerbside collection for recycled materials.[2] Differences in geographic areas, population, revenue, and access to waste management and recycling infrastructure all contribute to service disparity between local government areas.

6.3 This disparity is most evident in rural, remote and regional communities. Dispersed populations, lower revenue streams, longer distances to larger town centres and high transport costs usually mean that most municipal waste in these areas is sent to landfill rather than diverted.[3]

6.4 The South Coast Sustainable Waste Alliance (SCSWA) provided some insight into the challenges faced by rural and regional councils:

- active landfills approaching capacity;
- high costs associated with ongoing leachate and emissions management of current and former landfill sites;
- red tape and high costs associated with the search for and establishment of new landfill sites, which can take 5–10 years;

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1 Australian Local Government Association (ALGA), *Submission 91,* p. 2.

2 Local Government Professionals Australia (LGPA), *Submission 88,* p. 1.

3 Mr Ian Cowie, Director, LGPA, *Committee Hansard,* Canberra, 4 March 2020, p. 1.

- distance from conventional recycling facilities increasing the economic and carbon footprint of recycling;
- smaller volumes of waste from regional population limits viability of current solutions;
- large land area makes illegal waste dumping and disposal harder to identify and prosecute;
- limitations of current sorting and collection processes sees some recyclable materials sent to landfill; and
- susceptibility of coastline to marine debris and global waste deposited by ocean currents.[4]

6.5 Transport costs, the need for local solutions, and access to information were identified as key issues within regional communities.

Transport

6.6 For many rural and regional communities, the high cost of transporting waste to processing and recycling facilities often prohibits recovery of these resources. For example, the SCSWA stated that 'the financial and environmental cost of transporting resources from a regional centre currently limits diversion and recovery of some material types'.[5]

6.7 The Local Government Association of South Australia (LGASA) made the same point by highlighting the regional landscape of the state:

> A barrier to waste management, as identified by our regional membership, is that when the cost of transport is added to recyclables processing costs, it would often be cheaper to send recyclable materials to landfill. The barrier of distance that is required to achieve size and scale for recycling and resource recovery endeavors to be financially viable is often too great.[6]

6.8 The Australian Local Government Association (ALGA) highlighted the geographic distance and regional population sparsity as working 'against solutions to Australia's waste crisis.[7] These issues were considered to be particular problems for outback NT, Queensland and Western Australia:

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4 South Coast Sustainable Waste Alliance (SCSWA), *Submission 151*, p. 2. SCSWA is comprised of four Western Australian councils, namely the Shire of Denmark, Shire of Jerramungup, Shire of Plantagenet and City of Albany: SCSWA, *Submission 151*, p. 1.

5 SCSWA, *Submission 151*, p. 3.

6 Local Government Association of South Australia (LGASA), *Submission 120*, p. 16.

7 ALGA, *Submission 91,* p. 5.

> The cost of transporting recovered waste to markets or to reprocessing plants can be onerous. In Western Australia, where there are no reprocessing plants for paper and plastics, shipping recovered waste overseas represents a lower cost than haulage to plants in the eastern states. Low population means market forces work against the viability of regional reprocessing plants and technical upgrades to sorting infrastructure. However, most rural and regional areas have no kerbside recycling services, and all waste is landfilled.[8]

6.9 Mr Ian Cowie, Director, Local Government Professionals Australia (LGPA) highlighted access issues to reprocessing and recycling facilities in Western Australia:

> In considering national approaches and solutions to waste management, the Commonwealth government must be mindful of these variations between local governments and the different circumstances and capacities of local government. For instance, again, high transport costs prohibit rural and remote local governments, in many senses, from participating in the way metropolitan local governments can. Furthermore, even metropolitan areas in more isolated states, such mine in Western Australia, don't have easy access to local reprocessing and recycling facilities. Even on the east coast here, there are still some limitations to the facilities which are available, which is one of the reasons why we advocate for regional facilities to be developed to respond to local needs much more effectively.[9]

6.10 Other states and territories face unique challenges in waste management and recycling. The Tasmanian Government highlighted the logistical challenges for its waste management and resource recovery industry given its geography as an island state, while suggesting this could provide opportunities.[10] The ACT Government noted that it directly performs the waste management and resource recovery functions carried out in other jurisdictions by local governments serving as a regional hub for the ACT and surrounding areas.[11] And the Northern Territory Government pointed out in its contribution to the *National Waste Report 2018* the difficulties it faces in

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8 ALGA, *Submission 91*, p. 5.

9 Mr Ian Cowie, LGPA, *Committee Hansard*, Canberra, 4 March 2020, p. 1.

10 Tasmanian Government, *Submission 198*, pp. 1, 3.

11 ACT Government, *Submission 213*, p. 1. This is because the ACT does not have local governments as such, only 'voluntary, not-for-profit community councils': ACT Government, *ACT Community Councils*, <www.accesscanberra.act.gov.au/app/answers/detail/a_id/246/~/act-community-councils>, accessed 17 June 2020.

emergency waste management, particularly in managing the waste caused by extreme weather events such as cyclones and floods.[12]

Box 6.1 Envorinex[13]

Envorinex is a business based in George Town, Tasmania, that uses recycled polyvinyl chloride (PVC) and polypropylene to manufacture a range of products including noise abatement fencing, matting and septic tanks. It collects waste from a number of sites in mainland Australia, including Victoria's Oakleigh Centre for Intellectually Disabled Citizens. It is also a participant in the Vinyl Council of Australia's PVC Recycling in Hospitals scheme.[14]

Envorinex sells approximately 5 per cent of its products in Tasmania, 55 per cent to mainland Australia and 40 per cent overseas. Its septic tanks are in particular demand in some developing countries that lack adequate sanitation. The Commonwealth Government's Tasmanian Freight Equalisation Scheme has played an important role in the firm's success by assisting it with freight costs. The Commonwealth also provided it with a grant of approximately $730,000 under the Regional Jobs and Investment Packages scheme to cover half the cost of expanding its recycling capacity to include soft plastics.[15]

Local solutions

6.11 The Committee consistently heard that rural, regional and remote areas need local strategies and solutions to manage their waste. Submissions advocated for regional facilities to be developed to respond to local needs more

12 Blue Environment Pty Ltd, *National Waste Report 2018*, report prepared for the Department of the Environment and Energy, p. 45, <www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf > accessed 20 October 2020.

13 University of Tasmania, *Submission 18*, p. 7.

14 This scheme is discussed in more detail in Chapter 8.

15 Commonwealth Government, *Regional Jobs and Investment Packages (RJIP) — Regional Tasmania Grants Recipients*, <www.business.gov.au/grants-and-programs/regional-jobs-and-investment-packages-rjip/regional-tasmania-region-grant-recipients> accessed 29 October 2020. The grant was to Poly Marketing Pty Ltd, the company that trades as Envorinex: Envorinex, *About Envorinex*, <www.envorinex.com/about-envorinex>, accessed 29 October 2020.

effectively, or for shared facilities or hubs to be built to better support regional communities.[16]

6.12 The rationale for local solutions and shared facilities is to not only minimise the transportation of waste, but to maximise the volume of waste for recovery. In other words, it is to create economies of scale. Rural and regional communities require a steady and sustainable volume of waste to make a local processing operation work effectively. As explained by Mr Cowie:

> The real challenge in regional areas is to be able to get the volume to make a processing operation work effectively. But if the volume could be there then, yes, quite clearly you'd have the potential. I suppose that gets back to what we would talk about: there needs to be more investment in potential start-ups and businesses that can produce small-scale facilities that would cater for the smaller volumes in regional areas.[17]

6.13 In its submission, the SCSWA called on local governments, industries and communities to explore 'economically and environmentally viable local approaches' and recommends that priority be given to research and incentives to develop local, scalable resource recovery and recycling solutions.[18]

6.14 Similarly, the Local Government Association of Queensland noted that local communities should be supported by all tiers of government to manage their waste as close as practicable to its place of generation and continue to respect the principles of the waste hierarchy.[19]

Access to information

6.15 Access to information was raised as an impediment to waste management and recycling in regional areas. The benefit of specialised knowledge and information is two-fold. First, smaller rural and regional towns require information so they can introduce better waste management processes and facilities in their communities. Second, smaller rural and regional towns

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16 For example, LGPA, *Submission 88*, Local Government Association of Queensland (LGAQ), *Submission 128*, and SCSWA, *Submission 151*.

17 Mr Ian Cowie, LGPA, *Committee Hansard*, Canberra, 4 March 2020, p. 5.

18 SCSWA, *Submission 151*, p. 3.

19 LGAQ, *Submission 128*, p. 10.

require information as an avenue to promote themselves to industry and larger communities as part of a waste management solution. In short, they need to know how to get involved. As described by Cr Craig Davies, Mayor, Narromine Shire Council:

> I guess a coordinated approach, certainly to allow the industry to understand the benefits that would accrue from having some of their waste processed in the isolated region that I've described to you previously. It's our lack of industry knowledge and knowing who to speak to in the industry that makes it difficult for us. We are small. A lot of the bigger players don't look on us terribly favourably, but we can offer them a lot.[20]

6.16 The Committee agrees that smaller rural and regional council areas require the necessary information to upskill and promote waste and recycling operations.

Box 6.2 The Big Rivers Waste Management Working Group[21]

Waste management in the Big Rivers region of the Northern Territory suffered from outdated landfilling methods, which were not adequately separating recyclable and hazardous materials. Roper Gulf Regional Council, Victoria Daly Regional Council and West Daly Regional Council, supported by the territory Department of Health and Katherine Town Council, responded by forming the Big Rivers Waste Management Working Group.

The Working Group evaluated how the three councils were managing waste then integrated and improved their operations, with a focus on sharing costs, particularly waste transport and processing costs. This combined effort has turned resource recovery into a viable industry in the area and provided employment for unskilled workers. The Working Group's innovative approach has been recognised by numerous grants from the Commonwealth and Territory governments.

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20 Cr Craig Davies, Mayor, Narromine Shire Council, *Committee Hansard*, Canberra, 17 June 2020, p. 8.

21 National Aboriginal Community Controlled Health Organisation (NACCHO), *Submission* 223, p. 8.

Aboriginal and Torres Strait Islander communities

6.17 In its submission, the National Aboriginal Community Controlled Health Organisation (NACCHO) examined waste management and recycling in Aboriginal and Torres Strait Islander Communities.[22] In particular, NACCHO drew the Committee's attention to the need to improve waste management and recycling in these communities, and increase employment opportunities for Aboriginal and Torres Strait Islander people in waste and recycling industries.[23] NACCHO argued that these improvements are not only needed to improve service delivery and economic opportunity but to improve the health and wellbeing of people living in Aboriginal and Torres Strait Islander communities.[24]

6.18 NACCHO stated that 'current provisions for regulating and managing waste in rural and regional communities are often insufficient in ensuring the health and wellbeing of residents'.[25] The issue here is that when waste is not managed properly, the health problems for communities are significant.

6.19 Specific challenges for Aboriginal and Torres Strait Islander communities in managing waste include:

- limited transportation options;
- irregular waste collection services;
- high costs of setting up and maintaining waste management systems;
- limited waste infrastructure or access to markets for recyclables;
- difficulties recruiting and retaining staff;
- vast distances and poor road conditions between towns;
- inability to afford the relocation or redesign of landfills to better protect the environment;
- difficulties identifying custodians of the land and obtaining consent from land owners to develop landfill areas, and
- limited waste data to better assess waste management and recycling infrastructure needs.[26]

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22 NACCHO, *Submission 223*.

23 NACCHO, *Submission 223*, p. 3.

24 NACCHO, *Submission 223*, p. 3.

25 NACCHO, *Submission 223*, p. 3.

26 NACCHO, *Submission 223*, p. 4.

6.20 NACCHO made three recommendations which focus on identifying and implementing waste management and recycling strategies that: 1) protect the environment and health and wellbeing of residents; 2) protect peoples' access to land, water and traditional food sources, and 3) create enterprise and jobs opportunities in waste management, recycling and related industries.[27]

6.21 Specific solutions identified for improving waste management recycling in Aboriginal and Torres Strait Islander communities include:

- community education and awareness of the need to avoid and reduce waste, including food waste;
- accessing grants programs for reducing and reusing waste;
- circulating best-practice guidance materials for handling and disposing of various wastes;
- identifying emerging and ongoing waste management issues requiring multi-faceted solutions;
- increasing coordination of localised waste arrangements to prevent litter and illegal dumping;
- improving transportation of hazardous wastes out of communities (including reducing costs);
- expanding the container deposit scheme and plastic bag bans;
- funding regional councils to work together and share recycling infrastructure;
- assessing landfill sites and prioritising the management of those that are an environment and health risk;
- identifying and pursuing innovative technologies and systems (recycling, clean energy, etc.);
- funding research and data management into meeting targets in waste reduction; and
- conducting regulatory reviews and providing progress reports on waste reduction.[28]

6.22 The use of Aboriginal and Torres Strait Islander Environmental Health Workers and Officers were identified as vital in educating residents in rural and remote communities about best practice in waste management.[29]

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27 NACCHO, *Submission 223*, pp. 3, 6, 7.

28 NACCHO, *Submission 223*, p. 5.

29 NACCHO, *Submission 223*, pp. 7–8.

Microfactories

6.23 Professor Veena Sahajwalla shared with the Committee innovative work by the University of New South Wales' Centre for Sustainable Materials Research and Technology (SMaRT Centre) which has specific applicability to rural and regional communities.[30]

6.24 The SMaRT Centre has been researching innovative technologies – referred to as micro-recycling science – to reform waste streams into value added materials and products. In particular, its Microfactorie technology can be used to reform waste into materials for reuse and manufacturing.[31]

6.25 Microfactories are described as a 'series of small machines and devices that use patented technology to perform one or more functions in the reforming of waste products into new and usable resources. They can be installed in an area as small as 50–100 square metres, and can be set up wherever waste is stockpiled, such as a building site or alongside regional waste disposal sites, to process waste at the source'.[32]

6.26 According to Professor Sahajwalla this innovative science and technology will 'profoundly disrupt today's centralised, vertically integrated model of production'.[33] As a model which embraces local solutions to local waste problems, this innovation can help to overcome problems associated with distance and transport, volumes of waste, and economies of scale in regional areas.

6.27 Promoted as the 'the future of global manufacturing', a key advantage of Microfactorie technology is that it is 'small-scale', 'decentralised' and will 'enable communities to produce many of the products, materials and resources they need locally by using resources largely derived from waste'.[34]

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30 Professor Veena Sahajwalla, Director, Centre for Sustainable Materials Research and Technology (SMaRT Centre), University of New South Wales, *Committee Hansard,* Canberra, Wednesday 12 August 2020, Centre for SMaRT, University of NSW, *Submission 80.*

31 SMaRT Centre, *Submission 80,* p. 3–4.

32 S. Muldowney, How Inventor Veen Sahajwalla is Revolutionising Recycling Science, *In The Black*, <www.intheblack.com/articles/2020/07/01/veena-sahajwalla-revolutionising-recycling-science>, accessed 20 October 2020.

33 SMaRT Centre, *Submission 80,* p. 4.

34 SMaRT Centre, *Submission 80*, pp 1–2.

6.28 Professor Sahajwalla explained that Microfactories are about designing solutions for communities that are 'fit for purpose' and connected to 'manufacturing a value added product':

> When someone in a regional town wants to look at, for instance, recycling solar panels — or it could be recycling glass or tyres — the question always comes up from communities, especially when you're talking about smaller volumes, of how you actually enable recycling and transformation of waste into value-added products but do it at a scale that makes sense for that region. Microfactories are really all about understanding the requirements of scale; they are able to deliver solutions that work on that scale and that are fit for purpose. The keyword here is: what is the purpose?[35]

6.29 To this end, Professor Sahajwalla stated that Microfactories will not only help to address waste and recovery issues in particular communities, they will link recycling and manufacturing to help create new economic opportunities in rural and regional areas including employment.[36]

6.30 The SMaRT Centre's technology has already contributed to 'millions of tyres' being diverted from landfill and partially replacing coke in electric arc furnace steelmaking.[37] Other materials such as discarded textiles, paper and glass are being reformed into floor tiles, ceiling tiles, or sound-absorbing wall tiles, and discarded e-waste such as laptops and smart phones is being converted into materials for use in metals and industrial grade ceramics, and plastic filaments for 3D printing.[38]

6.31 Microfactories present important export opportunities for Australians. Not only in exporting the technology itself but the products that results. Professor Sahajwalla told the Committee that the crucial part of the manufacturing process is making it cost competitive:

> With localised manufacturing in Australia, if we can produce enough to meet our own needs, we won't have to import it. When we get to the point where we are producing more than enough, the export opportunities in this global

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35 Professor Veena Sahajwalla, SMaRT Centre, *Committee Hansard*, Canberra, 12 August 2020, p. 1.

36 SMaRT Centre, *Submission 80*, p. 4.

37 SMaRT Centre, *Submission 80*, p. 4.

38 SMaRT Centre, *Submission 80*, pp 1–2. See S Muldowney, How Inventor Veen Sahajwalla is Revolutionising Recycling Science, *In The Black*, <www.intheblack.com/articles/2020/07/01/veena-sahajwalla-revolutionising-recycling-science > accessed 21 October 2020 and C Sheedy, Meet One Engineer Helping People See the Huge Possibilities in the Circular Economy, *Create Digital*, < www.createdigital.org.au/meet-engineer-helping-people-see-huge-possibilities-circular-economy/> accessed 21 October 2020.

> market are massive, so there's absolutely no question that, for all of these types of products we're talking about, there's an opportunity to produce something that is going to be cost competitive, which is always an important part of our thinking. That's been part of our journey as we work with our industry partners — to work our way through enabling an operator to become cost competitive.[39]

6.32 While this technology presents enormous opportunities for rural and regional communities, a potential impediment for smaller communities may be access to investment and funding. Specifically, the difficulty of local communities to find funding to match that offered by the Commonwealth Government under its recently announced Recycling Modernisation Fund to set up a Microfactorie. As Professor Sahajwalla explained:

> If industries have to put some funding into it, how does a small community go about doing that?
>
> … how do we enable and support the deployment of microfactories? But the investment in purchasing and setting up the modular systems which make a microfactorie is going to be the next step. I absolutely applaud the Recycling Modernisation Fund that has been announced recently. I guess time will tell how regions are going to pick up on that type of investment from the federal government to enable us to take Australian science and deliver waste recycling solutions so we can deliver these benefits to our communities.[40]

6.33 In a written submission, the SMaRT Centre made six policy recommendations to promote 'recovery, re-use, recycling and reformation of products by industry and their end customers'.[41] Four of these recommendations relate specifically to Microfactorie:

- invest in the Microfactorie model within local regions by including a subsidy scheme to incentivise and support uptake by third parties or local governments. A fund similar to the Building Better Regional Fund targeted to improve waste management by local councils could be considered.
- support the establishment of a Microfactorie pilot plant to:
  - accelerate partnerships with industry to drive investment and scaling of the model;

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39 Professor Veena Sahajwalla, SMaRT Centre, *Committee Hansard*, Canberra, 12 August 2020, p. 7.

40 Professor Veena Sahajwalla, SMaRT Centre, *Committee Hansard*, Canberra, 12 August 2020, pp. 2–3.

41 SMaRT Centre, *Submission 80*, p. 6.

  - facilitate ongoing research and development; and
  - support international engagement in world-class Australian technologies.
- invest directly in initiatives such as UNSW's SMaRT Centre to support industry-linked research activities between commercial partners and universities, and innovative responses to waste management issues.
- promote the Microfactorie model to provide an important conduit for partnership development with industry and government stakeholders. Government could fund a 'tech-voucher' system to enable businesses to prototype and test their product ideas at UNSW's SMaRT Microfactorie.[42]

6.34 The SMaRT Centre recommended that local councils be encouraged to address the whole life-cycle of waste by supporting partnerships with manufacturing companies, and that all levels of government should legislate the greater use of 'green materials' in construction, product packaging, and government procurement.[43]

Committee comment

6.35 The Department of Agriculture, Water and the Environment shared with the Committee some preliminary work supported by the Commonwealth to help establish waste management and resource recovery facilities in rural and regional communities, specifically in Northern Australia and Queensland.[44]

6.36 These projects, which are in their early stages, complement measures outlined in the National Waste Policy Action Plan and the Response Strategy. These include:

- report on opportunities to promote regional collection and recycling of soft plastics through expansion of the Regional Model for Soft Plastics;
- develop shared infrastructure and collection processes for packaging waste in remote and regional areas through the Remote and Regional Waste Collection Partnership;

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42 SMaRT Centre, *Submission 80*, p. 6.

43 SMaRT Centre, *Submission 80*, p. 6.

44 Department of Agriculture, Water and the Environment (DAWE), *Committee Hansard*, Canberra, 21 October 2020, pp. 3–5.

- explore opportunities to leverage existing regional development programs to support better waste management and resource recovery; and
- increase access to resource recovery and waste management infrastructure for regional, remote and Indigenous communities in every state and territory.[45]

6.37 It is the Committee's view that rural and regional Australia offers significant opportunities to better manage and process Australia's waste. This is due to regional Australia's willingness to attract, invest and establish local industries, and the assets of regional Australia that lend themselves to this type of industry, particularly compared to the often more populated, congested and land limited cities.

6.38 The Committee recognises that the location of waste management and resource recovery facilities is primarily a matter for state and territory and local governments. However, in order to maximise the opportunities offered by rural and regional communities, the Committee recommends that the Commonwealth Government prioritise its coordination and leadership in this area in two key areas. First, in assessing the potential of rural and regional towns to manage and process waste. This assessment should consider key attributes of a location such as the regional landscape, existing transport routes, local infrastructure and amenities, and potential markets for recovered waste. Second, in assisting with investment in the necessary infrastructure to support a local industry.

6.39 The Committee also recognises the difficulty of rural, regional and Indigenous communities in accessing resource recovery services, particularly for agricultural waste, and for disposing of vehicles and machinery in a sustainable way. Where possible, the Committee recommends that consideration be given to the introduction of mobile waste management services to help collect, transport and process waste in these areas.

Recommendation 15

6.40 The Committee recommends that the Commonwealth Government facilitate and coordinate a national assessment of the capacity and potential of rural, regional and remote communities to establish a local waste management and resource recovery industry or serve as a regional

45 DAWE, *National Waste Policy Action Plan 2019*, p. 15.

hub. This assessment should include an examination of the attributes of communities, including but not limited to, the regional landscape, existing transport routes, local infrastructure, current amenities and services, and markets for recovered waste.

Recommendation 16

6.41 The Committee recommends that the Commonwealth Government examine measures for rural, regional and remote communities to access adequate funding to invest in local waste management and resource recovery infrastructure and solutions.

Recommendation 17

6.42 The Committee recommends that the Commonwealth Government, in consultation with state and territory and local governments, establish a mobile waste management and recycling program for rural, regional, remote and Indigenous communities designed to:

- **Collect waste directly from properties, farms and Indigenous communities and transport this waste for processing and resource recovery in larger regional or town centres.**

- **Collect abandoned vehicles from properties and roads for crushing and resource recovery in larger regional or town centres.**

7. Textiles

7.1 Textile waste is a large and rapidly growing problem.[1] It has the lowest recovery rate of all waste types with 87.5 per cent of waste going to landfill.[2]

7.2 Each year, the average Australian purchases 27 kilograms of clothing and disposes of 23 kilograms to landfill. Australians buy 60 per cent more items of clothing than 15 years ago and keep them for half as long.[3] As succinctly stated by Ms Nina Gbor, the problem for many people 'is not that they don't have enough clothing but have too much and don't use it.'[4]

7.3 A major driver of this situation is 'fast fashion' — the trend of clothing retailers selling cheap, mostly synthetic clothes inspired by the latest fashions, designed to be worn for only a short time before being thrown out and replaced by new clothes once fashions change.[5] Mr Graham Ross, Founder, BlockTexx told the Committee that fast fashion is 'causing greater pressure on landfill and donated clothing associations'.[6]

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1 Australasian Circular Textiles Association (ACTA), *Submission 77*, p. 6.

2 Blue Environment Pty Ltd, *National Waste Report 2018*, report prepared for the Department of the Environment and Energy, p. 92, <www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf > accessed 21 October 2020. These figures do not taken into account re-use, which might push the recovery rate above that for plastics (86.7 per cent going to landfill) if included for both streams.

3 SCRgroup, *Submission 227*, p. 6; King Cotton, *Submission 74*, p. 2.

4 Ms Nina Gbor, *Submission 41*, p. 2.

5 Ms Nina Gbor, *Submission 41*, pp. 1–2; ACTA, *Submission 77*, p. 1. At p. 5 ACTA states that 'only 30% of clothing are made from natural fibres, 70% of now comes from synthetic sources' [sic], but it is unclear how clothing made from mixed fibres (both natural and synthetic) is classified.

6 Mr Graham Ross, Founder, BlockTexx, *Committee Hansard*, Canberra, 28 August 2020.

7.4 In addition to this, the recycling rate for synthetic materials in clothing is often much lower compared to other products. For example, the recycling rate for PET from plastic bottles is around 30 per cent globally, while for PET in clothing (polyester) it is less than one per cent.[7]

7.5 The current used textile recovery industry is economically dependent on exports.[8] While charities are able to recover a large proportion of the textiles donated to them, they can only sell about 15 per cent of donated clothing in their shops and have to recover the rest through export or recycling.[9]

7.6 The Australian Circular Textile Association (ACTA) and BlockTexx submitted that the economic viability of this industry in under threat. This is because export prices are falling and will continue to fall as fast fashion causes a glut in the supply of used textiles globally and some countries tighten their regulation of imports.[10]

7.7 King Cotton rejected this claim stating that overseas demand for Australian used clothes is strong and the main challenge to the economics of the industry is the expense of land on which to place collection bins.[11]

7.8 The ACTA notes that most textile waste is not from 'post-consumer clothing' but from 'post-industrial sources' (such as hotel linens, furniture and upholstery and uniforms).While this waste is poorly documented, in Victoria it comprised 68 per cent of all textile waste sent to landfill in 2018.[12] There was relatively little focus on post-industrial waste in evidence to the Committee compared to waste from post-consumer clothing. However, Miss Camille Reed, Chief Executive Officer and Founder, ACTA, was optimistic that such textiles may be easier to recycle because 'these are cleaner streams of homogenous, huge-volume textiles which are reliable, easily recoverable, [and] can create a stable or economically viable business case.[13]

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7 BlockTexx, *Submission 75*, p. 1.

8 Infrastructure Victoria, *Submission 201*, p. 11.

9 Ms Nina Gbor, *Submission 41*, p. 1.

10 ACTA, *Submission 77*, p. 5; BlockTexx, *Submission 75*, p. 5.

11 Mr Tony Rallis, Business Development Manager, King Cotton, *Committee Hansard*, Canberra, 28 August 2020, p. 13.

12 ACTA, *Submission 77*, pp. 3–4.

13 Miss Camille Reed, Chief Executive Officer and Founder, ACTA, *Committee Hansard*, Canberra, 28 August 2020, p. 8.

Opportunities in textile recovery

7.9 While textile waste poses significant challenges, it offers great potential for innovative solutions. The National Association of Charitable Recycling Organisations (NACRO) submitted that charities are already achieving recovery rates for textiles of up to 90 per cent and are collaborating with industry and academia. Strong results can be achieved merely by scaling up what already works.[14] As Mr Omer Soker, Chief Executive Officer, NACRO, told the Committee:

> The good news is that we have capacity for lots more. With the right support we can double that impact. The more textile donations we receive, the bigger our impact. We already have the infrastructure: 3000 charity shops; 10,000 collection bins; a massive workforce. We have logistics, sorting, warehousing capabilities. We already are the biggest active solution to textiles in Australia. We are your low-hanging fruit.

7.10 A considerable amount of research is already being done into methods for recycling textiles and manufacturing new products, including by the Commonwealth Scientific and Industrial Research Organisation and the Centre for Sustainable Materials Research and Technology (SMaRT Centre) at the University of New South Wales.[15]

7.11 Some submitters argued that the industry could substantially benefit from a higher recovery rate for textiles. For example:

- recycled material could provide price stability for textile mills, which they do not currently have;[16]
- demand for recycled polyester is strong, including in China which still requires it for its clothing manufacturing while its domestic production suffers from its restrictions on plastic waste imports (recycled polyester

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14 National Association of Charitable Recycling Organisations (NACRO), *Submission 17*, pp. 4, 8. In August 2020 NACRO rebranded itself as Charitable Recycling Australia although NACRO remains its legal name: Charitable Recycling Australia, Home, <www.charitablerecycling.org.au/> accessed 18 September 2020. To avoid confusion it will be referred to as NACRO throughout this report.

15 Commonwealth Scientific and Industrial Research Organisation (CSIRO), *Submission 215*, pp. 9–10; Centre for Sustainable Materials Research and Technology at the University of New South Wales (SMaRT Centre), *Submission 80*, pp. 1, 5.

16 BlockTexx, *Submission 75*, p. 2.

being made from recycled PET, commonly sourced from beverage bottles);[17]

- due to landfill levies there is financial incentive for industry to divert post-industrial textiles away from landfill;[18] and
- consumers are increasingly mindful of the corporate values of their clothing brands, meaning there is value to those brands in being seeing as sustainable and not being associated with waste.[19]

Proposed solutions

7.12 A common theme in submissions to the inquiry was the need for a 'mindset change' in relation to textile waste;[20] in essence, an acceptance of a circular economy for textiles.[21] There were numerous calls for relevant stakeholders to collaborate more, either formally or informally.[22] As explained by Miss Reed:

> It's going to take more than one party to help overcome the financial challenges and/or burdens. Also, it shouldn't be seen as competitive. Most people don't see it like that — the sustainability, not so much the competitive notion as to who gets there first to crack the puzzle — and so it's more of an opportunity for how we can best divvy up resources to share and learn from each other.[23]

7.13 The Committee heard about some examples of collaboration that are already occurring in the industry, including:

- A 'think tank' on textile waste co-hosted by the Southern Sydney Regional Organisation of Councils (SSROC), the SMaRT Centre and the NSW Circular Innovation Network;[24]

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17 BlockTexx, *Submission 75*, pp. 1–2, 5–6.

18 ACTA, *Submission 77*, p. 4.

19 ACTA, *Submission 77*, p. 5; BlockTexx, *Submission 75*, pp. 2–3.

20 BlockTexx, *Submission 75*, p. 2.

21 For example SMaRT Centre, *Submission 80*, p. 5; Ms Nina Gbor, *Submission 41*, p. 2.

22 Formal collaboration: Southern Sydney Regional Organisation of Councils (SSROC) (*Submission 82*, pp. 2–3) and Waste Management and Resource Recovery Association of Australia (WMRR) (*Submission 81*, p. 5 — to focus on several priority waste streams, not just textiles); informal collaboration: BlockTexx (*Submission 75*, p. 8) and World's Biggest Garage Sale (WBGS) (*Submission 96*, p. 2).

23 Miss Reed, ACTA, *Committee Hansard*, Canberra, 28 August 2020, p. 9.

24 SSROC, *Submission 82*, p. 2.

- The recent formation of ACTA itself, which is aiming for a 95 per cent recovery rate for textiles by 2030;[25] and
- A partnership between the Vinyl Council of Australia (VCA) and the Specialised Textiles Association, which is working to establish a product stewardship scheme for post-industrial polyvinyl chloride (PVC) textiles.[26]

7.14 King Cotton shared with the Committee two basic ways in which the resource recovery rate for textiles can be substantially increased:

- Expanding re-use (either domestically or overseas) through the network of textile collection bins, online systems and similar means; and
- Expanding recycling proper (such as for manufacturing new textiles).[27]

7.15 King Cotton advocated for the first option as being more commercially viable, as did NACRO on the basis of the results of the current system.[28] By contrast, stakeholders involved in developing new recycling technologies such as the SMaRT Centre and BlockTexx had a more optimistic view of technology's potential.[29] Both sides of the debate nonetheless acknowledged that both re-use and recycling must play a role in better managing textile waste.[30]

Government policy

7.16 There was strong support for a national textiles policy. For example, NACRO and the Salvation Army called for the development of a 'National Textiles Reuse Policy' in consultation with all stakeholders and including long term targets for the recovery of textiles from landfill.[31] The SCRgroup suggested a policy modelled on the European Union's *Waste Framework Directive*[32] and France's Extended Producer Responsibility Policy for

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25 ACTA, *Submission 77*, pp. 3, 11.

26 Mr Jan van de Graaff, Product Stewardship Manager, Vinyl Council of Australia (VCA), *Committee Hansard*, Canberra, 28 August 2020, p. 27.

27 King Cotton, *Submission 74*, p. 4.

28 King Cotton, *Submission 74*, p. 4; NACRO, *Submission 17*, pp. 9–10.

29 SMaRT Centre, *Submission 80*, pp. 1–2; BlockTexx, *Submission 75*, pp. 3–4.

30 NACRO, *Submission 17*, p.7; BlockTexx, *Submission 75*, p. 8.

31 NACRO, *Submission 17*, pp. 9; 16; Salvation Army, *Submission 211*, p. 6.

32 *European Parliament and Council Directive 2008/98/EC of 19 November 2008 on Waste and Repealing Certain Directives* [2008] OJ L 312/3.

Textiles.[33] It also called for long term targets.[34] Similarly, ACTA proposed the introduction of national standards for textile imports and a requirement that new synthetic textiles contain at least 70 per cent recycled material[35] while NACRO called for more uniform state and territory legislation.[36]

7.17 In addition, NACRO and ACTA both put forward their own three-stage ten-year 'roadmaps' for addressing textile waste.[37]

Exports and landfill levies

7.18 Protecting used clothing exports, and landfill levies were two specific issues raised with the Committee. For example, several stakeholders were concerned about protecting used clothing exports from what in their view would be excessive regulation. It was argued that exports of used clothing should be seen as exports of a commodity rather than waste and that they are vital to the viability of the domestic clothing re-use system.[38] As Mr Soker, Chief Executive Officer, NACRO explained:

> …we view these exported textiles as a resource. They are only not reusable in Australia because of the demands of Australian consumers, whereas they meet the demands of lower-income individuals in other markets. The point we are trying to make is that the exported clothing is not a waste product; it is a resource, because it can still be used.[39]

7.19 Mr Soker stated that 'one of the things we need to do, and it's on our agenda, is audit the supply chains so we have a good understanding of what happens to it at those end markets.'[40] King Cotton also stressed the importance of having 'export rules that provide certainty' and called for these to be introduced.[41]

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33 *Code de l'Environnement* [Environment Code] (France) art L541–10.

34 SCRgroup, *Submission 227*, pp. 7–8.

35 ACTA, *Submission 77*, p. 3.

36 NACRO, *Submission 17*, p. 14.

37 NACRO, *Submission 17*, p. 13; Salvation Army, *Submission 211*, p. 7; ACTA, *Submission 77*, p. 7.

38 NACRO, *Submission 17*, p. 11; King Cotton, *Submission 74*, p. 3; SCRgroup, *Submission 227*, p. 11.

39 Mr Omer Soker, Chief Executive Officer, *Committee Hansard*, Canberra, 28 August 2020, p. 7.

40 Mr Soker, *Committee Hansard*, Canberra, 28 August 2020, p. 7.

41 King Cotton, *Submission 74*, p. 4.

7.20 BlockTexx criticised the fact that 'landfill levies are not used to fund recycling innovation', and that in its view funding is unfairly skewed in favour of 'established operators', to the disadvantage of 'early stage companies'.[42] ACTA submitted that a landfill levy rebate should be provided on textile diversion and that a ban on textiles going to landfill would support the textile recovery sector.[43] The SCRgroup stressed however that 'alternatives for textile re-use and recycling must be in place' before any landfill ban is introduced.[44]

Re-use

7.21 There was general support among stakeholders for the role charities play in textile recovery. NACRO argued that its members' activities in this area are not only vital to textile waste management but important to society as a whole because of their social and economic benefits.[45] NACRO noted that the recovery rate for textiles donated to charity is high, but for textiles outside the charitable sector it is low.[46]

7.22 NACRO submitted that charities face various challenges in their textile re-use operations, including in coping with unusable donations and in identifying 'appropriate end markets'.[47] BlockTexx stated that charities could play an important role in solving the textile waste problem, but struggle to manage the current volumes being donated to them, with unusable donations being a particular problem.[48]

7.23 This was strongly disputed by the charities and for-profit clothing recovery organisations. For example, Mr Tony Rallis, Business Development Manager, King Cotton, stated:

> The point that we're saturated is totally fabricated and untrue. The charities will support me in this case.

7.24 Similarly, Mr Matthew Davis, National Director, Salvos Stores, commented:

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42 BlockTexx, *Submission 75*, p. 7.

43 ACTA, *Submission 77*, pp. 3, 8.

44 SCRgroup, *Submission 227*, p. 16.

45 NACRO, *Submission 17*, pp. 5–6.

46 NACRO, *Submission 17*, p. 9.

47 NACRO, *Submission 17*, pp. 2, 12.

48 BlockTexx, *Submission 75*, pp. 3, 7.

> It's true to the extent that, once we've sorted through it all, there is a large percentage of material that isn't suitable for resale. What's not true is that we don't want donations. It's really important that we encourage the Australian community — and the solutions that we come up with — to prioritise reuse. It's absolutely incorrect to say that we are not still very much in the market for donations, to create value for the community.[49]

Collection bins

7.25 A vital aspect of the re-use system is the network of collection bins operated by charities and private companies. King Cotton submitted that 85 per cent of clothing collection occurs through such bins, and only 15 per cent through other means.[50] Submitters agreed that government needs to take action to ensure more bins are available and that they are better located, while acknowledging that this is largely a matter for local councils.[51]

7.26 Mr Rallis drew the Committee's attention to the cost of leasing land for collection bins. Specifically, he told the Committee:

> My biggest problem is that we as exporters deal in cents. When you're selling something for a certain number of cents per kilo and it gets dropped by 15 per cent, if I had real estate through government partnerships — which we do, but in a broader sense — and I could put out another 700 bins, I would have no problem with the market taking that product. My problem is that 25 per cent of your sale goes towards leasing fees of that land, that's the problem.[52]

7.27 The SCRgroup advocated for the inclusion of provisions relating to bin placement in its proposed National Waste Framework, including a target of 1 bin for every 1500 head of population (the target in place in France).[53] Both the SCRgroup and King Cotton were highly critical of some councils' regulations that favour charitable bin operators over commercial ones.[54]

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49 Mr Matthew Davis, National Director, Salvos Stores, *Committee Hansard*, Canberra, 28 August 2020. Mr Davis is also the Chair of NACRO, and appeared before the Committee in both capacities.

50 King Cotton, *Submission 74*, p. 2.

51 BYO Containers, *Submission 167*, p. 2; King Cotton, *Submission 74*, pp. 2–3; SCRgroup, *Submission 227*, pp. 9–10.

52 Mr Rallis, *Committee Hansard*, Canberra, 28 August 2020, p. 14.

53 SCRgroup, *Submission 227*, pp. 7, 9–10.

54 SCRgroup, *Submission 227*, pp. 9; King Cotton, *Submission 74*, pp. 2–3.

7.28 A key challenge for operators of clothing re-use bins is illegal dumping, and the expense of over $14 million each year cleaning up such activity.[55] SCRgroup identified a number of responses to this problem including:

- providing landfill levy relief for bin operators (who currently have to pay levies on the dumped items they clean up);
- consistent nationwide anti-dumping penalties and signage (along the lines of the signage it has developed for its own bins); and
- a campaign to encourage the public to report dumping.[56]

7.29 In addition, NACRO advocated for the Commonwealth and state and territory governments to each invest $10 for each tonne of illegally dumped waste that charities have to manage.[57]

Clothes repair

7.30 The repair of clothes was another important aspect of re-use identified in the submissions. For example, the World's Biggest Garage Sale (WBGS) explained that it is working with several major retailers to repair and resell their faulty stock in its 'Retail Repairs' program.[58] The SSROC called for an exemption on GST for the labour costs of repairs,[59] and Ms Amy Blain suggested the promotion of 'repair cafes' where people can bring their damaged clothes to be repaired and 'clothes swap' events where people can swap their old clothes with each other.[60] Ms Nina Gbor also advocated for clothes swap events.[61] The WBGS already operates similar events it describes as 're-commerce events', except that it resells the clothes (and other goods) that are donated.[62]

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55 SCRgroup, *Submission 227*, p. 12; NACRO, *Submission 17*, p. 12; BlockTexx, *Submission 75*, p. 7.

56 SCRgroup, *Submission 227*, pp. 12–14. SCRgroup suggested that in some local government areas it is actually cheaper to engage in low range dumping and receive the associated fine than it is to dispose of the goods legally at a transfer station or landfill: *Submission 227*, p. 14.

57 NACRO, *Submission 17*, p. 12.

58 WBGS, *Submission 96*, pp. 1–2.

59 SSROC, *Submission 82*, p. 4. SSROC does not actually mention GST in this context, but refers to value-add tax (VAT) instead.

60 Ms Amy Blain, *Submission 92*, p. 3.

61 Ms Nina Gbor, *Submission 41*, pp. 2–4.

62 WBGS, *Submission 96*, p. 1.

Recycling technology

7.31 Submitters to the inquiry were consistently critical of Australia's current capacity for recycling textiles. For example, the ACTA stated that 'currently, there is no scaled capacity to recycle textiles onshore in Australia'.[63] NACRO described the sector as 'currently underdeveloped' and not commercially viable.[64] The Salvation Army suggested that 'there is no underpinning domestic processing capacity' for low-grade textiles.[65] And IKEA noted that in Australia 'a lack of scaled infrastructure for reprocessing plastics' and 'a lack of textile recycling' were two of the main obstacles to its goal of being 100 per cent circular by 2030.[66]

7.32 The Committee heard that technologies for recycling textiles can be divided into two basic categories — mechanical and chemical.[67]

7.33 In mechanical recycling, the textiles are shredded, and generally used to manufacture products such as insulation and rags although some brands use this material to produce new garments.[68] Mechanical recycling works well for single fibre textiles, but is less effective for mixed fibres.[69] Nonetheless it is the main form of recycling in use today, and currently 12 per cent of global textile waste is recycled mechanically, compared to less than one per cent chemically — the remaining 87 per cent is sent to landfill or incinerated.[70]

7.34 While chemical recycling is not currently commercially used in Australia, there was debate over how developed it is overseas. Drawing on a 2019 Swedish research paper, the SCRgroup presented a list of 'recycling technologies existing on market scale today' that includes methods of chemical recycling for pure PET textiles, pure cotton cutting waste and pure 'nylon 6' products such as fishing nets and carpets.[71] The Salvation Army

63 ACTA, *Submission 77*, p. 4.

64 NACRO, *Submission 17,* p. 12.

65 Salvation Army, *Submission 211*, p. 9.

66 IKEA Australia, *Submission 85*, p. 2.

67 BlockTexx, *Submission 75*, pp. 3–4.

68 BlockTexx, *Submission 75*, p. 3; SCRgroup, *Submission 227*, p. 19.

69 BlockTexx, *Submission 75*, p. 3; SCRgroup, *Submission 227*, p. 19.

70 BlockTexx, *Submission 75*, p. 7.These figures apparently do not include re-use.

71 SCRgroup, *Submission 227*, pp. 19–20.

stated that 'there are international examples to draw insight from' and provided brief summaries of nine of these.[72] BlockTexx suggested 'textile recycling is very much in its infancy' and struggles with multi-fibre clothing.[73] Green Connect submitted that 'there is no viable solution for recycling textiles'.[74]

7.35 ACTA noted that two 'first-of-a-kind' facilities for hydrothermally recycling cotton and polyester blends were opened in Hong Kong in 2018 by a partnership of the Hong Kong Research Institute of Textiles and Apparel and H&M Foundation;[75] however these are not commercial facilities.[76] BlockTexx outlined its Australian-developed S.O.F.T (separation of fibre technology); a technology capable of separating cotton and polyester blends.[77] This technology is not yet in commercial use.

7.36 Regardless of the exact current state of chemical recycling technology, there was agreement amongst stakeholders that significantly more research and development needs to occur in Australia. Support for the development of new technology was a key recommendation of NACRO and the Salvation Army. Green Connect and ACTA called for government funding to support this.[78] The SCRgroup submitted that state governments should increase 'funding into textile re-use and recycling before landfill bans for recoverable clothing are [introduced]'.[79]

7.37 There was support among stakeholders for new recycling technology, and for this to be developed in collaboration. For example, Miss Reed of ACTA stated:

> there's still an opportunity for companies to get on and do their own thing, but there has to be more collaboration and open-source knowledge.[80]

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72 Salvation Army, *Submission 211*, pp. 9–11.

73 BlockTexx, *Submission 75*, p. 7.

74 Green Connect, *Submission 79*, p. 3.

75 ACTA, *Submission 77*, p. 1.

76 H&M Foundation, Recycling Facilities Takes [sic] Fashion Industry One Step Closter to Circularity, *Media Release*, 3 September 2018.

77 BlockTexx, *Submission 75*, p. 4.

78 Green Connect, *Submission 79*, p. 2; ACTA, *Submission 77*, p. 8.

79 SCRgroup, *Submission 227*, p. 4,

80 Miss Reed, ACTA, *Committee Hansard*, Canberra, 28 August 2020, p. 9.

7.38 Mr Matthew Davis, Chair, NACRO, stated that his members are willing to 'collaborate to establish an infrastructure solution' and that 'NACRO, as that representative body, is positioned to facilitate that dialogue.'[81]

Product stewardship

7.39 As with many other waste streams considered by the Committee, product stewardship was promoted as a solution to manage textile waste.[82] Some submitters suggested that any scheme or schemes should be mandatory while the WBGS called for the imposition of penalties on companies that destroy unsold or returned items.[83]

7.40 There was considerable optimism about the prospects of successfully introducing textile product stewardship schemes, with Zero Waste Victoria suggesting that they could be 'readily implemented' for 'soft furnishings, including carpets and textiles' and RMIT University advising that researchers at its School of Fashion and Textiles could 'support emerging stewardship schemes' for waste textiles and other similar products.[84]

7.41 The Committee heard evidence that there is already considerable activity occurring in relation to product stewardship for textiles. Mr Soker of NACRO explained that his organisation is working on developing a product stewardship scheme for clothing together with the Australian Fashion Council, the National Retail Association, with advice and support from WRAP UK and a number of other organisations.[85]

7.42 IKEA Australia shared with the Committee its business model that includes 'innovative circularity programs' such as a furniture buyback service.[86] This service aims to give IKEA furniture a second life by allowing customers to return previously purchased IKEA furniture in exchange for an IKEA refund

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81 Mr Davis, NACRO, *Committee Hansard*, Canberra, 28 August 2020, p. 9.

82 BlockTexx, *Submission 75*, p. 8; SSROC, *Submission 82*, p. 2.

83 NACRO, *Submission 17*, p. 15; King Cotton, *Submission 74*, p. 4; WBGS, *Submission 96,* p. 2.

84 RMIT University, *Submission 116*, p. 2.

85 Mr Soker, NACRO, *Committee Hansard*, Canberra, 28 August 2020, p. 6. WRAP (Waste and Resources Action Programme) UK is a United Kingdom-registered charity that works to' promote sustainable waste management' across a wide range of industries in that country: Waste and Resources Action Programme, *Our History* <www.wrap.org.uk/about-us/our-history> accessed 24 September 2020.

86 IKEA Australia, *Submission 85*, p. 3; IKEA Australia, *Buy Back*, <www.ikea.com/au/en/customer-service/services/buyback-pubff9ee470
>, accessed 10 August 2020.

card.[87] This returned furniture is then resold by IKEA as is. IKEA offers buy back 10,000 products up to 10 years old.

7.43 IKEA is looking to implement further product stewardship for textile waste but is facing difficulties in doing so. As Ms Melissa Miller, Country Sustainability Manager, explained:

> our procurement team is supporting us on sourcing potential partnerships; however, a challenge is finding a national manufacturer, especially with the legislation and rules around exporting waste between states.[88]

7.44 In its submission, the ACTA put forward a number of proposals for change including:

- an operational national Textile Stewardship Scheme, requiring $4 billion of investment from government, industry and individuals;[89]
- a tax rebate for products complying with stewardship policies; and
- the inclusion of textiles on the Product List published by the Minister for the Environment under the *Product Stewardship Act 2011* (Cth).[90]

7.45 ACTA outlined its efforts to establish a 'takeback system' by 2022 and its plans to promote extended producer responsibility.[91]

7.46 The Committee heard about the work of VCA who is combining with the Specialised Textiles Association to establish a national product stewardship scheme for a range of industrial PVC textiles. These include 'grain covers, tarpaulins, advertising banners, tents and marquees, truck tarps, marine fabrics, swimming pool liners and upholstery fabrics.'[92] The two associations are seeking funding from the National Product Stewardship Investment Fund in this endeavour.[93]

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87 IKEA Australia, *Submission 85*, p. 3.

88 Ms Melissa Miller, Country Sustainability Manager, *Committee Hansard*, Canberra, 28 August 2020, p. 23. IKEA Australia has ten stores nationwide, spread across the five mainland states and the ACT: IKEA Australia, *IKEA Store Locator* <www.ikea.com/au/en/stores/> accessed 22 September 2020.

89 ACTA, *Submission 77*, p. 3.

90 ACTA, *Submission 77*, pp. 3, 8.

91 ACTA, *Submission 77*, pp. 7, 9–10.

92 Mr van de Graaf, VCA, *Committee Hansard*, Canberra, 28 August 2020, p. 27.

93 Mr van de Graaf, VCA, *Committee Hansard*, Canberra, 28 August 2020, p. 27.

Product design and procurement

7.47 A related solution proposed by several submitters was improved product design. Green Connect suggested a specific focus on replacement of 'problematic textiles' with more 'environmentally friendly' alternatives as part of its proposal for more government funding of textile recycling as a whole.[94] RMIT University called for 'increasing emphasis…to be given by government to funding sustainable fashion production cycles.'[95] And ACTA noted that one of the projects on which it is working is 'designing products with end-of-life in mind'.[96]

7.48 Both NACRO and the Salvation Army submitted that there has historically been too much focus on managing products at the end of their lives at the expense of making improvements earlier in their lifecycles such as improving their design, although this attitude is changing.[97] Several submitters advocated for government regulation of the clothing production cycle to ensure circularity or the use of exclusively biodegradable materials.[98]

7.49 Mr van de Graaff, Product Stewardship Manager, VCA, endorsed the idea of governments doing more to encourage development of product design skills, but noted:

> The issue that sometimes we strike is that the actual benefits are hard to measure and so government shies away from doing that, or they're cut short because it's not clear what those benefits are. They are, I understand, very hard to measure, which is very different to some of the other programs that government runs where you can see increases in resource recovered. But there is certainly an opportunity for us to do more of that and to look at how we can upskill industry.

7.50 In addition to government regulation to improve product design, there were calls for government procurement of recycled textiles to help manage waste. For example, the ACTA suggested national standards for the procurement of textiles[99] and explained that its own efforts to improve procurement are

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94 Green Connect, *Submission 79*, p. 2.

95 RMIT University, *Submission 116*, p. 2.

96 ACTA, *Submission 77*, p. 7.

97 NACRO, *Submission 17*, p. 4; Salvation Army, *Submission 211*, p. 2.

98 WBGS, *Submission 96*, p. 2.; Ms Amy Blain, *Submission 92*, p. 3; Ms Nina Gbor, *Submission 41*, p. 1.

99 ACTA, *Submission 77*, p. 10.

focused on 'sectors with significant textile use' such as hospitality (linens, towels, and uniforms), construction (carpets) and hospitals (linens and uniforms).[100] Similarly, BlockTexx suggested procurement targets or even 'mandated procurement of recycled materials from government or industry'.[101]

Public awareness and education

7.51 Greater public awareness and education was identified as a necessary measure to help reduce textile waste.[102] BlockTexx suggested that while plastic has long been perceived as a major source of pollution, there has been much less community awareness of the problem of textile waste, although in its view this may be starting to change.[103] The Salvation Army explained that consumers do not fully understand what they can donate to charity or how, and that charities are engaged in several initiatives to improve this situation.[104] The ACTA stated that public advocacy is one of its main areas of focus, including 'educating consumers on the impacts of consumption decisions'[105] while the SCRgroup recommended that the Commonwealth Government run a national educational campaign in co-ordination with campaigns by state and territory governments (including in schools) and local councils.[106]

Committee comment

7.52 The volume of textile waste generated in Australia is remarkable. Equally remarkable is the potential for textiles to be reused and recycled, with some industry stakeholders aiming for a 95 per cent target in the next decade. This is an important opportunity.

7.53 The Committee's examination of waste from textiles and household goods focused on three key areas: consumer waste and turnover of goods, opportunities to recycle and reuse products, and current impediments. The

100 ACTA, *Submission 77*, p. 10.

101 BlockTexx, *Submission 75*, pp. 2, 7.

102 King Cotton, *Submission 74*, p. 4.

103 BlockTexx, S*ubmission 75*, p. 8.

104 Salvation Army, *Submission 211*, p. 5.

105 ACTA, *Submission 77*, p. 7.

106 SCRgroup, *Submission 227*, pp. 11–12, 16.

Committee was encouraged by the willingness of stakeholders to work together, and sets out a series of recommendations designed to ensure a more sustainable textile industry that focuses on designing out waste, recycling textiles, and changing community attitudes and behaviours.

7.54 While many of the recommendations set out in this report can be applied to all waste types, the Committee makes three specific recommendations for textiles and household goods.

Recommendation 18

7.55 That the Commonwealth Government examine the flow of textile waste and other household goods in Australia, as well as Australia's current and future capacity to process and recover this waste. The aim of this assessment is to identify challenges and opportunities to better manage this waste stream.

Recommendation 19

7.56 That the Commonwealth Government develop a specific national textile waste policy which is underpinned by the principles of a circular economy. It is recommended this policy focus on, but not be limited to:

- **greater investment in domestic recycling technology and infrastructure;**
- **improved product stewardship and design;**
- **introduction of standards and specifications for recycled content in textiles;**
- **targeted government procurement policies for recycled textiles;**
- **consistency across state and territory policy; and**
- **greater consumer education and awareness regarding textile waste, reuse and repair.**

Recommendation 20

7.57 That the Commonwealth Government, in consultation with state and territory governments, examine options for:

- **improving the placement and availability of charitable and commercial clothing recycling bins in local government areas; and**

- **minimising the costs associated with managing illegally dumped goods or unsuitable donations.**

8. Focus areas

8.1 The Committee received evidence on a broad range of waste types including food and garden waste, medical waste, solar panels and mining waste. It emphasised the breadth of opportunity that exists for resource recovery across various sectors and products, as well as some challenges to better waste management in these areas.

Waterways and oceans

8.2 Global images of the Great Pacific Garbage Patch in the North Pacific Ocean are a stark reminder of the problem of waste in our waterways and oceans.[1] The vast majority of this waste is microplastics, which causes significant problems for our environment, marine life and food supply.[2]

8.3 The CSIRO conservatively estimates that there are 14 million tonnes of microplastics on the seafloor.[3] Furthermore, this figure 'does not account for

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1 National Geographic, *Great Pacific Garbage Patch*, 2019. <www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/>, accessed 10 November 2020.

2 National Geographic, *Great Pacific Garbage Patch*, 2019. <www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/>, accessed 10 November 2020.

3 Barrett J, Chase Z, Zhang J, Holl MMB, Willis K, Williams A, Hardesty BD and Wilcox C (2020) *Microplastic Pollution in Deep-Sea Sediments From the Great Australian Bight*, 5 October 2020, <www.csiro.au/en/News/News-releases/2020/14-million-tonnes-of-microplastics-on-seafloor?utm_source=Snapshot>, accessed 10 November 2020.

the estimated 8 million tonnes of plastic lost from the world's coast annually'.[4]

8.4 The Committee received limited evidence regarding innovative ways to manage waste in our oceans and waterways. The general view raised in submissions was the need to prevent waste – particularly single use plastics and litter - from entering our waterways in the first place. Furthermore, that this can be achieved by reducing our use of plastic, improving rubbish disposal, and ensuring that manufacturers and producers are responsible for the pollution they cause.

8.5 The City of Port Phillip, Victoria summarised these approaches as:

- better management of waste so it does not escape our systems (litter prevention);
- better management of waste which does escape our systems (litter management);
- working with the construction industry, manufacturers and industry partners to prevent waste from the source;
- strengthening environmental laws and penalties for illegal waste disposal and littering; and
- educating communities about the impacts of litter.[5]

8.6 Mr Geoff Pryor identified similar approaches in his submission to the inquiry.[6]

Local initiatives

8.7 The Local Government Association of South Australia (LGASA) cited that 'around 80% of marine plastic pollution comes from land sources'.[7] Several local council initiatives designed to reduce single use plastic, litter and cigarette butts from entering waterways were described in submissions to the inquiry.[8] Some of these included:

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4 Barrett J, Chase Z, Zhang J, Holl MMB, Willis K, Williams A, Hardesty BD and Wilcox C (2020) *Microplastic Pollution in Deep-Sea Sediments From the Great Australian Bight*, 5 October 2020, <www.csiro.au/en/News/News-releases/2020/14-million-tonnes-of-microplastics-on-seafloor?utm_source=Snapshot>, accessed 10 November 2020.

5 City of Port Phillip, *Submission 6*, p. 2.

6 Mr Geoff Pryor, *Submission 221*, p. 11.

7 Local Government Association of South Australia (LGASA), *Submission 120*, p. 5.

8 Australian Local Government Association (ALGA), *Submission 91*, pp. 13–15.

- the Hobart City Council was the first capital city to pass a by-law restricting the use of single-use plastic takeaway food packaging;
- the City of Darwin has restricted the types of disposable items that can be used at events on council land and at Darwin's markets;
- the Mackay Regional Council has introduced free portable water stations for community groups in an effort to reduce the amount of single-use plastic water bottles in the environment;
- the Byron Shire Council has installed 128 new cigarette bins, implemented a smoking ban on all beaches and undertaken enforcement and monitoring to decrease cigarette litter in the community; and
- the Randwick City Council has trialled three solar smart bins in an effort to reduce the overflow of rubbish in the environment. The smart bins compact rubbish as it fills, allowing for greater storage. The bins send alerts to the Council when they are full, enabling the bins to be emptied immediately.[9]

8.8 In its submission, the City of Port Adelaide Enfield noted the 'Council has supported countless community and business initiated litter cleans ups that has removed tonnes of illegally dumped materials' from local waterways. The submission noted new initiatives such as compostable dog waste bags, an adopt-a-spot program, and the installation of 'hook, line and thinking' fishing detritus collection units as examples of local initiatives designed to reduce waste in waterways.[10]

8.9 The Committee had planned to conduct site visits to learn more about specific technology and services designed to prevent rubbish from entering water ways. With the introduction of travel restrictions following COVID-19 this was not possible. Three particular innovations – the Sea Bin, Litter Trap, and Ocean2earth – are described below.

Seabin

8.10 The City of Melbourne has installed five Seabins following a successful trial in 2019. Seabins are essentially floating rubbish bins. The units work like a pool skimmer by floating on the water's surface and collecting litter using an

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9 Randwick City Council, *How smart are our smart bins? This smart,* July 2019. <www.randwick.nsw.gov.au/about-council/news/news-items/2019/july/how-smart-are-our-smart-bins-this-smart>, accessed 10 November 2020.

10 City of Port Adelaide Enfield, *Submission 199*, p. 2.

underwater pump.[11] Each unit collects up to 200kg of litter each day, including rubbish, oil, fuel and detergents. Created by two Australian boat builders and surfers, Pete Ceglinski and Andrew Turton, around 860 Seabins have been sold in more than 30 countries.[12]

Litter trap

8.11 Litter traps are devices installed in storm water drains to capture waste before it enters waterways. Litter traps work on two levels. The first is by preventing waste from polluting and damaging our waterways. The second is by collecting data on the quantity and type of waste products being captured. Data collection is an important step as it ensures that efforts can be made to reduce and prevent the captured products becoming waste.

8.12 For example, data from the Eurobodalla Shire Council, Drain Buddies, which is similar to a litter trap, found that most litter was single-use takeaway plastics, such as straws, coffee cups, take-away containers, cutlery and bags.[13] The Eurobodalla Shire Council now works with food retailers under its *We Care Eurobodalla* program to shift the focus from correctly disposing of single use plastic to finding suitable environmentally sustainable alternatives.[14]

Ocean2earth

8.13 Ocean2earth converts fish waste into organic compost for gardening and landscaping.[15] Founded by brothers Kyran and Tim Crane in 2019 in the Bega Valley, NSW, Ocean2earth prevents organic marine waste – such as offal from any fish, abalone, sea urchins, oysters, mussels, seaweed, and bait – from being disposed in landfill and our waterways and oceans.[16]

8.14 The service collects waste from local seafood processors and specially marked blue marine bins at boat ramps. Currently operating at six boat

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11 ALGA, *Submission 91*, p. 13.

12 Sustainability Matters, *Smart bins of the sea: City of Melbourne uses Seabin Technoloy*, January 2020. <www.sustainabilitymatters.net.au/content/water/article/smart-bins-of-the-sea-city-of-melbourne-uses-seabin-technology-38981032>, accessed 10 November 2020.

13 ALGA, *Submission 91*, p. 14.

14 ALGA, *Submission 91*, p. 14. See <www.esc.nsw.gov.au/living-in/natural-environment/get-help/we-care,-eurobodalla-project>, accessed 10 November 2020.

15 Ocean2Earth, *About*, <ocean2earth.com.au/about/>, accessed 10 November 2020

16 Ocean2Earth, *About*, <ocean2earth.com.au/about/>, accessed 10 November 2020.

ramps in Bermagui Harbour, Bermagui River, Quarantine Bay Eden, Pambula Lake Broadwater, Kianinny Tathra and Mogareeka, the marine bins are initially decontaminated by hand before being processed at the Merimbula Recycling Centre.[17]

8.15 Almost all of the marine waste collected by Ocean2earth is transformed into compost. The end product is odour free, 100 per cent organic and can be used to improve soil and plant health and growth.[18] Ocean2earth aims to expand this innovative 'compost not landfill' concept along the NSW coastline.[19]

Urban run-off

8.16 The Committee heard that it is not just plastics and litter that threaten our waterways and oceans. Various urban, industrial and commercial 'run-off' into water ways as well as the impact of vehicles and machinery on oceans and waterways were identified as risks.

8.17 For example, the Anti-Toxic Waste Alliance (ATWA) identified 'run off from industrial sites and incidents', whether 'accidental or intended' as having the potential to damage or destroy aquatic ecosystems.[20] The ATWA called for regulatory systems, infrastructure and oversight, particularly of industrial sites and the waste industry, to prevent such harm.[21]

Research on marine pollution

8.18 In 2016, the Senate's Committee on Environment tabled a report, *Toxic Tide: the Threat of Marine Plastic Pollution in Australia.* In its report, the Senate noted limited research on the extent of plastic debris in our coast areas and waters, as well as the impact of this plastic pollution.[22]

8.19 Professor Steven D'Alessandro and colleagues from the University of Tasmania highlighted the role of universities, industry bodies and scientists in filling these knowledge gaps and helping to inform the public policy

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17 Ocean2Earth, *About*, <ocean2earth.com.au/about/>, accessed 10 November 2020.

18 Ocean2Earth, *About*, <ocean2earth.com.au/about/>, accessed 10 November 2020.

19 Ocean2Earth, *No Fish Waste*, <ocean2earth.com.au/no-fish-waste/>, accessed 10 November 2020.

20 Anti-Toxic Waste Alliance (ATWA), *Submission 180,* p. 7.

21 ATWA, *Submission 180,* p. 7.

22 Senate Environment and Communications References Committee, *The Threat of Marine Plastic Pollution in Australia,* April 2016, Canberra.

framework for plastic waste and plastic recycling.[23] In particular, the authors noted there is an important opportunity 'to present the choices, constraints and possibilities associated with managing plastic waste and developing a plastics recycling market while minimising plastic waste impacts on human health and our environment (land, waterways and marine).[24]

8.20 Furthermore, Professor Steven D'Alessandro and his colleagues noted that such research would have benefits beyond Australia to include our Pacific neighbours and would contribute directly to the Commonwealth's Pacific Partnership Program.[25]

Food organics and garden organics waste

8.21 The management of food organics and garden organics waste (FOGO) represents a significant challenge for many local councils. Estimates suggest that as much as 50 per cent of household waste is food and garden waste.[26]

8.22 Food and garden organics waste presents a number of problems. It takes up already diminishing space in landfills. Decomposing FOGO waste produces environmentally harmful methane gas. FOGO waste is also a potentially valuable resource that can be recovered and reused – for example, to produce energy, feed people or animals, or compost.[27]

8.23 Across Australia, FOGO waste is managed in different ways. Some local councils offer tailored services and collection points for FOGO waste while others do not. Furthermore, there may be variation in the services offered. For example, some may collect garden waste in a separate bin but not food waste. Food waste may be extracted from general waste bins and processed while in other areas food waste and garden waste will all be sent to landfill.

8.24 The differences across jurisdictions are largely shaped by the capacity of local governments to collect this waste, and their access to suitable

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23 University of Tasmania, *Submission 18*, p. 7.

24 University of Tasmania, *Submission 18*, p. 7.

25 University of Tasmania, *Submission 18*, p. 9.

26 Local Government Professionals Australia, *Submission 88*, p. 2.

27 For more information see DAWE, *Recovering Organic Waste*, <www.environment.gov.au/protection/waste-resource-recovery/food-waste/recovering-organic-waste>, accessed 10 November 2020.

infrastructure to process it. The quality of the FOGO product is important and may determine the availability of an economically viable market.

8.25 Submissions to the inquiry called for a national approach to divert FOGO from landfill. For example, the LGAQ said that it 'supports the development of a national strategy to respond to the treatment of organic waste with consideration given to the development of a range of appropriate waste technologies and sustainable solutions'.[28] It was a view shared by other stakeholders.[29]

8.26 Key strategies identified for improving FOGO collection and diverting this from landfill included:

- Introducing a national ban on domestic and commercial organics to landfill, similar to Europe.[30]
- Initiating organic and food waste collections for households, businesses and public spaces.[31]
- Improving source separation and reducing contamination of these streams from other domestic, commercial and public waste. This is essential to maximise the recovery rate, quality and value of this material as a compost and soil fertilizer.[32]
- Establishing nationally agreed and scientifically based organic and food resource recovery specifications so the output can be certified for application to land and other uses.[33]
- Public education and awareness regarding source separation, home or locally based composting, product information, and sustainable purchasing choices (imperfect fruit and vegetables) etc.[34]

8.27 Locating processing infrastructure closer to the source of waste and end markets was considered important for improving diversion of FOMO waste. The Committee planned a site visit to Goterra in the ACT to learn more

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28 Local Government Association of Queensland, *Submission 128*, p. 14.

29 For example Moreland City Council, *Submission 107*, p. 4,

30 MRA Consulting Group, *Submission 207*, p. 2.

31 National Waste and Recycling Industry Council (NWRIC), *Submission 197,* p. 3, BYO Containers, *Submission 167,* p. 1, Mr David Paynter, *Submission 65,* p. 2 and DELWP, *Submission 224,* p. 9.

32 NWRIC, *Submission 197,* p. 3, and Zero Waste International Trust, *Submission 93,* pp. 1–2.

33 NWRIC, *Submission 197*, p. 3.

34 LGASA, *Submission120,* pp. 17–18. Also see submissions referred to in Chapter 9.

about local food waste management but this site visit did not proceed due to COVID-19 travel restrictions.

8.28 Goterra has developed an innovative organic food waste management system that uses robots and maggots to process waste, and produce high protein stock feed (insect meal) and nutritious soil conditioner (frass).[35] The result is a food waste management solution that boasts low emissions and a higher return on investment. In addition, Goterra's technology is modular, allowing for a local food waste management solution to be close to where waste is created.[36]

Box 8.1 Lake Macquarie City Council's Management of FOMO Waste[37]

In July 2018 New South Wales's Lake Macquarie City Council adopted new arrangements for managing FOGO waste: it now provides its 80,000 households with a three bin kerbside collection service for FOGO waste, dry recyclables and residual garbage. FOGO waste is collected weekly whereas residual garbage is collected fortnightly. In addition to a landfill the Council and its contractor Remondis now operate the Lake Macquarie Organics Resource Recovery Facility, a $10 million piece of infrastructure.

In the year following that commencement of the new arrangements the Council recovered 37,128 tonnes of FOGO waste and landfilled 26 per cent less waste (by weight) than in the previous year. This equated to a reduction of 111 kilograms of waste to landfill for each resident of Lake Macquarie for the year.

Medical waste

8.29 The Committee held a roundtable on medical waste that included representatives from the Australian Medical Association (AMA) and Doctors for the Environment Australia (DEA), Queensland Health and the Vinyl Council of Australia (VCA).[38] The Committee heard that Australian

35 Goterra, *Waste management infrastructure for the world*, <goterra.com.au/>, accessed 10 November 2020.

36 Goterra, *New waste management ecosystems*, <goterra.com.au/>, accessed 10 November 2020.

37 Lake Macquarie City Council, *Submission 218*, pp. 1–2.

38 Standing Committee on Industry, Innovation, Science and Resources, *Committee Hansard*, Canberra, 2 September 2020.

healthcare produces around 130,000 tonnes of waste per year.[39] As an example, in the case of Victoria's Western Health, 15 per cent of waste is clinical, 22 per cent is recycled, and the remaining 63 per cent is general waste that is sent to landfill.[40]

8.30 A number of challenges posed by the management of medical waste in hospitals were raised during the roundtable. These included:

- There is no systematic approach to waste management issues;[41]
- It is difficult for staff to know whether medical products are recyclable and hospitals do not have recycling infrastructure such as bins set up;[42]
- There is no clear, generally agreed definition of clinical waste and healthcare professionals are not well trained in identifying it;[43] and
- There is a heavy reliance on single-use plastic items and there is minimal capacity to recycle such items (apart from those made of polyvinyl chloride (PVC)).[44]

8.31 Of these issues, there was agreement that the first is most important. As explained by Dr Forbes McGain from the AMA and DEA:

> It's all very well and good to have people . . . doing things, but if it's not systematic then the barriers will always be blocking us — organisational culture, issues about infection control, lack of education, incorrect incentives for healthcare facilities, and waste on the part of the organisers and the suppliers.[45]

8.32 Despite these challenges, witnesses were optimistic about the potential for improvement. For example, it was suggested that many health professionals

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39 Dr Forbes McGain, Australian Medical Association and Doctors for the Environment Australia (AMA & DEA), *Committee Hansard*, Canberra, 2 September 2020, p. 5.

40 Dr Forbes McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 5. The *National Waste Report 2018* (Blue Environment Pty Ltd, prepared for the Department of the Environment and Energy, <www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf> accessed 21 October 2020) does not include any statistics for medical and clinical waste.

41 Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 2.

42 Mrs Renae McBrien, Children's Health Queensland Hospital and Health Service (CHQHHS), *Committee Hansard*, Canberra, 2 September 2020, p. 4.

43 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

44 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

45 Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 2.

are enthusiastic about better waste management and it 'should be easy' to increase the use of recycled content in medical packaging.[46]

8.33 In the course of advocating for a similar entity to be established in Australia, Dr McGain pointed out that in the United Kingdom the National Health Service's (NHS's) Sustainable Development Unit has achieved significant cost savings through its waste management initiatives and related efforts.[47] These savings amounted to over £90 million between 2013–14 and the beginning of 2018.[48]

8.34 One medical waste initiative that has already achieved success is the VCA's PVC Recycling in Hospitals program.[49] Established in 2013, it collects and recycles PVC IV fluid bags, oxygen masks and tubing.

8.35 PVC comprises about a quarter of the plastics used in healthcare.[50] In 2019, the program recycled 230 tonnes of PVC and captured up to 40 per cent of IV bags in some health authorities.[51] It now operates in over 250 healthcare facilities across Australia and New Zealand and has inspired similar programs in other countries.[52] The program is run with the support of Baxter Healthcare, the local manufacturer of PVC IV bags and a VCA member, and without that support would not be commercially viable due to the cost of logistics.[53]

8.36 There was some disagreement regarding what the Commonwealth Government should do to make such schemes viable without corporate

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46 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 1; Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, pp. 2, 7.

47 Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 3. The Sustainable Development Unit (SDU) is jointly funded by NHS England and Public Health England, and has no involvement in the health systems of Scotland, Wales or Northern Ireland: SDU, *Who We Are* <www.sduhealth.org.uk/about-us/who-we-are.aspx> accessed 16 September 2020.

48 SDU, *Sustainable Development in the Health and Care System: Health Check 2018*, February 2018, p. 4, <www.sduhealth.org.uk/documents/publications/2018/SDUhealthcheck2018_WEB_SEP2018UPDATE.pdf>accessed 15 September 2020.

49 See PVC Recycling in Hospitals, <www.recyclinginhospitals.com.au>accessed 10 November 2020.

50 Ms Sophi MacMillan, Vinyl Council of Australia (VCA), *Committee Hansard*, Canberra, 2 September 2020, p. 1.

51 Ms MacMillan, VCA, *Committee Hansard*, Canberra, 2 September 2020, pp. 2, 5.

52 Ms MacMillan, VCA, *Committee Hansard*, Canberra, 2 September 2020, p. 2.

53 Ms MacMillan, VCA, *Committee Hansard*, Canberra, 2 September 2020, pp. 2, 4.

philanthropy. While Ms Sophi MacMillan, Chief Executive Officer of the VCA, called for more 'consistent' procurement policies that reward organisations that adopt product stewardship, Dr Forbes McGain supported more direct government regulatory involvement (closer to co-regulatory or mandatory product stewardship, see Chapter 4).[54]

8.37 It was agreed by all witnesses that the COVID-19 pandemic has substantially worsened the medical waste problem. As explained by Mrs Renae McBrien from Queensland Health:

> COVID has made our waste streams very much more complex. There are huge volumes of waste coming through now, and it is a huge issue; it is exponential.[55]

8.38 The Committee heard there had been a 30 to 60 per cent fall in the volume of material collected through the PVC Recycling in Hospitals program in the six months to September, and in the case of Western Health '…there's been at least a doubling of infectious waste. Recycling has been smashed.'[56]

8.39 Three major problems arising from the pandemic were highlighted:

- an increase in the volumes of infectious waste;[57]
- an increase in the difficulty of classifying waste as clinical or general due to the introduction of complex infection control measures, without the necessary staff training or management capacity within hospitals;[58] and
- a decrease in elective operations, which are where much of the waste (such as PVC) that is currently recycled is generated.[59]

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54 Ms MacMillan, VCA, *Committee Hansard*, Canberra, 2 September 2020, pp. 7–8.

55 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

56 Ms MacMillan, VCA, *Committee Hansard*, Canberra, 2 September 2020, p. 5; Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 5. Western Health is responsible for much of Melbourne's Western Suburbs. It has been heavily affected by the pandemic: Western Health, *About Us* <www.westernhealth.org.au/AboutUs/Pages/default.aspx> accessed 10 September 2020; Department of Health and Human Services (Victoria), *Victorian Coronavirus (COVID-19) Data* <www.dhhs.vic.gov.au/victorian-coronavirus-covid-19-data> accessed 10 September 2020.

57 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4; Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 5

58 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

59 Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 5; Ms MacMillan, VCA, *Committee Hansard*, Canberra, 2 September 2020, p. 5.

8.40 In addition to improved product stewardship, suggestions made to improve the management of medical waste included:

- establish a local equivalent of the NHS's England Sustainable Development Unit;[60]
- improve recycling labelling on medical products and their packaging;[61]
- develop a 'systemic approach' to clinical waste, including an 'education profile' for all health professionals;[62]
- provide 'external support systematically' to hospitals to assist them in managing their waste problems associated with the COVID-19 pandemic;[63] and
- develop policies to replace single use plastics with biodegradable items, including improved procurement practices.[64]

8.41 The witnesses who appeared at the Committee's roundtable were largely unable to comment on the state of waste management and recycling in the healthcare system outside of hospitals, although Dr McGain suggested that in the case of general practitioners '…this is purely anecdotal…but there is wide variation, rather like there is within hospital practice'.[65]

8.42 The Commonwealth Department of Health explained that Primary Healthcare Networks (PHNs) are independent organisations established by the Commonwealth 'to reorient and reform the primary health care system' and commented:

> The provision of advice on the management of medical waste and oversight of medical waste within general practice is not within the remit of PHNs. The Department does not collect information, nor require PHNs to report on their own, or general practice, recycling of waste.[66]

8.43 Evidence regarding the ownership, management and disposal of human tissue and anatomical waste was provided by Children's Health Queensland on notice.[67] Children's Health Queensland stated that while the common law

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60 Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 3.

61 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

62 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

63 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 5.

64 Mrs McBrien, CHQHHS, *Committee Hansard*, Canberra, 2 September 2020, p. 5–6.

65 Dr McGain, AMA & DEA, *Committee Hansard*, Canberra, 2 September 2020, p. 5.

66 Department of Health, *Submission 233* Answer to Question on Notice, p. 2.

67 Children's Health Queensland, *Submission 232*.

does not recognise that there are property rights in the human body, there are 'several laws and regulations which govern who is, practically speaking, responsible for the proper handling and disposal of deceased human bodies and removed human body parts and tissues in Queensland'.[68]

Box 8.2 Aquapak and DB Packaging

Aquapak is a British company that has developed a biodegradable, hot water soluble polyvinyl alcohol (PVOH) product known as Hydropol, which it manufactures in pellet form.[69] These pellets are distributed in Australia and New Zealand by DB Packaging. [70]

The pellets can be used to manufacture a range of products including packaging film, various kinds of bags, and protective garments such as gloves and aprons.[71] Hydropol can be biodegraded in anaerobic digestion systems (commonly used in waste water treatment processes) and while it is presently unclear how long it takes to break down in the ocean it does not attract toxins or form micro plastics, so it is not as environmentally harmful as other plastics.[72] When Hydropol biodegrades it forms carbon dioxide, water and 'mineralised natural biomass'.[73]

One use of Hydropol is in hot water soluble medical laundry bags which DB Packaging supplies to NSW Health for use in its hospitals.[74] Bags of dirty and contaminated linen are placed into washing machines, and the bags themselves dissolve during the washing process.[75] This reduces

68 Children's Health Queensland, *Submission 232*, p. 1.

69 Aquapak Polymers, *The Unique Properties of Hydropol*, <www.aquapakpolymers.com/unique-properties-of-hydropol/> accessed 28 October 2020.

70 Aquapak Polymers, *DB Packaging Appointed Aquapak Distributor for Australia and New Zealand*, <www.aquapakpolymers.com/2019/10/31/db-packaging-appointed-aquapak-distributor-for-australia-new-zealand/> accessed 28 October 2020.

71 Aquapak Polymers, *Our Products*, <www.aquapakpolymers.com/products/> accessed 28 October 2020.

72 Aquapak Polymers, *Hydropol™ — Better for the Environment*, <www.aquapakpolymers.com/biodegredation/> accessed 28 October 2020.

73 Aquapak Polymers, *Hydropol™ — Better for the Environment*, <www.aquapakpolymers.com/biodegredation/> accessed 28 October 2020.

74 Aquapak Polymers, *Case Study DB Packaging HWS Laundry Bags*, 26 November 2019, <www.youtube.com/watch?v=ACHxN5Jy-Qs&feature=youtu.be> accessed 28 October 2020.

75 Aquapak Polymers, *Case Study DB Packaging HWS Laundry Bags*, 26 November 2019, <www.youtube.com/watch?v=ACHxN5Jy-Qs&feature=youtu.be> accessed 28 October 2020.

waste by allowing the linen to be re-used whereas previously it had to be incinerated, and improves staff safety by reducing handling of contaminated material.[76]

Solar panels

8.44 The Committee held a public hearing to discuss the management of solar panels once they have been removed, replaced or decommissioned.[77] Solar panels are set to become one of Australia's largest electronic waste streams in coming years, with around a quarter of Australian households having installed solar panels.[78]

8.45 Dr Chris Fell, Chair of the Australian PV Institute, described the growth of solar panels in Australian in recent years as 'sustained and significant'.[79] Specifically, he told the Committee:

> In 2019 we installed around four gigawatts around Australia. That is around 13½ million panels. The total number of panels that we've installed has grown by a factor of 10 in the past eight years and has more than doubled in the past two years.[80]

8.46 The Committee heard that while the warranty on solar panels is usually 25 years, people may replace panels before then. For example, Mr Clive Fleming, Director, Reclaim PV Recycling, a company that specialises in solar panel recycling, estimated the life span to be '10 or 15 years'.[81] He told the Committee:

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76 Aquapak Polymers, *Case Study DB Packaging HWS Laundry Bags*, 26 November 2019, <www.youtube.com/watch?v=ACHxN5Jy-Qs&feature=youtu.be> accessed 28 October 2020.

77 Standing Committee on Industry, Innovation, Science and Resources, *Committee Hansard*, Canberra, 7 October 2020.

78 The Hon Angus Taylor MP, Minister for Energy and Emissions Reduction, the Hon Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, Supporting R&D to Improve End-of-Life Issues for Solar Panels, *Media Release*, 2 October 2020, <minister.awe.gov.au/evans/media-releases/support-rnd-for-eol-issues-solar> accessed 3 December 2012.

79 Dr Christopher Fell, Chair, Australian PV Institute (APVI), *Committee Hansard*, Canberra, 2 September 2020, p. 1.

80 Dr Christopher Fell, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 1.

81 Mr Clive Fleming, Director, Reclaim PV Recycling Pty Ltd (Reclaim), *Committee Hansard*, Canberra, 2 September 2020, p. 2.

> ..there's a small percentage — let's say, two or three per cent — of panels that come off within the first five years. It's a global trend, which we learnt early on. There's another component of that, which looks at the upgrades. Going from a system that was installed, let's say, 12 years ago — and it was a very small system — to a system now, you can have batteries installed on it. There's going to present a percentage of people that choose that path. Without going to that 20-year mark and knowing how many of these systems have been taken off or replaced, it's hard to get that information. But there are ways to quantify some of that data. We've done our own estimates and projections on what it looks like for our own detailed knowledge of the streams that are going to present. It's looking like — I would say, based on my knowledge — maybe 10 or 15 years. It's around that sort of mark.[82]

8.47 Other estimates put to the Committee however included 21 years on average, and between 20 to 25 years.[83]

8.48 It was estimated that 52 million solar panels are currently in circulation in Australia.[84] The Clean Energy Council (CEC) predicts that by 2050, waste from retired solar panels will be over 1,500 kilo-tonnes.[85]

End of life

8.49 Australia does not have a sustainable process for managing end-of-life solar panels.[86] Currently, solar panels that have reached an end may end up in landfill, be stockpiled or recycled. Dr Jose Bilbao, a member of the Australian PV Institute, told the Committee:

> At the moment, we don't have a product stewardship system. So companies like Reclaim are collecting some of the weight. We know that some councils are stockpiling them, while they're going straight into landfill in other places. Victoria, last December created their own regulation that PV modules are not

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82 Mr Clive Fleming, Reclaim, *Committee Hansard*, Canberra, 2 September 2020, p. 2.

83 Dr Christopher Fell, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 1 and Clean Energy Council (CEC), *Submission 236,* p. 1.

84 Standing Committee on Industry, Innovation, Science and Resources, *Committee Hansard*, Canberra, 7 October 2020, p. 1.

85 CEC, *Submission 236,* p. 1.

86 The Hon. Angus Taylor MP, Minister for Energy and Emissions Reduction and the Hon. Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, *Joint media release: Supporting R&D to improve end-of-life issues for solar panels*, 2 October 2020. <minister.awe.gov.au/evans/media-releases/support-rnd-for-eol-issues-solar>, accessed 10 November 2020.

> to go to landfill from December onwards, but in all the other states and territories this is still allowed.[87]

8.50 As with other waste products, solar panels are considered to be valuable resources. Specifically, the components of solar panels, once separated, can be used to make other products. As explained by Dr Bilbao:

> I believe that with PV modules reaching end of life we have an opportunity to recycle them and recover important and valuable materials that can go back into different manufacturing flows. I see end-of-life management not only as a way to avoid social and environmental impacts but also as a way to recover the economic value of our past modules.[88]

8.51 The CEC stated that for a typical crystalline silicon PV module, 'currently only the aluminium plates surrounding the solar panels and glass are recyclable within Australia'.[89]

8.52 Mr Fleming from Reclaim PV explained the process they use to recycle solar panels. He told the Committee:

> We don't recycle the lead. There is a very small amount of lead. In our process, which actually takes away the polyvinyl fluoride back sheet, as well as the EVA, ethylene vinyl acetate, middle — let's call it cell barriers — those two components as well as any soldering gets taken out through our pyrolysis process. Everything else that comes from that panel that remains is actually recycled, yes.[90]

8.53 Mr Fleming told the Committee that his business is starting to recycle 'about 40,000 to 50,000' solar panels per year now.[91] He estimates that in 12 months, this figure could 'double, maybe even triple'.[92]

8.54 The CEC identified two key barriers to recycling solar panels:

1 The difficulty in dissolving the glue which holds the components together within the solar PV panels. If the glue holding the components of the solar PV panels can be dissolved efficiently, then most of the

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87 Dr Jose Bilbao, Member, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 2.

88 Dr Jose Bilbao, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 1.

89 CEC, *Submission 236*, p. 2.

90 Mr Clive Fleming, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 3.

91 Mr Clive Fleming, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 5.

92 Mr Clive Fleming, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 5.

components within solar PV panels, such as different types of metals, glass and silicon can be recycled within Australia today.

2 The removal of rooftop solar PV panels prematurely instead of the intended 20–25 years. The issue here is that if some part of the solar PV panel system gets damaged it requires the whole system to be replaced.[93]

8.55 Potential solutions identified for increasing the recycling of solar panels and reducing the likelihood of this waste ending up in landfill include establishing:

- a secondary market of solar panels to extend the life of the existing stock. Under this scheme, older modules would be tested and resold; and
- a new product stewardship scheme for solar PV panels.[94]

Product stewardship

8.56 In Australia, there is no product stewardship scheme for solar panels. This differs to overseas experience. For example, Dr Bilbao said

> In Europe PV modules are part of their WEEE [Waste Electrical and Electronic Equipment] product stewardship regulations. They have to recycle and process all the modules that reach end-of-life in the EU. Japan and Korea have similar recycling schemes and product stewardship schemes.[95]

8.57 The Committee heard that Europe is producing 'eco-labelling' which will result in PV modules that are 'either easier to recycle or are manufactured with recycled materials'.[96] Mr Bilbao suggested that 'it would be wise to implement similar eco-labelling processes for panels coming to Australia.[97]

8.58 The CEC suggested that a product stewardship scheme in Australia 'should start by having multiple collection points for old solar panels around Australia which stop old PV panels from reaching landfill.[98] It suggested

93 CEC, *Submission 236*, p. 2.

94 CEC, *Submission 236*, p. 2.

95 Dr Jose Bilbao, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 3.

96 Dr Jose Bilbao, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

97 Dr Jose Bilbao, APVI, *Committee Hansard*, Canberra, 2 September 2020, p. 4.

98 CEC, *Submission 236*, p. 2.

that e-waste be banned from landfill in each jurisdiction, as is the case in Victoria.[99]

8.59 In its submission, the CEC described its involvement in three proposed PV recycling projects which are expected to commence over the next few years, subject to funding.[100] These projects relate to the circular economy, product stewardship and data collection. In addition, the CEC outlined some current solar PV recycling initiatives which include a $10 million commitment by the NSW Government to boost solar panel recycling, and research undertaken by Deakin University to extract silicon from discarded solar panels and repurpose it into nano-silicon for batteries.[101]

8.60 In October 2020, the Commonwealth Government awarded $15.14 million in funding to help address solar panel efficiency, overall cost reductions and end of life issues.[102] The funding will support 16 research projects across six universities, and is expected to create more than 50 jobs over two years.[103]

8.61 The Committee notes that photovoltaic systems remain listed on the *2020-21 Product List* as per section 108A of the *Product Stewardship Act 2011*. This means that the Minster for Environment will consider, 'during 2020-21, whether some form of accreditation or regulation under the Act might be appropriate'.[104] Photovoltaic systems were first listed in 2016–17.[105] The Victorian Government is leading the work on a product stewardship scheme

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99 CEC, *Submission 236,* p. 2.

100 CEC, *Submission 236,* pp. 2–3.

101 Deakin University, *Deakin researchers find key solution to recycling solar panels,* 14 October 2019. <www.deakin.edu.au/about-deakin/media-releases/articles/deakin-researchers-find-key-solution-to-recycling-solar-panels>, accessed 10 November 2020.

102 Australian Renewable Energy Agency, *Research boost for solar panel efficiency and cost reduction*, 2 October 2020. <arena.gov.au/news/research-boost-for-solar-panel-efficiency-and-cost-reduction/>, accessed 10 November 2020.

103 The Hon. Angus Taylor MP, Minister for Energy and Emissions Reduction and the Hon. Trevor Evans MP, Assistant Minister for Waste Reduction and Environmental Management, *Joint media release: Supporting R&D to improve end-of-life issues for solar panels*, 2 October 2020. <minister.awe.gov.au/evans/media-releases/support-rnd-for-eol-issues-solar>, accessed 10 November 2020.

104 Department of Agriculture, Water and the Environment (DAWE), *2020–21 Product List*, <www.environment.gov.au/protection/waste-resource-recovery/product-stewardship/legislation/product-list-2020-21>, accessed 10 November 2020.

105 DAWE, *2020–21 Product List*, <www.environment.gov.au/protection/waste-resource-recovery/product-stewardship/legislation/product-list-2020-21>, accessed 10 November 2020.

in consultation with the Commonwealth Government, state and territory governments, industry, and other stakeholders.[106]

Wind turbines

8.62 The CEC provided a written submission on the decommissioning of wind turbines. It noted that:

- There are currently 101 wind farms built across Australia. Approximately 15 per cent of these farms are over 15 years old, with only two farms being 20 years or older.
- The standard lifetime of a wind turbine is approximately 20–25 years, although this may be extended to 30 years with a refurbishment;
- At the end of their life, wind farms are either fully decommissioned or 'repowered', with both processes requiring the retirement of the turbines.[107]

8.63 In its submission, the CEC described the components of a wind turbine and the recycling capabilities of each. It acknowledged that 'the biggest challenge in recycling wind turbines is the blades'.[108] This is due to the composite materials contained in current generation blades. Specifically the CEC stated:

> ... it is possible to recycle the composite material through cement-co-processing. There are a small number of participants in the chemical and recycling industry that are investigating the commercial feasibility of recycling blades. However, any such market requires a large volume of material, unable to be provided by the wind industry alone, and incentives to become viable.[109]

8.64 The CEC further explained that problems associated with recycling composite material is a global and cross industry issue.[110] It highlighted some advances made in Europe with recycling composite waste and the development of blades with increased longevity and recyclability. The CEC called on the Commonwealth Government to facilitate a business-case investigation into the size of the potential recycled composite waste

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106 DAWE, *2020–21 Product List*, <www.environment.gov.au/protection/waste-resource-recovery/product-stewardship/legislation/product-list-2020-21>, accessed 10 November 2020.

107 CEC, *Submission 236*, pp. 3–4.

108 CEC, *Submission 236*, p. 5.

109 CEC, *Submission 236*, p. 5.

110 CEC, *Submission 236*, p. 4.

market.[111] It recommends introducing incentives for industry players to participate in composite recycling, and funding research into new and alternative methods of composite recycling.[112]

Mining

8.65 The Committee explored innovative waste management and recycling initiatives on mining sites, and in particular, measures to manage and remove harmful or toxic waste.

8.66 The Committee examined two mining sites as case studies – the Mount Morgan Mine in Queensland and the Woodsreef Mine in New South Wales.

Mount Morgan Mine

8.67 Mount Morgan Mine is located near the town of Mount Morgan, 32 kilometres southwest of Rockhampton, and was active from 1882 until 1990.[113] During that period the mine produced 250 tonnes of gold and 360,000 tonnes of copper.[114]

8.68 The Committee received evidence about the mine from Mr Neal Johansen, Chairman, Wowan Dululu Landcare Group. Mr Johansen told the Committee that there is 10,000 to 11,000 megalitres of highly acidic water in the open-cut pit, separated from the Dee River by only an earth wall made of tailings.[115] In his view, the current situation at the mine is worse than it was in 1996 when the Wowan Dululu Landcare Group was formed, because there is more water in the pit, although the drought has caused the water level to drop in recent years.[116]

8.69 The Committee heard that there were multiple uncontrolled releases of water from the pit over a 10 year period, despite assurances to the

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111 CEC, *Submission 236*, p. 5.

112 CEC, *Submission 236*, p. 5.

113 Queensland Government, *Mount Morgan Mine* <www.qld.gov.au/environment/land/management/abandoned-mines/projects/mt-morgan>, accessed 15 October 2020.

114 Queensland Government, *Mount Morgan Mine* <www.qld.gov.au/environment/land/management/abandoned-mines/projects/mt-morgan> accessed 15 October 2020.

115 Mr Neal Johansen, Chairman, Wowan Dululu Landcare Group, *Committee Hansard*, Canberra, 7 October 2020, p. 7.

116 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, pp. 6–7.

community that these would be a 'one-in-100 year event'.[117] Mr Johansen expressed particular concern that the pollution from the mine might make it more difficult for local farmers to comply with regulations regarding food safety and runoff from their land onto the Great Barrier Reef.[118]

8.70 The measures taken by the Queensland Government to manage the mine's waste problem include sending email alerts when there is an 'acid flow' in the river, operating pumps to pump untreated water leaking from the pit back into it, and operation of a water treatment plant treating the water in the pit, although in Mr Johansen's view '…it's probably more of a maintenance in that it tries to keep the level below overflow.'[119]

8.71 Mr Johansen described some significant effects the runoff from the mine has on the Dee River:

- there are high levels of aluminium, zinc and magnesium in the river and the water is highly acidic;[120]
- for around 10 kilometres downstream, the water is unsuitable for feeding stock;[121] and
- for around 40 kilometres downstream, the water is unsuitable for swimming and recreational use.[122]

8.72 In Mr Johansen's view, it would cost the Queensland Government over $700 million to fully clean up the Mount Morgan mine.[123] Mr Johansen suggested that the best hope for the rehabilitation of the mine is for a mining company to reprocess the mine's tailings, telling the Committee:

> We had the best opportunity a couple of years ago with Carbine Resources. Incredibly, the gold prices have lifted to almost double of what they required to make it a feasible project. That was literally our biggest opportunity to have that mine site cleaned up. They were going to treat the tailings — put them back into the open cut pit and put clay toppings on them. That was the absolute ultimate, but we just could not get it off the ground.[124]

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117 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 6.

118 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 6.

119 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 7.

120 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 6.

121 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 7.

122 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 7.

123 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 6.

124 Mr Johansen, *Committee Hansard*, Canberra, 7 October 2020, p. 9.

Woodsreef Mine

8.73 Representatives of the Legacy Mines Program of the Department of Regional New South Wales provided an overview of the history of the Woodsreef Mine, which is the 'largest asbestos mine in New South Wales'.[125]

8.74 Woodsreef Mine, located approximately 15 kilometres east of Barraba, comprises an area of 290 hectares. The ore onsite is classified as chrysotile asbestos, which is also known as white asbestos. Open-cut mining first occurred at Woodsreef Mine between 1918 and 1923. Between 1973 and 1983, large-scale mining was undertaken, producing 550,000 tonnes of refined asbestos from approximately 100 million tonnes of mined ore.[126]

8.75 Since the 1990s, the Legacy Mines Program has funded remediation work aimed at stabilising the tailings, reducing erosion and preventing sediment from leaving the Woodsreef Mine site.[127] Representatives of the Legacy Mine Program told the Committee that its program was established to help land managers with the remediation and rehabilitation of historic and abandoned mines, focusing primarily on public safety and improving the environment. Specifically, Mr Nick Staheyeff, Manager, Legacy Mines, said:

> A proportion of our sites have significant waste on them. Our program and our work with the landowners is to contain that contamination or waste to the site so it doesn't cause off-site impacts. That's pretty much the driver for our program.[128]

8.76 The Committee heard that the current risk profile of the Woodsreef Mine remains onsite. In other words, there is little risk that any harmful effects of the asbestos will be experienced away from the site. As stated by Mr Staheyeff:

> The studies that have been done on the site — in the 1990s by Dames and Moore and more recently by SLR Consulting — have shown that the asbestos is mostly contained to the site. All of the air quality monitoring has shown that there hasn't been any offsite detection of asbestos. The theory that Dames and

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125 Mrs Kate-Louise Maddison, Project Manager, Legacy Mines, Department of Regional NSW, *Committee Hansard*, Canberra, 26 August 2020, p. 5.

126 Mrs Kate-Louise Maddison, Department of Regional NSW, *Committee Hansard*, Canberra, 26 August 2020, p. 1.

127 Mrs Kate-Louise Maddison, Department of Regional NSW, *Committee Hansard*, Canberra, 26 August 2020, p. 1.

128 Mr Nick Staheyeff, Manager, Legacy Mines, Department of Regional NSW, *Committee Hansard*, Canberra, 26 August 2020, p. 3.

> Moore started with was that the asbestos crusts over and heals itself onsite. This has been recently looked at by Macquarie University, who have confirmed that.[129]

8.77 Furthermore, Mr Staheyeff explained that while anyone who enters the site and disturbs the material can potentially be exposed to asbestos, generally the potential for those fibres to become liberated offsite is low.[130] In short, the further a person is from the site, the less exposure is likely.

Backfilling and resource recovery

8.78 The potential for resource recovery from mining sites was raised in a small number of submissions. For example, the Western Australian Government identified two emerging opportunities for managing waste from its mining sites — backfilling existing sites and re-mining old sites.

- Backfilling existing sites: given tailings from new mining projects in Western Australia are taking up valuable space in landfills, consideration is being given to other disposal options for mine site waste which can be demonstrated to be low risk to human health and the environment.
- Re-mining or export: older mine sites are likely to have been mined using methods that resulted in lower yields than today's technology. Revisiting mine tailings can potentially increase the working life of existing mines and provide opportunities for abandoned mine sites.[131]

8.79 The Western Australian Government noted that 'accessing tailings deposits for mining purposes may provide a cost effective opportunity for further resource recovery, particularly when factoring in the full cost of mining including mine site rehabilitation'.[132]

8.80 The CSIRO examined opportunities to recover resources from mine waste including tailings, slags, converter sludges and pyritic ashes.[133]

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129 Mr Nick Staheyeff, Department of Regional NSW, *Committee Hansard*, Canberra, 26 August 2020, p. 2.

130 Mr Nick Staheyeff, Department of Regional NSW, *Committee Hansard*, Canberra, 26 August 2020, p. 2.

131 Western Australian Government, *Submission 210,* p. 10.

132 Western Australian Government, *Submission 210,* p. 10.

133 CSIRO, *Submission 215*, p. 9.

8.81 Cr Craig Davies, Mayor, Narromine Shire Council described the potential to backfill existing mine pits with industrial waste. He said:

> We have significant mine pits immediately south of the township of Narromine, and we have spoken to the owners of those pits, who are more than happy to engage in negotiations with operators to look at the potential for industrial waste to be put into those pits. So we are not just looking at waste to energy; we are looking at the potential for those pits to be utilised in a waste system.

Waste from energy production

8.82 The Australian Energy Council (AEC) drew the Committee's attention to opportunities that waste from energy production can provide. In particular, the AEC highlighted the value of coal ash in making bricks, lightweight aggregate and concrete. Specifically the AEC stated:

> The ability of coal ash to serve as a partial substitute for cement deserves particular attention, as it is not only more technically sound but also better for the environment (cement manufacturing is one of the largest greenhouse gas contributors).[134]

8.83 The AEC noted that despite the benefits of coal ash, Australia's re-use rate is one of the lowest in the world at 44 per cent compared to other countries such as Japan (97 per cent), the United Kingdom (70 per cent) and China (69 percent).

8.84 The AEC cited regulatory confusion across jurisdictions as an impediment to the efficient management of coal ash, and called on the Commonwealth Government to 'provide leadership in this area through the standardisation and harmonisation of regulation across the state'.[135] The need to raise public awareness about the benefits of reusing waste products was identified. In the case of coal ash, the AEC argued:

> negative media coverage has created perception issues that make government and businesses unnecessarily cautious when regulating or investing in such products. For products with clear re-use capabilities, these perceptions are not appropriate and unnecessarily hinder greater uptake.[136]

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134 Australian Energy Council (AEC), *Submission 153,* p. 1.

135 AEC, *Submission 153,* p. 1.

136 AEC, *Submission 153,* p. 2.

8.85 To address these negative perceptions of coal ash and move the sector towards a circular economy, the AEC called on governments to facilitate consultations between regulatory bodies, electricity generators and key stakeholders to help identify solutions to maximise the reuse value of coal ash.[137]

Committee comment

8.86 Waste management and resource recovery applies to every sector of the Australian economy. The examination of waste streams discussed above highlights the potential of waste across various sectors, and some of the challenges inherent in doing more with waste.

8.87 Single use plastics are a significant contributor to waste in our oceans, having a devastating effect on marine life and the environment. The Committee was encouraged by the many programs and initiatives introduced by local and state governments to prevent plastic waste entering our water ways. It notes the body of research being undertaken domestically and internationally. The Committee has not specifically addressed plastics in this report following the recent *National Plastics Summit* and the significant work underway by government and industry to reduce single use plastic, improve plastic recycling and domestic processing, and encourage demand for recycled products. The Committee supports this work.

8.88 The Committee sees significant potential for greater resource recovery in the medical sector which would benefit from the wider roll out of existing initiatives, national coordination of efforts, sustainable procurement policies, and improved education and training of staff. The Committee was impressed by the national PVC Recycling in Hospitals program, and the willingness of medical practitioners to support significant waste management reform in this sector. The Committee recommends further examination of these issues.

8.89 The Commonwealth Government has set a goal to halve food waste by 2030. Significant work is underway to support this goal, all of which is set out in the National Food Waste Strategy, Roadmap and the National Waste Policy Action Plan. The Commonwealth Government is funding the Fight Food Waste Co-operative Research Centre, and recently advertised a 'partnership call' to establish a National Food Waste Governance Entity to deliver the

137 AEC, *Submission 153,* p. 2.

National Food Waste Strategy.[138] This involves a commitment of $4 million over four years to establish the entity. The Committee supports these initiatives. It recommends the Commonwealth Government in consultation with the states and territories consider other options for processing food and garden waste including as compost and fertilizer.

8.90 The Committee received little evidence regarding the management of hazardous waste on mining sites. It considers this an important area requiring further examination. It is essential that hazardous waste is limited and contained to the site where it was created and poses no risk to surrounding communities, water ways or the environment. Opportunities to re-use old mining sites through backfilling or re-mining should be explored.

8.91 As the uptake of solar panels by Australian households increases, PV waste will fast become a significant and growing waste stream. The Committee heard that Australia does not have a systemic sustainable process for managing end-of-life solar panels, although the core components of solar panels – glass, plastic and metal – can be recycled. The Committee fully supports the introduction of a product stewardship scheme to better manage this waste stream and reduce the volume of solar panels disposed in landfill.

8.92 Similarly, as the current generation of wind turbines reach their end of life, consideration should be given to how these pieces of infrastructure can be managed more sustainably. Evidence received by the Committee stated that the biggest issue with the management of wind turbines is the blades, given the composite materials used to make them. It is the Committee's view that the Commonwealth Government in consultation with state and territories explore options to manage decommissioned wind turbines.

Recommendation 21

8.93 The Committee recommends that the Commonwealth Government undertake further research into improving waste management and resource recovery in the medical sector including opportunities to reduce, recycle and reuse waste from hospitals, clinical practices and medical facilities.

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138 DAWE, *Partnership call: National Food Waste Governance Entity.* <www.environment.gov.au/about-us/partnerships/partnership-call-food-waste>, accessed 10 November 2020.

8.94 Consideration should be given to establishing a unit similar to NHS England's Sustainable Development Unit to harmonise Commonwealth and State and Territory regulation.

8.95 The Committee recommends that the Department of Health take the lead on this body of work in consultation with the Department of Agriculture, Water and the Environment.

Recommendation 22

8.96 The Committee recommends that the Commonwealth Government in consultation with the states and territories, ensure that any ethical issues arising from the management, handling and disposal of human and anatomical waste are respectfully addressed.

Recommendation 23

8.97 The Committee recommends that the Commonwealth Government in consultation with the states and territories explore options for resource recovery of food organics and garden organics waste including processing as compost and fertiliser for horticulture and agriculture.

8.98 It is recommended that a business plan be developed to identify opportunities for reprocessed food organics and garden organics waste to be transported and sold in rural and regional markets.

Recommendation 24

8.99 The Committee recommends that the Commonwealth Government in consultation with state and territories explore options to sustainably manage decommissioned wind turbines.

9. Community engagement

9.1 The Committee received 138 submissions from individuals.[1] Nearly all of these submissions were similar in format and content, and advocated for a more sustainable approach to waste management.[2]

9.2 The individual submissions predominantly listed a broad range of suggestions for improving domestic recycling, diverting waste from landfill, and changing the content of products. The submissions overwhelmingly called for a ban on single use plastics and stressed the need for alternatives to materials, products and practices that are harmful to the environment.

9.3 The most consistent suggestions arising from these submissions included:

- Introduce national recycling schemes for containers, clothes and shoes, refillable bottles, and refillable packaging.

- Extend producer responsibility where retailers and manufacturers are accountable for the waste created by their products. Furthermore, allow consumers to return product waste to the place of purchase.

- Design products and parts for repair not obsolescence. Introduce national 'right to repair' laws, and a system of 'stars' to indicate how

1 These submissions have been marked with an asterisk (*) in Appendix A.

2 See Zero Waste Victoria, *The Federal Government is Calling for Public Submissions so Australia Can Rethink Waste*, Kirsty Bishop-Fox, 7 January 2020, <www.zerowastevictoria.org/2020/01/07/federal-government-public-submissions-rethink-waste-recycling>, accessed 31 January 2020.

easily a product can be repaired to enable customers to make an informed choice.

- Fund and support local community initiatives such as repair centres and cafes, Boomerang Bags groups, and sharing or lending platforms. For example, lending libraries for toys, tools, do-it-yourself equipment, clothes, household and kitchen items, and community vegetable gardens.

- Make recycling more accessible to the community. For example, establish local drop off points that can receive and/or process targeted materials on a smaller scale. This could include e-waste, batteries, light bulbs, and ink cartridges. Improve recycling access by connecting people with waste recyclers. For example, phone applications such as ShareWaste that links waste items with people who can use it, or a national online hub to make it fast and easy to connect with recyclers at a community level.

- Ban single-use plastic and products known to be harmful to the environment – for example, plastic cutlery, utensils, plates and bowls, polystyrene containers and packaging, disposable cups, single use straws, glow sticks, plastic glitter and microbead products, beer rings, commercial and industrial plastic wrapping and duct tape. Balloons and balloon releases should be banned to reduce litter in waterways, oceans and on land.

- Ban single-use plastic bags and remove loopholes for retailers to provide sturdier (and destructive) plastic bags. Retailers should not provide plastic bags for free nor should they profit from the sale of thicker plastic bags. Only use bags made from natural or organic materials. Proceeds from the sale of plastic bags should be allocated to an environment fund. This fund should be used to support local clean-up, waste reduction and education initiatives.

- Introduce consistent and clear legislation that allows customers to bring their own containers to all supermarkets, delis, butchers and other food

retailers including takeaway and hospitality services, and provide incentives for business owners who encourage this. Supermarkets should have sections were people can buy in bulk or subsidise bulk food stores to encourage greater use. Make packaged fruit and vegetables more expensive than non-packaged goods, and ban plastic produce bags for fruit and vegetables as well as plastic wrapping for produce.

- Greater focus on packaging. It should only be allowed if there is a facility in Australia to recycle it. Preference sustainable packaging such as cotton, hemp and hessian over plastic packaging.

- Improve labelling through unambiguous and standardised labelling to ensure that all plastic products and packaging are clearly marked regarding how products should be correctly disposed. Labelling should provide information on the percentage of plastic and recycled content and accurate definitions and messaging around terms such as 'compostable' and 'degradable'.

- Introduce a target of 100 per cent recycling and accessible recycling for all Australians. Products should only be labelled as recyclable, if they can be recycled by everyone in Australia.

- Ban 'lock-in' contracts between private companies and local councils that guarantee a supply of waste for feedstock or waste-to-energy facilities. These contracts potentially detract from efforts to divert organics and recyclables from landfill and other initiatives to reduce waste.

- Place greater emphasis on diverting all organic and recyclable materials from landfill. Make composting available across all council areas, including public compost bins for food waste. In addition, allow imperfect fruit and vegetables to be sold in supermarkets, and introduce more systems to donate unwanted food to charities.

- Improve kerbside recycling by standardising waste bins across the country to remove the confusion that arises from different councils having different policies – including bin lid colours, what goes in each bin and what can be recycled. There is a need to introduce more bins for different types of waste (hard/soft plastic, glass, paper, and food and organic waste) and provide better standardised guidance on which bin is used for each waste stream, for example by using consistent stickers and signage.

- Greater public education and awareness regarding waste management and recycling including what happens to waste, how to live in a circular economy, and how to prioritise repair, reuse and recovery over recycling. School-based education is an important part of this process.

9.4 Other suggestions made in the individual submissions included focusing on materials to transition to a circular economy, subsidising cloth nappies, wipes and reusable sanitary items, financing state-of-the-art recycling facilities, heavily taxing companies that send waste to landfill, and imposing larger fines for people and corporations that break environmental protection rules.

Committee comment

9.5 The Committee is encouraged by the enthusiasm and commitment of interested stakeholders to contribute to this inquiry, and their genuine efforts to reduce, recycle and reuse waste resources. As noted in Chapter four, behaviour change – whether at the consumer, community, commercial or government level – is fundamental to changing the mindset and culture of communities, and managing waste resources more effectively.

9.6 The submissions received by the Committee advocated for more sustainable waste management and resource recovery practices consistent with the principles of a circular economy. Importantly, the submissions emphasised community; of working together to reuse, share and distribute resources to extend the life of products and their components for as long as possible.

9.7 Many of the suggestions and recommendations set out in the individual submissions are canvassed in this report, and are included in the Commonwealth Government's National Waste Policy Action Plan.

Hon Barnaby Joyce MP
Chair
2 December 2020

A. Submissions

1 Mr Granville Taylor

2 Dr William Gara

3 *Confidential*

4 Licella Holdings

5 Australian Packaging Covenant Organisation

6 City of Port Phillip

7* Kai Brach

8* Graham Patterson

9* Miss Tegan Ballinger

10* Cajsa Knutson Lording

11* Lan Tran

12* Fiona Brown

13* Alex Wedd

14 Mr Victor Bivell

15 Australian Renewable Energy Agency

16 Hunter Resource Recovery

17 National Association of Charitable Recycling Organisations Inc

18 University of Tasmania

19* Elyse Cotchin

20* Narelle Bellingham

21* Lucienne Oriander

22* Stephanie Potter

23* Kate Hilbert

24* Louisa Frazzetto

25* *Name Withheld*

26* Acoye

27 Western Australian Local Government Association

28* Emily Russell

29* *Name Withheld*

30* *Name Withheld*

31* Carol and Fred Newton

32* *Name Withheld*

33* Hazel Law

34* Josie Curtis

35* *Name Withheld*

36* Luke Wilson

37* Mr Andy Moore

38* Christine Field

39* *Name Withheld*

40* *Name Withheld*

41 Ms Nina Gbor

42* *Name Withheld*

43* Skye Haldane

44* Nick Farrar

45* Julie Bolland

46* Mrs Hannah Richards

47* Ms Erin Lindwall

48* Anson Plaza Committee

49* Lindsay Talbot

50* Margaret Alicia Barwood

51* *Name Withheld*

52* *Name Withheld*

53* Miss Grace Taylor

54* *Name Withheld*

55* *Name Withheld*

56* *Name Withheld*

57 City of Adelaide

58 SUEZ Australia and New Zealand

59* Mrs Siti Nurhayati

60* Ms Katherine Friend

61* *Name Withheld*

62* Ashley Cornish

63 Waste Contractors and Recyclers Association of NSW

64* *Name Withheld*

65* Mr David Paynter

66* Ms Eira Clapton

67* *Name Withheld*

68* Mrs Milica McKay

69* *Name Withheld*

70 Recovered Energy Australia

71* Mrs Nina Kutzner

72 *Confidential*

73 *Confidential*

74 King Cotton Australia Pty Ltd

75 BlockTexx Pty Ltd

76 Bingo Industries

77 ACTA

78 Western Sydney Regional Organisation of Councils

79 Green Connect

80 The Centre for Sustainable Materials Research and Technology, University of New South Wales

81 Waste Management and Resource Recovery Association of Australia

82 Southern Sydney Regional Organisation of Councils Inc

83 Waverley, Woollahra and Randwick Councils

84 Narromine Shire Council

85 IKEA Australia

86 CanBiz Consultants — Waste Management Solutions

87* *Name Withheld*

88 LG Professionals Australia

89 Australian Food and Grocery Council

89.1 Supplementary to submission 89

90* Capital Scraps Composting

91 Australian Local Government Association

92* Ms Amy Blain

93 Zero Waste International Trust

94 Everledger

95 Mr Roger Wilkinson

96 The World's Biggest Garage Sale

97* *Name Withheld*

98 Ms Karen Ellis

99* *Name Withheld*

100* Sam Priestly

101* Ms Lynette Reville

102* *Name Withheld*

103* Ms Natalie Mitchell

104* Sue Goodrick

105 CropLife Australia

106* Jenny Hughes

107 Moreland City Council

108 Australian Grape and Wine Incorporated

109 Australian Academy of Technology and Engineering

109.1 Supplementary to submission 109

110* Rosie Lou

111* Suzie Fancourt

112* Sarah Taylor

113* Maki Morita

114* *Name Withheld*

115 Plastic Free Foundation

116 RMIT University

117* Mrs Sue Lloyd

118* *Name Withheld*

119* Mrs Carolyn Kent-Muldrew

120 Local Government Association of South Australia

121* Ameka Mcfarlane

122* *Name Withheld*

123* Lara Cameron

124* Jenny Calder

125* Emilie Cameron

126* *Name Withheld*

127* Ms Chloe Lines

128 Local Government Association of Queensland

129* Ms Susan Hennessy

130* *Name Withheld*

131 *Name Withheld*

132* *Name Withheld*

133* *Name Withheld*

134* Ms Jemma Crawford

135* Larissa Tedesco

136* Jane Rosenlund

137 Ipswich Residents Against Toxic Environments

138* Lissa Villeneuve

139* *Name Withheld*

140* Juliet Schmidt

141* *Name Withheld*

142* Jamie Carr

143* Miss Shirley Chang

144* *Name Withheld*

145* *Name Withheld*

146 Mr Neil Funston

147* *Name Withheld*

148* Don Wilson

149* Luke Clifton

150* Mrs Lisa Burke

151 South Coast Sustainable Waste Alliance

152* Rebecca Beattie

153 Australian Energy Council

154 *Confidential*

155* Alina A

156 Ms Erin Lewis-Fitzgerald

157* *Name Withheld*

158* *Name Withheld*

159* *Name Withheld*

160* *Name Withheld*

161 National Toxics Network

162* *Name Withheld*

163 *Name Withheld*

164 *Name Withheld*

165 Law Council of Australia

166* Mailie Ross

167 BYO Containers

168* *Name Withheld*

169* Elaine T

170* Ms Fiona Allan

171* Danielle Constantine

172* Simone Hijazi

173* Erin Rhoads

174* *Name Withheld*

175* Dorian Cooper

176* Paula McIntosh

177* Becky Walls

178* Mr Kieren Moran

179* Louize Clarke

180 Anti-Toxic Waste Alliance

181* *Name Withheld*

182* Melanie Marson

183* Jessie Thomson

184* *Name Withheld*

185* Mrs Paola Gredler

186* *Name Withheld*

187* *Name Withheld*

188* Lihz Bailey

189* Melissa McGroarty

190* Niina Kautto

191* *Name Withheld*

192* Kate Dal-Ben

193 *Name Withheld*

194* Cleo Pilcher

195* Anne Morrill

196* Hannah Potter

197 National Waste and Recycling Industry Council

198 Tasmanian Government

199 City of Port Adelaide Enfield

200* *Name Withheld*

201 Infrastructure Victoria

202 Australian Industrial Ecology Network

203* Verena Hunt

204 Buddies ELC

205 Vinyl Council of Australia

206 S. Stoneway

207 Mike Ritchie and Associates Pty Ltd

Attachment 1

208* Tammy Faiman

209* Sally Jackson

210 Western Australian Government

211 The Salvation Army

212 Full Cycle Bioplastics Australia

213 ACT Government

214 Project 24 Working Group

215 Commonwealth Scientific and Industrial Research Organisation

216 Zero Waste Victoria

217 *Confidential*

218 Lake Macquarie City Council

219 Mr Steve Robertson

220 Australian Battery Recycling Initiative

221 Geoff Pryor

222 Law Institute of Victoria

223 National Aboriginal Community Controlled Health Organisation

224 Victorian Department of Environment, Land, Water and Planning

225 National Council of Women Australia

226 Veolia

227 SRCgroup

228 Department of Agriculture, Water and the Environment

229 *Confidential*

230 Department of Industry, Science, Energy and Resources

231 Australian Medical Association and Doctors for the Environment Australia

232 Children's Health Queensland Hospital and Health Service

233 Department of Health

234 Department of Regional NSW

235 Tyre Stewardship Australia

236 Clean Energy Council

B. Exhibits

The Lactote PRD, Peter Bourke, December 2019

Waverly Council submission on the New South Wales Government's 20 year waste and resource recovery strategy, September 2019.

C. Public hearings

Wednesday, 27 November 2019

Committee Room 1R1, Parliament House, Canberra

Department of Industry, Innovation and Science

- Mr David Lawrence, General Manager, Sectoral and Place-based Policy, Industry Growth Division
- Dr Kirrily Peters, Manager

Commonwealth Scientific and Industrial Research Organisation

- Dr Heinz Schandl, Research Group Leader

Wednesday, 4 December 2019

Committee Room 1R2, Parliament House, Canberra

Department of Environment and Energy

- Mr Dean Knudson, Deputy Secretary, Environment Protection Group
- Ms Kristin Tilley, First Assistant Secretary, Environment Project Division

Wednesday, 26 February 2020

Committee Room 1R1, Parliament House, Canberra

Australian Food and Grocery Council

- Dr Geoffrey Annison, Acting Chief Executive Officer

- Mr Barry Cosier, Director, Sustainability

Wednesday, 4 March 2020

Committee Room 1R1, Parliament House, Canberra

Local Government Professionals Australia

- Ms Clare Sullivan, Chief Executive
- Mr Ian Cowie, Director

Wednesday, 10 June 2020

Committee Room 1R1, Parliament House, Canberra

Veolia

- Mr Danny Conlon, Chief Executive Officer and Managing Director

National Waste and Recycling Industry Council

- Ms Rose Read, Chief Executive Officer

Wednesday, 17 June 2020

Committee Room 1R1, Parliament House, Canberra

Narromine Shire Council

- Cr Craig Davies, Mayor

Project 24 — Camden Council and Campbelltown City Council

- Mr Corey McArdle, Manager, Waste and City Presentation, Camden Council
- Mr Peter Rimmer, Domestic Waste Service Coordinator, Campbelltown City Council

City of Port Adelaide Enfield and City of Charles Sturt

- Ms Fiona Jenkins, Coordinator, Waste and Sustainability, City of Charles Sturt
- Mrs Rebekah Schubert, Manager, Waste and Resource Recovery, City of Port Adelaide Enfield

Wednesday, 5 August 2020

Committee Room 1R1, Parliament House, Canberra

Department of Industry, Science, Energy and Resources

- Mr David Williamson, Deputy Secretary
- Dr Kirrily Peters, Acting General Manager, Business Facilitation

Commonwealth Scientific and Industrial Research Organisation

- Dr Heinz Schandl, Research Group Leader

Department of Agriculture, Water and the Environment

- Mr Dean Knudson, Deputy Secretary
- Ms Kristin Tilley, First Assistant Secretary Waste Legislation Policy
- Mr Jason Mundy, Acting First Assistant Secretary, Environmental Protection Division

Wednesday, 12 August 2020

Committee Room 1R1, Parliament House, Canberra

Centre for Sustainable Materials Research and Technology, University of New South Wales

- Professor Veena Sahajwalla, Director, Centre for Sustainable Materials Research and Technology

Australian Academy of Technology and Engineering

- Mr Philip Butler, Co-chair, Expert Working Group on Technology Readiness in the Waste and Resource Recovery Sector
- Ms Alix Ziebell, Director, Policy and Government Relations

Wednesday, 26 August 2020

Committee Room 1R1, Parliament House, Canberra

Department of Regional NSW

- Dr Minh Trang Thi Ho, Acting Director, Resources Planning and Programs, Mining, Exploration and Geoscience

- Mr Nick Staheyeff, Manager, Legacy Mines
- Mrs Kate-Louise Maddison, Project Manager, Legacy Mines

Waste Management and Resource Recovery Association of Australia

- Ms Gayle Sloan, Chief Executive Officer

Friday, 28 August 2020

Committee Room 1R2, Parliament House, Canberra

National Association of Charitable Recycling Organisations

- Mr Omer Soker, Chief Executive Officer
- Mr Terry O'Neill, Vice-Chair

The Salvation Army

- Mr Matthew Davis, National Director, Salvos Stores (and Chair, National Association of Charitable Recycling Organisations)
- Mr Martin Nordstrom, Sustainability Coordinator, Salvos Stores

Australasian Circular Textiles Association

- Miss Camille Reed, Chief Executive Officer and Founder

Circular Centre

- Ms Alison Jose, Director

Block Texx

- Mr Graham Ross, Founder

King Cotton

- Mr Tony Rallis, Business Development and Shareholder

World's Biggest Garage Sale

- Mrs Yasmin Grigaliunas, Chief Executive Officer and Co-Founder

IKEA

- Mr Aaron Duke, Public Affairs Leader
- Ms Melissa Miller, Country Sustainability Manager
- Ms Bhumika Selot, Country Sustainability Business Partner

Vinyl Council of Australia

- Mr Jan Van De Graaff, Product Stewardship Manager

Wednesday, 2 September 2020

Committee Room 1R1, Parliament House, Canberra

Australian Medical Association and Doctors for the Environment

- Dr Forbes McGain

Queensland Health

- Mrs Renae McBrien, Environmental Consultant

Vinyl Council of Australia

- Ms Sophi MacMillan, Chief Executive Officer

Wednesday, 7 October 2020

Committee Room 1R1, Parliament House, Canberra

Reclaim PV Recycling

- Mr Clive Fleming, Director

Australian PV Institute

- Dr Christopher Fell, Chair
- Dr Jose Bilbao, Member

Wowan Dululu Landcare Group

- Mr Neal Johansen, Chairman

Wednesday, 21 October 2020

Committee Room 1R1, Parliament House, Canberra

Department of Agriculture, Water and the Environment

- Mr Matthew Ryan, Assistant Secretary, Waste Action Plan and Modernisation Branch, Environment Protection Division
- Ms Kristin Tilley, First Assistant Secretary, Environment Projection Division

D. Treaties and legislation

Australia's international treaty obligations and Commonwealth legislation relevant to waste management and resource recovery includes:

Treaties[1]

- *Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal* [1992] ATS 7
- *Minamata Convention on Mercury* (done 10 October 2013, not yet in force)
- *Montreal Protocol on Substances that Deplete the Ozone Layer* [1989] ATS 18
- *Rotterdam Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade* [2004] ATS 22
- *Stockholm Convention on Persistent Organic Pollutants* [2004] ATS 23
- *Vienna Convention for the Protection of the Ozone Layer* [1988] ATS 26
- *Waigani Convention to Ban the Importation Into Forum Island Countries of Hazardous and Radioactive Wastes and to Control the Transboundary Movement and Management of Hazardous Wastes Within the South Pacific Region* [2001] ATS 17

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1 Environmental Protection and Heritage Council, *National Waste Policy: Less Waste, More Resources*, November 2009, p. 2; Department of Foreign Affairs and Trade, 'The Australian Treaty Database', <www.info.dfat.gov.au/TREATIES>, accessed 11 June 2020.

Legislation[2]

- *Hazardous Waste (Regulation of Exports and Imports) Act 1989*
- *Industrial Chemicals Act 2019*
- *Agricultural and Veterinary Chemicals Act 1994*
- *Environment Protection (Sea Dumping) Act 1981*
- *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989*
- *Product Stewardship (Oil) Act 2000*
- *Product Stewardship Act 2011*

[2] *Never Waste a Crisis: the Waste and Recycling Industry in Australia*, p. 24 para [2.79]; Australian Government, 'Federal Register of Legislation', <www.legislation.gov.au/Home>, viewed 11 June 2020; Department of Agriculture, Water and the Environment, 'Ozone Protection and Synthetic Greenhouse gas Management Legislation', <www.environment.gov.au/protection/ozone/legislation#:~:text=The%20Ozone%20Protection%20and%20Synthetic%20Greenhouse%20Gas%20Management%20Act%201989,substances%20and%20synthetic%20greenhouse%20gases> accessed 11 June 2020.