

WASTING THE FUTURE?

OPPORTUNITIES FOR CHANGE
IN THE AUSTRALIAN WASTE
SYSTEM

AUGUST 2018



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This report has been prepared by Fiona McKenzie, Orange Compass, for the Australian Futures Project. The author takes full responsibility for the report's contents and conclusions. Please email: fiona@orangecompass.com.au with any feedback.

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1 EXECUTIVE SUMMARY

This report attempts to dig deeper in to how the waste system works and why it is structured the way that it is. What quickly became apparent when trying to understand the workings of the Australian waste system was that there isn't such a thing. There are many waste systems. There are state by state systems with unique rules and regulations. There are systems to manage the flows of different discarded materials such as tyres, e-waste, organics and plastics. There are value chains with different market forces for each of these materials as well. And perhaps most of all, the word waste captures none of this complexity nor the value of those materials that have had their first use.

Through interviews with experts and a review of case studies and literature, it was found that the Australian waste system is stuck in its current state due to a number of factors. Key challenges include:

Outdated mindsets:

- Language of waste
- Public perceptions
- A focus on recycling over waste avoidance
- New ideas but not new pathways

Cumbersome structures and processes:

- Lack of value chain diversity
- Complex product composition
- Perverse incentives
- Inconsistency and uncertainty across jurisdictions
- Lack of targets
- Reducing consumption as the elephant in the room
- Lack of market development
- Absent product stewardship and design rules
- Lack of transparency and data
- Weak national strategies

Adverse patterns of behaviour:

- Lack of courage and leadership
- Consumer waste behaviours

Despite these challenges, all is not lost. There were many ideas and opportunities for a better future. Examples include:

Shifting mindsets:

- Paradigm shift to a circular economy
- Changing what and how we measure value

- Changing the language of waste
- Moving the focus on from recycling to reuse

Reimagining structures and processes:

- Setting a clear vision
- Setting mandatory targets
- Market Development
- New business models
- Product Stewardship and design rules
- Caution on energy from waste

Unlocking new patterns of behaviour:

- Consumers as potential drivers
- Collaboration across sectors
- Avoid reinventing the wheel

It is hoped that this report helps to provide readers with a clear and concise overview of the state of waste in Australia and the opportunities before us to transform both production and consumption.

Informed by the findings of this report, the Australian Futures Project intends to convene a workshop of key stakeholders and partners to explore promising interventions in the third quarter of 2018. In a facilitated process, it will undertake a prioritisation process to narrow down the range of solutions that could be options for the Australian context. Further action will be scoped out with potential supporters, partners and stakeholders.

2 INTRODUCTION

2.1 PURPOSE OF THIS REPORT

The purpose of this report is to create a common understanding of the current waste system (including key structures, processes, incentives, regulation) through a synthesis of the literature as well as stakeholder interviews.

The report also seeks to identify if and how it would be possible to intervene in the waste system (broadly defined) in order to significantly reduce waste volumes and improve environmental, social and economic wellbeing.

Analysis of Australian and international case studies have helped to inform the findings in the report.

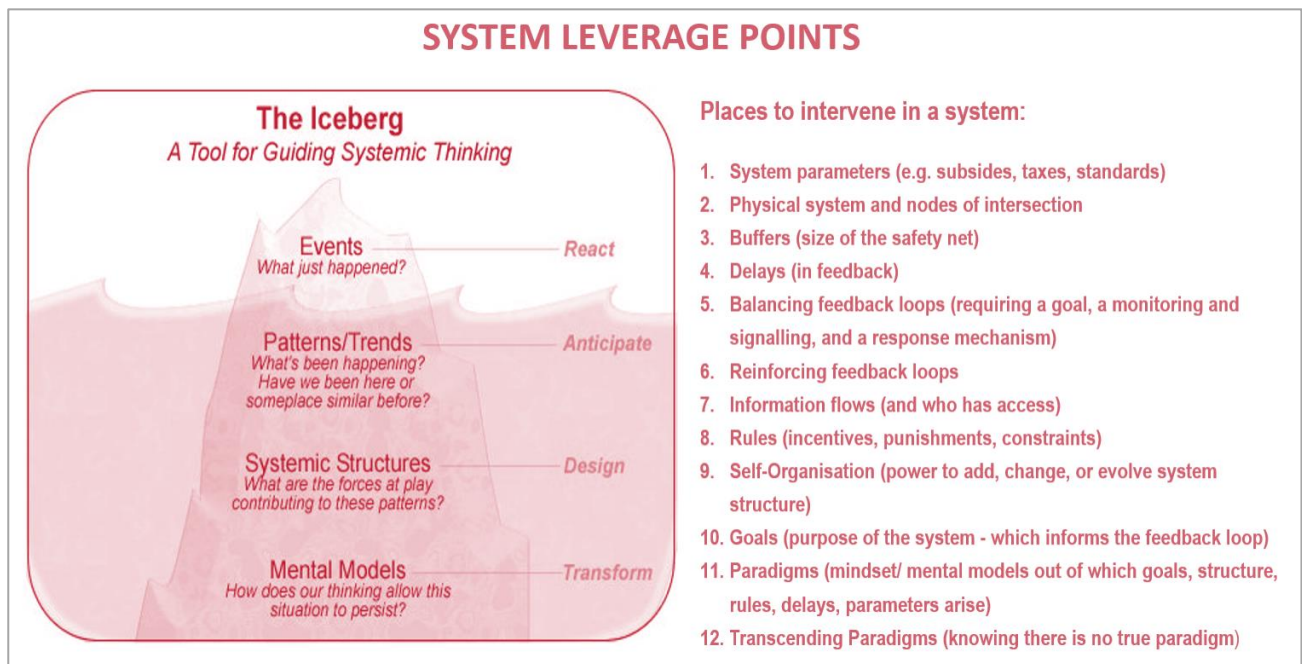
2.2 A SYSTEMIC APPROACH

The analysis in this report is informed by systems thinking. The waste issue is complex. It doesn't have a single cause or solution. It covers everything from our overuse of plastics and our love of short lived consumables, through to our chronic wastage of food. The line between waste and recycling is blurred. It includes the economics of the recycling industry, local land use planning challenges of bioenergy generation, and recovery efforts to redirect potential waste back into the supply chain. This is an issue that spans across diverse government portfolios, industries, supply chains, human behaviours and mindsets. It affects our land and marine environments, our society, and our economy. It is also an issue with history. Waste is essentially made up of multiple complex adaptive systems. These systems are dynamic and self-organising. The complexity comes from interactions and feedback between system components.

Understanding these systems and creating systems change requires understanding more than which actors and institutions (formal and informal) exist in the system. It requires understanding the interactions that are governed by elements such as relationships, Structures, processes, resources and also the mental models or paradigms that sit beneath it all.

To make changes in a system requires understanding where and how it might be possible to influence the nature of these interactions. "Leverage points" is a term often used to these places to intervene in a system. Well known models for identifying leverage points include the iceberg model (Gerber, 2012) and the work of Donella Meadows (Meadows, 2009). See Figure 1 below.

Figure 1. System leverage points (Meadows, 2009, Gerber, 2012)



There have been many efforts in the past attempting to reshape the system. While serious change is needed, finding effective points of intervention is a challenge. Determining possible leverage points requires thinking beyond current ‘symptoms’ of the problem in question and getting to the deeper causes at play. General wisdom is that leverage points that get closer to shifting mental models and widely held assumptions are of the greatest transformative potential. That being said, all areas of intervention can be powerful and addressing structural and relationship aspects of a system can be a pathway to shifting mindsets over the longer-term. It is also worth remembering that changes in one part of the system can cause counterintuitive and unpredictable changes to emerge in other parts. And no single person can know the whole system or has the whole answer. This is what makes both collaboration and adaptive learning so important in any effort to create systems change.

In this report, findings are organised by the categories of: mindsets; structures and process; and patterns of behaviour. The report is divided into two sections – one focused on the current status quo and then a section on opportunities for the future.

2.3 OVERVIEW OF AUSTRALIA’S LINEAR WASTE SYSTEM

This report is focused on the Australian waste system in terms of solid non-hazardous materials. There are very different protocols and processes for liquid wastes (sewerage, trade waste and hazardous liquid waste) and hazardous substances and biosolids. Other excluded categories include waste from primary production activities (agriculture, mining and forestry) as well as pre-consumer waste that is recycled as part of a production process.

Solid waste in Australia is generally categorised into three streams: municipal solid waste (MSW) from households and council operations; commercial and industrial (C&I) waste; and construction and demolition (C&D) waste. Waste fates have also historically been categorised into three types:

disposal, which overwhelmingly means landfill; recycling; and energy recovery, which refers to processes such as conversion of organic waste into methane that is subsequently combusted to generate electricity (Pickin and Randell, 2017).

The limited data we have on waste in Australia is highly aggregated. According to the 2016 National Waste Report, (Pickin and Randell, 2017) we know that Australia's rates of waste generation and recycling are around the average for a developed economy.

In 2014-15 Australia produced about 64 million tonnes of waste, which is equivalent to 2.7 tonnes of waste per capita. Almost 60% of this was recycled. Waste composition according to volume is 21% municipal waste, 31% construction and demolition, 17% fly ash, 31% commercial and industrial waste.

Municipal waste is from households and local government activities such as from parks maintenance. In 2014-15, Australians generated about 13 Mt of municipal waste, about 51% recovered. This is the lowest resource recovery rate of the three main waste streams. In terms of household waste, the average garbage bin contains 60% organic material waste. This is largely made up of food and garden waste.

The starting point is we've got a growing waste problem, in terms of waste generation. In every jurisdiction of the country, we're producing more waste. We're importing more, so we're not manufacturing it here. We're basically importing products that then become waste or packaging that is then becoming waste. At the moment, resource recovery rates are okay but they aren't great.

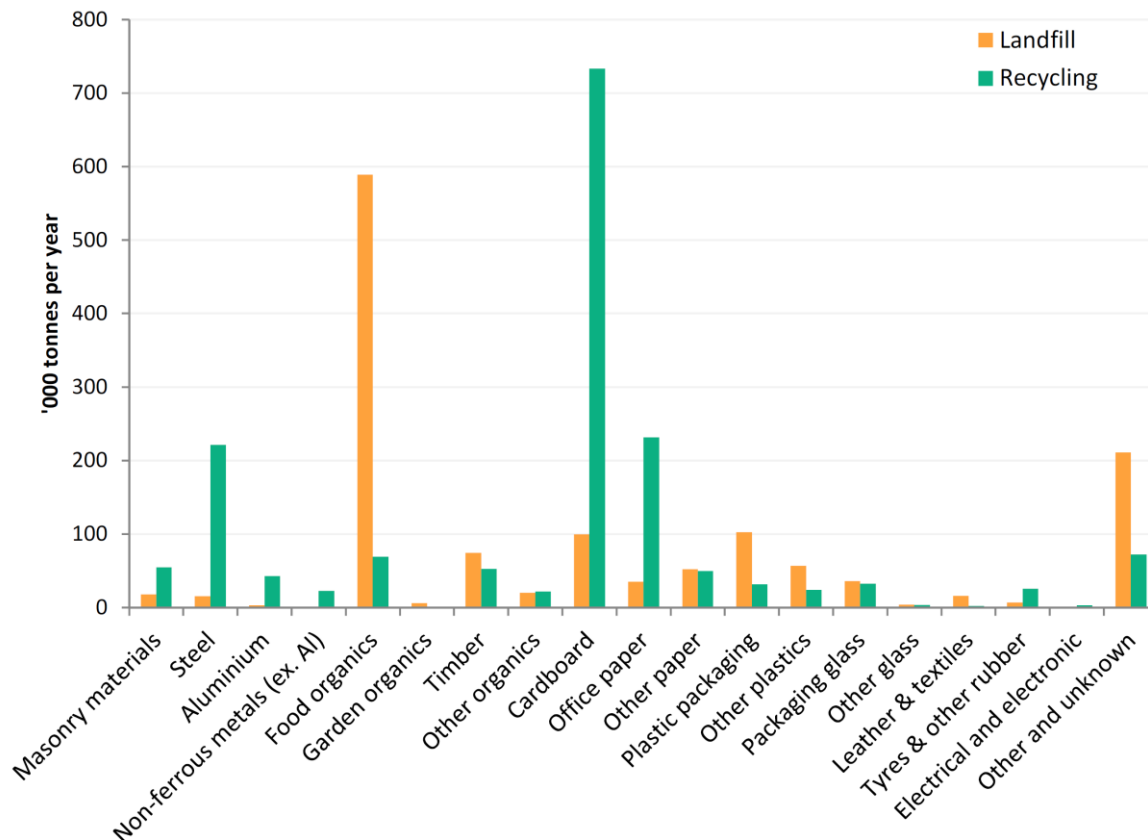
Even taking just the aggregate data, it is possible to determine some trends. The trend compared to previous years is towards more recycling and more recovery of energy from waste. In the period 1996-2015 our population rose by 28% but waste generation increased by 170%. In somewhat good news, the volume going to landfill has remained relatively constant, with recycling increasing (Ritchie, 2016). However, the volumes of consumption and waste going to landfill are still significant. What this means is that consumers and local councils are doing a better job of not just sending everything to landfill. However, while recycling is better than landfill, what remains very low are levels of reuse.

We generate two and a half times the amount of waste but we're still only landfilling the same amount, which is a good thing. Recycling has grown from 7 percent to 56 percent of all waste. However, we're still landfilling 20 million tonnes of waste and there's nothing on the horizon within, say, a decadal time period, that's going to see that reduce. The only thing that will see that reduce is much more intervention by government in terms of source separation and design for recycling, and the introduction of energy from waste to clean up, and basically thermally treat the residuals that would otherwise go to landfill.

The composition of waste is also changing. Some significant material streams—paper and cardboard, glass and fly ash—are declining. Waste metals, organics and plastics also appear to be reducing, at least on a per capita basis. Masonry materials from demolitions, on the other hand, are increasing. Waste from the commercial and industrial (C&I) sector plus construction and demolition have the highest resource recovery rates (64%). However, detailed information on C&I sector waste to landfill and diversion to recycling is also very lacking. In Victoria, Sustainability Victoria (SV) commissioned work to fill this information gap. Research found that food organics was the most significant material in the C&I waste stream that is disposed to landfill. There were also significant quantities of packaging across many industry divisions. It was concluded that

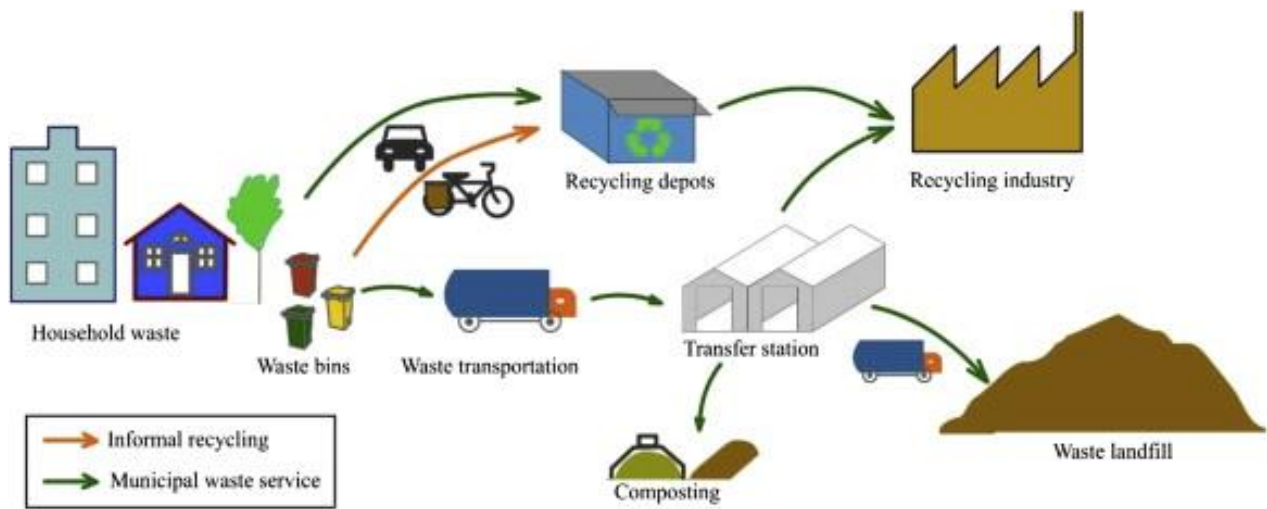
there remain many opportunities to reduce waste generation and increase diversion across the C&I sector (O'Farrell et al., 2013). Figure 2 below shows the material composition of the C&I waste and recycling streams in Victoria.

Figure 2. Material composition of the C&I waste and recycling streams in Victoria (O'Farrell et al., 2013).



Since Australia stopped incinerating rubbish in the middle of the 20th century, most of our solid waste has ended up in landfill. However, no one knows exactly how many landfills exist, where they all are, or how large they are. Government data suggest that there are around 600 officially registered sites, and as many as 2,000 smaller unregulated ones (McCabe and Clarke, 2017). What we do know is that the waste system in Australia is highly linear and geared towards recycling or landfill (see Figure 3 below for a simplified illustration). This can occur within Australia or also be sent offshore.

Figure 3. Simplified diagram of waste management in Australia (Zaman, 2014)



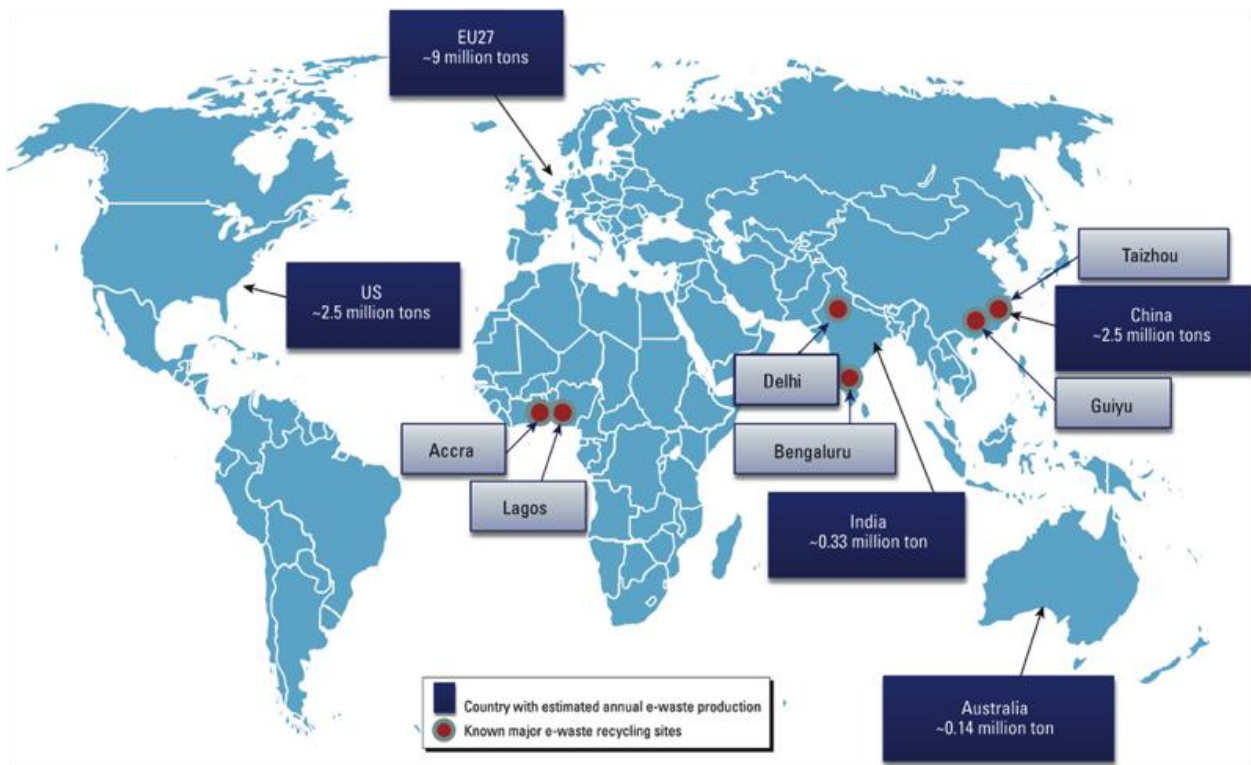
Australia doesn't process all its waste onshore. Some gets exported. Unfortunately, the data on this is also lacking. The Australian Bureau of Statistics published waste data in 2013 but work this has since been defunded and discontinued. In the lead up to 2013, the data showed we had been exporting exponentially more year by year. During 2011-12, Australia exported 4.4 million tonnes of waste valued at more than \$2 billion. That accounted for 0.8 per cent of total Australian exports. Australia exports different waste material to different countries. For example, organic wastes have typically been sent to New Zealand, Indonesia and Korea, while plastics have gone to China (ABS, 2013). Given the recent media attention, it is worth emphasising that not all waste is exported and of that which is, only 30% had been going to China (Blue Environment, 2018). For example, in Queensland, 80% of the materials recovered in 2016-17 were processed in Queensland. 5% of diverted materials were sent interstate for further processing and only 15% of diverted materials were sent overseas for further processing (Department of Environment and Heritage Protection, 2017). So, while the recent plastic ban in China is a significant structural adjustment for the industry, it isn't the whole story by any means. In terms of all waste, the world's '50 biggest sites' where waste is currently being dumped are in other parts of Asia (not China), Africa, Asia and Latin America/Caribbean, with two in Europe (see Figure 4 below).

Figure 4. World's 50 biggest dumpsites (UNEP, 2015)



E-waste is another area of concern not least the potential negative health consequences of the materials within e-waste. Data is unreliable but we know that the United States, Western Europe, China, Japan, and Australia are the major producers and exporters of e-waste. The following Figure 5 uses data from 2008-2010 to estimate annual production of e-waste and the location of major 'recycling' sites. The estimates are incomplete for many regions including Japan, Russia, and Canada. Again, a lack of data is the issue here.

Figure 5. Estimated annual production of e-waste and major recycling sites (Chen et al., 2011).



The story with waste is one of complexity and opacity. The data at a 'material flows' level is almost absent. We know at a highly aggregated level the volumes of categories of waste going to landfill, recycling or reuse. At a small scale, businesses know their own data and flows. But from a council through to a state by state level, the data is poor and infrequently collected. Assumptions and estimates are the dominant characteristic of waste reporting. If you wished to know how much waste is produced by fashion, or how much product packaging makes up our waste flows, it would be impossible to really know. Likewise, it is impossible to know what happens to the waste that leaves our shores. There are known waste collection sites across Asia and Africa. There are also many speculated and unknown sites. And once it gets there, any tracking is completely lost.

3 WHAT'S SHAPING THE CURRENT SYSTEM?

3.1 OUTDATED MINDSETS

The way we think shapes the way we act. This is true for waste, where paradigm, stigmas and assumptions shape the structures of the system and patterns of behaviour. Some of the key points that emerged here were around the language of waste, as well as confusion about the value of recycling.

3.1.1 WHAT'S IN A NAME?

Waste is the name we give to those products we've consumed and taken out of the supply chain. But waste itself is a supply chain. Probably because of its name and the stigmas associated with waste, the wider public has ignored a whole industry, and we've overlooked the missing piece of the puzzle when it comes to sustainability.

The word waste came up a few times as a misnomer. It fails to capture the diversity of the industry.

We don't actually have a definition of waste in any act in Australia. Everyone uses the dictionary definition; it's something that's discarded.

If we go really back to basics - we have a problem with the language of waste. We always call it a waste. We don't call recycling a secondary material or a resource. We don't call it a feedstock. So there's problems in the way we use language, and that gives consumers and everybody a right to dispose of this stuff inappropriately.

Accompanying this was a sense of lack of "awareness of our industry and what can be done, and how you can avoid waste or how you can better manage it". Several interviewees used the term "out of sight and out of mind".

Interviewees felt that waste is over-simplified when it is anything but simple. It was also felt that waste is an after-thought in many conversations about Australia's future. An example was given of a commissioned inquiry into future growth in a major Australian city. It was noted that "the waste industry got our first mention at page 158 of 164. You're talking about 800,000 new households. Emergency vehicles, which are important, but have less truck movements than us, but they got a higher emphasis than we did".

3.1.2 NO VOTES IN WASTE

This lack of awareness has implications because politicians tap in to what they think communities care about. And if waste isn't at the top of the agenda for the community, it definitely isn't for politicians. An example was given of a conversation with a senior politician during an election campaign. The interviewee was bluntly told "there's no votes in waste". She attempted to explain

the potential for job creation, manufacturing and processing industries and community action but was working against deeply held assumptions about what was is. And if it isn't top of mind for the community sees it is can be hard for sympathetic politicians to make the case.

Some environment ministers are trying to grapple with it but it's not one that gets a lot of votes around the table. You know what I mean?

Recent efforts to raise awareness via television programs was a topic of conversation.

War on Waste raises the fact this is a really important issue and the community and the society wants to do the right thing. And as an industry, we really are wanting to do the right thing... Four corners really did a hatchet job on the broad industry, which was really unfair. These were issues that we were working through. So straight away people want to assume that we're doing the worst, which wasn't fair or true for 95 percent of the industry.

It was felt that consumer awareness was a big missing piece of the puzzle.

You've got all these people outraged that all this waste is going to Queensland, and they don't want the waste burnt, but then they made the waste.

3.1.3 AVOIDING WASTE VERSUS RECYCLING WASTE

The focus on recycling was raised as an issue if it came at the expense of product reuse. It was also an issue because recycling to date has been geared towards low value products like glass sands for road construction.

The fact that people think that they're doing something when they recycle in a way is problematic because they're not doing much - they're not doing anything else in the rest of their lives, for example, consuming less. And maybe in a way recycling is allowing people to think that what they're doing is okay when, in fact, their whole lifestyle is not okay. Recycling is the last resort.

3.1.4 NEW IDEAS BUT NOT NEW PATHWAYS

The concept of a circular economy is helping to fuel a stronger focus on waste. And while it is great news that waste is receiving more attention in some circles, those that have been in the industry longer talked about their concerns that it can become another fad unless implementation is taken seriously. They spoke of many of previous concepts that were very similar but which have yet to materialise because the difficult path to change was never forged. There was also a concern that the concept of a circular economy could be misconstrued as being all about waste recycling rather than waste avoidance and changing behaviours in terms of consumption.

We've tried a number of times to deal with triple bottom line. We've all lived through triple bottom line reporting and the Global Reporting Initiative and we've never really cracked the social, environmental, and economic.

I've been in this space for 30 years and one constant frustration is that we pick the next little trophy cabinet project and a prize up on the wall and go, "Gee, look at us. Didn't we do that well?" Whether it's banning plastic bags or focusing on coffee cups or introducing curb side recycling, these are nice to have at the margins but they do nothing towards designing what

we say we want, which is a circular economy, which doesn't dig up, use and landfill material streams.

I'm a bit jaded. Because I was working on circular economy stuff in the 1990s. I've worked on what was called cleaner production, eco-efficiency, industrial ecology, and producer responsibility when all the ISO standards came out. And lifecycle costings. We were working on that then, and now we're in 2018 and it's all new language. Oh, let's do circular economy. So I'm a bit jaded from that perspective...Yes, it will fix some of the system problems within the recycling processing system. But it's not going to fix the fact that when you buy something in Target, it's got triple packaging on it. There's been nothing about waste avoidance. There's been no funding for waste avoidance, apart from a little bit in the food waste area. They've only focused on recycling. And the circular economy is basically closing the loop on recycling. It's not actually looking at avoiding the waste in the first place, necessarily.

I mean you know I've been doing this stuff since 1990, so there is, you know, that idea of fatigue and you know you give up in despair because things are pretty bad if you really think about it.

Making waste a resource is what we've been talking about for 20 years.

In addition to referencing some of the older terminology that preceded the language of the circular economy, interviewees also pointed to some of the earlier works such that of Amory and Hunter Lovins and the Rocky Mountain Institute or Bill McDonough, Ray Anderson (Interface Carpets) and some of the other pioneers in this space. In fact, many schools of thought have preceded the notion of the circular economy since the 1970s. According to the Ellen MacArthur Foundation, examples include the functional service economy (performance economy) of Walter Stahel; the “cradle to cradle” design philosophy of William McDonough and Michael Braungart; biomimicry as articulated by Janine Benyus; the industrial ecology of Reid Lifset and Thomas Graedel; natural capitalism by Amory and Hunter Lovins and Paul Hawken; and the blue economy systems approach described by Gunter Pauli (Ellen MacArthur Foundation, 2015).

The point being made by interviewees was that good ideas aren't enough. They need to be implemented and adopted at scale.

3.2 CUMBERSOME STRUCTURES AND PROCESSES

System structures largely relate to regulations and institutional settings. Processes include how decisions are made and implemented.

3.2.1 LACK OF VALUE CHAIN DIVERSITY

A reoccurring theme throughout the interviews and the literature was the degree of immaturity, lack of sophistication and inadequate diversity of structures to suit the complexity of the waste system. If one good thing has come out of the China plastics ban, it is probably the realisation from the wider public that we actually export some of our waste – and that we have inadequate domestic infrastructure to deal with it.

I think there could be much better national coordination, to be frank. What I'm hoping out of this China situation is there's renewed national attention because they are global issues and

national issues, and they're national markets, even waste moves around the country, and the manufacturing supply chain, obviously, is a national and global one.

Comments on the value chain focused on the very crude material sorting that occurs at key points. A particular focus was the household as a key point where a whole host of different materials become aggregated and mixed up. The household is then expected to be the place where re-sorting happens.

We've got a system that relies on kerbside recycling from residents. We don't have a lot of sorting at the source. If you go to Europe, you buy something in the supermarket and there's basically different bins close to the cash registers where you can recycle your packaging. In Australia, all that packaging goes home and gets into one bin, and it's not particularly well sorted.

There was the sense that greater sorting could happen at a household level if enabled properly.

You're doing a household collection of mixed waste and they're putting everything into the same truck. It's just the scale...If we're trying to pull out the organic fraction, which is food waste and garden waste, then it makes sense that you separate it at the household. And that's where they talk about source separated.

Source separation could be better at a business or household level. It is one of the ways that you could clean up the waste stream and then facilitate new markets. But you're constantly trading off cost with convenience in that area. And it depends on the materials. Waste is not homogenous.

3.2.2 COMPLEX PRODUCT COMPOSITION

Related to the sorting theme was the challenge of the increasingly complex composition of products. Even if a material was collected to be broken down and recycled, this task is complicated if a product is made up of many different materials, or worse, blended materials that are difficult or impossible to extract and reuse or recycle.

That's the biggest challenge - dealing with composition of plastics, paper, cardboard, metals. The main issue comes along when you put it all into one pot, and you try to engineer a system to pull it all out again, and through that process you end up with residue or contaminated streams across everything... And you blow that up to a bigger level, and you're doing a household collection of mixed waste and they're putting everything into the same truck...Say this restaurant does a renovation of these chairs, it's got plastic tips on the ends, it's got a metal body, it's got glue, and then numerous layers of manufactured wood. This couldn't really be recycled into compost or mulch or anything.

3.2.3 PERVERSE INCENTIVES

Fashion was given as a case in point where the lack of framework or incentives to do things differently was noted.

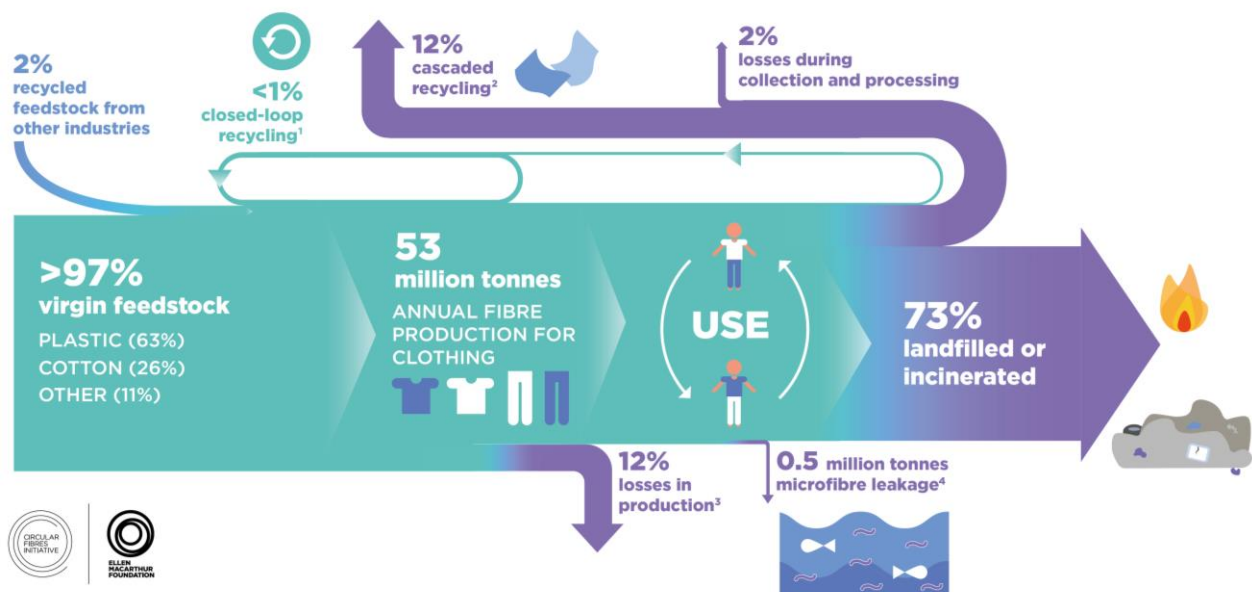
The problem is when fabrics are made of very complex, integrated fibres. The fibres are getting really complicated so they're hard to break down. So the impact of single fabrics is massive, and the impact of sustainable single fabrics is really important. The thing is, these

are our most creative sectors, they should be able to innovate. They just haven't got the framework to do it in. This is an analogy, but we talk about affordable housing. London tackled it a long time ago. Why is it that Lend Lease can deliver 40% affordable housing in London and still have a return on its investment, but it can't seem to deliver any in Australia? We need to be creating these market frameworks that drive the right behaviour.

In the last 15 years, clothing production has approximately doubled, driven by a growing middle-class population across the globe and increased per capita sales in mature economies. The latter rise is mainly due to the 'fast fashion' phenomenon, with quicker turnaround of new style and lower prices (Ellen MacArthur Foundation, 2017). Clothing is massively underutilised. Worldwide, clothing utilisation – the average number of times a garment is worn before it ceases to be used – has decreased by 36% compared to 15 years ago. Less than 1% of material used to produce clothing is recycled into new clothing, representing a loss of more than USD 100 billion worth of materials each year. Across the industry, only 13% of the total material input is in some way recycled after clothing use (Ellen MacArthur Foundation, 2017).

The following figure (Figure 6) illustrates the traditional linear flow of clothing materials, based on 2015 estimates, sourced from the Ellen MacArthur Foundation's Make Fashion Circular Initiative (Ellen MacArthur Foundation, 2017).

Figure 6. Global Material Flows for Clothing 2015 (Ellen MacArthur Foundation, 2017)



- 1 Recycling of clothing into the same or similar quality applications
- 2 Recycling of clothing into other, lower-value applications such as insulation material, wiping cloths, or mattress stuffing
- 3 Includes factory offcuts and overstock liquidation
- 4 Plastic microfibres shed through the washing of all textiles released into the ocean

3.2.4 INCONSISTENCY AND UNCERTAINTY ACROSS JURISDICTIONS

A key theme when it came to the regulatory settings governing the waste system in Australia was inconsistency and uncertainty. It was felt that the lack of certainty was impacting the development of a more mature waste industry in Australia. This is evident at a state and territory level.

The big thing about the waste industry is that it is a really challenging space to operate in from a private sector sense. Every state, all the jurisdictions, have their own responsibilities and focuses. We've got very different regimes in each state which makes it quite challenging. We don't join the dots well in Australia.

You either have a government at the national level which says circular economy is important to us and we'll pull all the relevant levers, or you don't. In the absence of that big mandated goal we end up with this absolute mish-mash of policy settings, and that's where we are. Whereas Europe, well they still have a mish-mash. It doesn't have anything like the contradictions that we have.

3.2.5 LACK OF TARGETS

Interviewees highlighted how Australia lacks specific targets in many state and also national strategies. This was contrasted to Europe where much more ambitious targets are set and reported on. As is the case for many complex challenges, it was felt that the state-federal divide contributes to the weakness of regulatory settings. The federal government sees that states as being responsible for waste. The focus of the states is on land use planning, health and safety.

The best we've got is some state targets to say we want to divert this material from landfill. Diverting material from landfill is not the same as creating a circular economy.

The only government that can really play at a resource conservation, emissions control, greenhouse gas emissions, circular economy, all of these big phrases that we use, is really the federal government. The federal government have shown almost no interest in waste so we have a big attention deficit around waste in Australia.

And while the states have responsibility, they delegate most of this to local government. The inconsistencies are even greater at a local government level.

We're actually doing a lot of good stuff but we're not doing it in a consistent way or a supported way. When you've got 500 local government areas doing their own individual contracts, the structure needs a complete rethink. Some local governments have got a separate rate for waste, others don't. You've got different procurement methodologies. You've got different size and scale. The market can deliver but it needs consistency in order to deliver. Unfortunately, waste is seen as an environment issue and not an industry issue as well.

At the local government level, there are issues with land use planning, such as the years it can take to get planning approval for a facility - if a waste facility is even allowed in the local government area.

The material resource recovery system assumes any processing of waste, or recycling, defines it as a waste facility. Most councils don't allow waste facilities in their zoning. It's a land use that's not allowed in lots and lots of places. And therefore, it's very, very hard for the industry to actually establish new businesses. They need a surety of supply of contracts for like 10 years from councils to set up. And you might get a group of councils that's willing to do that. But then to actually set up an infrastructure, it might take five years to get through the planning process or more.

And there was also a sense that regulatory setting are not keeping up with industry and technological realities.

Once it's deemed as a waste, there are a whole lot of regulations that come on top. I believe the health regulations and the food and hygiene regulations may be out of step with the use of recycled content. Child seat manufacturing are not allowed to use recycled plastic. Yet recycled plastic is now even stronger than primary produced plastic. So the specifications and the standards, as per usual, are not keeping up with the technology on recyclability. So standards are not updated as technology changes. There's such a lag between the two. There's procurement issues as well, for buying products with recycled content. Some things have gone wrong in the past with products with recycled content, and it's tainted the market.

I'm fighting battles just over glass sand. Give me a break. Why are you using natural sand when we can use glass sand? ... If it's a waste product that going to have human contact, potentially if you use it in organics, there's a standard and there's a reporting methodology which makes it harder to compete with virgin materials. One of the things that we have to do nationally is try and remove as many of these barriers while keeping the safety and environmental outcomes.

3.2.6 CONSUMPTION REDUCTION AS THE ELEPHANT IN THE ROOM

There was also a sense that current regulatory settings are only about managing waste not avoiding waste. Changing consumer behaviour and consumption driven economic growth was seen as the elephant in the room that no government is willing to tackle through regulations or policies.

There is almost no ability to slow the rate of waste generation with our current regulatory settings. The waste industry is very much the end of pipe, to take the problem and try and solve it.

3.2.7 LACK OF MARKET DEVELOPMENT

Secondary materials are those that are just as good but no longer categorised as “virgin materials”. It makes sense but unfortunately the markets for secondary materials are poorly developed. So too are the logistics. If we want to maximise value retention of the materials we consumer, then logistics and systems for collection and repurposing have to be a lot more sophisticated than they are today. With a focus on recycling, little attention has been paid to the development of the markets and industries of the secondary economy – or what is increasingly referred to as the circular economy.

The lack of a market for reusing and recycling products was discussed by every interviewee.

If nobody buys it, you've got to pay for it to be recycled and very few people want to do that. In the municipal sector it's not a great story, particularly, when you're looking at doubling waste over the next 30 years.

There's so many different products and materials. Every one of them uses different technologies. Every one of them is part of a different supply chain – obviously, there's overlaps. They're not mutually exclusive, but it means you've got to understand what

materials we can extract and what markets are we selling into, because that defines the supply chain.

There was a concern that waste is heavily regulated from an environmental perspective, whilst ignored from an industry or economic development perspective. This was explained to the case in how stockpiles of recycling are treated. Once something is classed as waste it triggers a set of regulations and responsibilities that wouldn't apply if it was treated as manufacturing or processing. Examples of health laws being used to justify excessive packaging or preventing the reuse of beverage containers were also cited. In some states and territories, the same departments are responsible for both industry development and environmental regulations and this was felt to be a conflict of interest.

The states that are doing the best in this space are SA and Vic because they've actually separated market development away from the regulation. Those poor EPAs like Queensland and New South Wales and WA are almost bipolar in nature ... I'm mean they're both developing the policy and enforcing it, and trying to look at the market development side of it.

While there are lots of examples and possibilities for doing a better job with waste, the challenge was that the economics don't add up. Several people mentioned the fact that it is cheaper to import Mexican green bottles than it is to make glass out of recovered glass in Australia. The point was made that secondary materials hold great promise but this won't work if there is no secondary market.

There are great benefits from recycling but what we haven't had that increased emphasis on the secondary market development to use that product... Because I'm in this industry, I ask my friends 'do you buy back recycled content?' They say 'well, I don't know'. And I say 'well, start asking the question because we can't manufacture it into something when no one's buying it'.

This was partly blamed on how cheap it is to send waste to landfill. Each state has different levies but they are all relatively low cost compared to some other countries.

The biggest challenge by far is cheap underfunded landfills in Australia; that is the structural problem we have. Landfills are artificially cheap. You have to plug the cheap landfill. If you've got a low priced under-costed landfill sitting in your economy somewhere, that's where all the waste is going so no one can recycle compare to that... There is now a \$70 landfill levy applying in Queensland. There isn't a levy in Tasmania. There isn't a levy in the Northern Territory. There isn't a levy in Canberra. All other states have levies at about \$60 a tonne. It's still not enough. The European levies are \$250 a tonne. The landfill allowance trading scheme in the U.K. had taxes at about \$400 a tonne if you breached your landfill allowance levels.

The market also suffers from being relatively small and lacking competition.

There's not a lot of choice in who works in this space. The space is not flooded with operators. There's four or five main operators for processing and dealing with recycling, for example. So that really limits where you can shop around, and who can actually do the job of processing your recycling and disposing of your waste in an environmentally sustainable way. There's a lack of competition in the marketplace, basically.

3.2.8 ABSENT PRODUCT STEWARDSHIP AND DESIGN RULES

In the context of the regulatory settings in Australia, product stewardship and the role of design featured very strongly in instructions with interviewees. It was seen as something of a blind spot where the way products are produced impacts so much of how they are firstly consumed and then throw away.

Product stewardship goes back to design of products in the first place for longevity, for example. And for recyclability. We don't incentivise reuse over recycling. And we don't incentivise longevity in product design. So even within product stewardship, you could incentivise products that last longer. We all know it's possible because we've all had parents with washing machines that lasted 30 years. There's no point in arguing that it's not possible.

Manufacturers are the big, big producers of waste and they need to take some responsibility. It's not okay whether it goes up in the air as pollution or it gets thrown in the ground as contamination; you know it's been going on for a long, long time and you know it's still going on.

Years ago it was "cradle to grave" and people talked about the responsibility of the manufacturer to take back all their waste. That's not novel but that would be fantastic. And then the design would be different and they wouldn't be designing things that are obsolete in five seconds because then they'd have to take it back and what are they going to do with their washing machines or kettles or whatever it is that breaks down?

E-waste is one of the fastest growing waste streams in the country and it's basically a cost shift from manufacturers and suppliers of that equipment to the community which then has to be paid for it to be processed as waste.

While Australia does have an extended producer responsibility legislative framework it was observed that it is very poorly applied.

We have, really, very little product stewardship in Australia. We have very lapsed product stewardship within Australia. There hasn't been a round in five years, from the federal government.

We seemed a lot slower to impose a regulatory impost and our product stewardship scheme – there are 23 different product stewardship schemes, and they're all quite different. None of them are really what you'd call an extended producer responsibility scheme which is what some of the EU and UK schemes are.

The Product Stewardship Act 2011 provides the framework to effectively manage the environmental, health and safety impacts of products, and in particular those impacts associated with the disposal of products and their associated waste. The framework includes voluntary, co-regulatory and mandatory product stewardship.

Voluntary accreditation of product stewardship arrangements encourages stewardship without the need for regulation. Accredited arrangements must meet specific requirements to ensure they carry out their activities in a transparent and accountable manner.

Co-regulatory product stewardship schemes are delivered by industry and regulated by the Australian Government. Regulations specify outcomes to be achieved and identify liable parties that are responsible for those outcomes. Liable parties acquit their responsibility by joining a co-

regulatory arrangement, which delivers the outcomes on their behalf. The National Television and Computer Recycling Scheme (NTCRS) is the only co-regulatory product stewardship scheme regulated under the Act. Outcomes are specified in relation to the collection and recycling of waste televisions and computers and identify importers and manufacturers of televisions and computer as the liable parties. The scheme has recycled approximately 230,000 tonnes of electronic waste since its inception.

Mandatory product stewardship places a legal obligation on parties to take certain actions in relation to a product. Requirements could include the labelling of products, making arrangements for recycling products at end of life, or requiring a deposit and refund to be applied to a product, or banning certain substances or materials from use in products. There are currently no mandatory product stewardship schemes mandated by the Act (Department of the Environment and Energy, 2018b).

Interviewees contrasted the regulatory settings in Australia with other countries that have end of life recycling product design requirements and compulsory 'take back' arrangements for material streams.

Could we move quicker? Absolutely. We know, for instance, that product stewardship schemes put additional rigour and focus on improving recycling. We know that government procurement is probably slow compared to other jurisdictions like the UK, Scotland and California.

3.2.9 LACK OF TRANSPARENCY AND DATA

It was surprising to discover that we know next to nothing about individual material and waste flows in Australia. Detailed, reliable data at a local government area level is almost non-existent. Data is available at highly aggregated levels in terms of the volumes of categories of waste going to landfill, recycling or reuse. At a small scale, businesses know their own data and flows. But from a council through to a state level, the data is poor and infrequently collected. Findings based on a review of the national waste report 2016 found that data on cross-border flows is poorly captured in all jurisdictions except disposal flows into Qld. It also found that disposal tonnages by source stream was unavailable for NT and SA and only partially available for VIC. Landfill composition was estimated by ACT, NSW, SA and VIC only. And jurisdictional and industry data applied may not all be based on the same definition for recycling, distorting the reported results. And in terms of recycling data, tonnages by source stream are unavailable from the ACT and only partially available for NT, QLD and TAS (Pickin et al., 2018).

Assumptions and estimates are the dominant characteristic of waste reporting. If you wished to know how much waste is produced by fashion, or how much plastic packaging makes up our waste flows, it would be impossible to really know. Likewise, it is impossible to know what happens to the waste that leaves our shores. There are known waste collection sites across Asia and Africa. There are also many speculated and unknown sites. And once it gets there, any tracking is completely lost.

This lack of data was old news to the interviewees.

It's not a transparent system... You've got a system at the back end of material resource recovery facilities that all do something slightly differently... All the co-mingled recycling is bundled up and goes off to one of the contractors for processing, or for bundling and export

overseas. But all of them have different rules. Some councils have collection services - so this is a separate company that just collects the waste and takes it to a processor - who take it to a different processor each time, depending on cost. They shop around for the lowest fee.

If you wanted to find out what happens to your recycling in the yellow bin you couldn't find out. It goes through so many supply chain loops. And if it's exported, you'll never find out... You can't find the data. There used to be better waste data through ABS. When ABS was cut back, all the waste data disappeared.

There's no measuring or monitoring in the waste space much at all. No one seems to know what the capacity within Australia is for processing our recycling, for example. And even for processing our waste to remove, say, the organic component from our red bins. It's a bit of an unknown.

It's terrible. To get the numbers it's this assumption after this assumption after this assumption after this estimation because the data is just really lacking. And there's a couple of reasons for that, and one is all the states have different systems and data is collected inconsistently everywhere. And the second one is collecting specific data about behaviour is really expensive at the moment. It's so expensive to collect good data that we're in the dark. Even when you try and do it properly it's so hard...even just to look at what point would you be able to get the data is challenging.

Trying to actually map material flows - to actually quantify all of those things... various consultants have done various pieces of that but it hasn't been done across the board looking at each sector, with each material equally rigorously to get a final picture; where is it currently going? What's the issue with that or what are the potential problems there?...for particular types of materials it's hard to work out.

3.2.10 WEAK NATIONAL STRATEGIES

It should be acknowledged that some efforts are being made at a Federal Government level. Current areas of focus for the Department of Environment and Energy include:

- the voluntary industry phase-out of microbeads
- improving national waste data and reporting
- a review of the Product Stewardship Act 2011 and evaluation of the National Television and Computer Recycling Scheme

Australia also has an Australian Packaging Covenant and earlier this year, Environment Ministers agreed that 100 per cent of Australian packaging be recyclable, compostable or reusable by 2025. The 100 per cent target will be delivered by the Australian Packaging Covenant Organisation.

While this announcement was acknowledged by interviewees, most were fairly scathing of the announcement as a way to appear to be doing something while doing nothing.

Well that's a nonsense commitment. Just because something's recyclable, reusable, or compostable doesn't mean that it's going to be. It just means it's going to be able to be recyclable by someone at an unknown cost by an unknown entity with unknown technology. It's just a silly commitment and yet that's what government has latched on to because it was a way of not doing very much.

That statement from the meeting of environment ministers didn't say it had to be recycled or compostable within Australia. At the moment, nearly every bit of packaging is recyclable, is compostable, somewhere in the world...We need specifications set by government. What is the standard within Australia for compostable material?

The Australian Packaging Covenant has been the principal national instrument to reduce the environmental impacts of consumer packaging in Australia since 1999. It meets its aim by supporting two goals that embody product stewardship and shared responsibility: optimising resource recovery of consumer packaging through the supply chain; and preventing the impacts of fugitive packaging on the environment.

The Covenant is underpinned by the *National Environment Protection (Used Packaging Materials) Measure 2011 (NEPM)*. It requires companies that produce or sell packaging and packaged products to come up with ways to design more recyclable, compostable or reusable packaging.

The Covenant is an agreement between the Australian, state and territory governments and the packaging industry. The Australian Packaging Covenant Organisation Ltd (APCO) is an independent, not-for-profit company established to administer the Covenant on behalf of government and Covenant Signatories. It has 950 member companies.

Australia even has a National Waste Strategy with relatively good aims and focus areas. However, it isn't binding and is seen as something yet to be implemented.

It's actually a pretty good document, written in 2009. The industry all endorsed it in 2009. It has been re-endorsed by the industry only this year as a starting position at various parliamentary enquiries into waste. Industry has said we can all embrace that. Let's just go back to that and start implementing it.

Australian National Waste Policy

The National Waste Policy was agreed to by all Australian environment ministers in November 2009, and endorsed by the Council of Australian Governments (Department of the Environment and Energy, 2018a). It was intended to set Australia's waste management and resource recovery direction to 2020. The aims of the National Waste Policy are to:

- avoid the generation of waste, reduce the amount of waste (including hazardous waste) for disposal
- manage waste as a resource
- ensure that waste treatment, disposal, recovery and re-use is undertaken in a safe, scientific and environmentally sound manner, and
- contribute to the reduction in greenhouse gas emissions, energy conservation and production, water efficiency and the productivity of the land.

The policy sets directions in six key areas and identifies 16 priority strategies that would benefit from a national or coordinated approach. These strategies were to provide focus to the work across individual jurisdictions, build on current directions and complement existing activity.

The six key areas are:

1. Taking responsibility - Shared responsibility for reducing the environmental, health and safety footprint of products and materials across the manufacture-supply-consumption chain and at end-of-life.
2. Improving the market - Efficient and effective Australian markets operate for waste and recovered resources, with local technology and innovation being sought after internationally.
3. Pursuing sustainability - Less waste and improved use of waste to achieve broader environmental, social and economic benefits.
4. Reducing hazard and risk - Reduction of potentially hazardous content of wastes with consistent, safe and accountable waste recovery, handling and disposal.
5. Tailoring solutions - Increased capacity in regional, remote and Indigenous communities to manage waste and recover and re-use resources.
6. Providing the evidence - Access by decision makers to meaningful, accurate and current national waste and resource recovery data and information to measure progress and educate and inform the behaviour and the choices of the community.

This is similar to the National Food Waste strategy which was released in 2017. Food waste is estimated to cost the Australian economy \$20 billion each year. This has significant impacts on the environment through the wasted use of resources such as land, water, energy and fuel to produce and distribute food. When disposed of in landfill, food waste has other environmental impacts such as the production of greenhouse gas emissions (The Department of the Environment and Energy, 2017). The goal of the strategy is to halve Australia's food waste by 2030. Actions are framed around:

- policy support
- business improvements
- market development
- behaviour change

Paving the way for this agreement was a sustained effort by stakeholders to convene representatives from across the entire food supply chain. Unfortunately, the resulting national strategy has good intentions but lacks teeth. It is built around engaging businesses and industries to make voluntary commitments and this achievement alone with take significant time and effort.

The national strategy is pretty weak. It's very obvious that food waste is not an election priority. The missed opportunity there is that it's not actually focusing on food waste prevention, it's waste transformation, reuse, and then heavy, heavy infrastructure projects.

3.3 ADVERSE PATTERNS OF BEHAVIOUR

When it came to patterns of behaviour, there were two areas of focus: lack of leadership and deeply embedded consumer waste behaviours.

3.3.1 LACK OF COURAGE AND LEADERSHIP

There was a sense that the lack of attention paid to waste industry has meant it has remained a neglected area. This has meant there is no common vision in Australia about where the waste industry should be going. It was also felt that leaders were not making the link between the waste industry and the opportunities for economic, social and environmental wellbeing.

If you fundamentally believe in a circular economy, then you've got to have the power of your convictions. The problem is we have a whole lot of people talking about this stuff but with no courage, or very little courage. We can sit in this hybrid land in between if we want to and we'll do little bits at the margins well, but we won't do the majority well, and that's where we are at the moment... Governments need to have the courage of their convictions. If they want to grow green collar jobs and they want to grow an economy that doesn't just consume and landfill, then we have to play at the big structural stuff.

We really need to really make sure that businesses and government understand the incredible benefit and the opportunity of fixing this problem.

3.3.2 CONSUMER WASTE BEHAVIOURS

Waste behaviours such as not recycling properly were raised. A simple example is that almost one third of all recyclable items are placed in the garbage bin and end up in landfill (Ritchie, 2016).

Everybody's behaviour is kind of totally irrational really in this space and particularly in recycling. A lot of people who grew up in Australia in the last 30, 40 years learned how to recycle when they were kids. But how recycling works, what can be recycled and what products are coming into the home are so different now that those rules don't kind of really work?

You had a product - you had a material, you pulled it out of the earth, you turned it into a product and now it's gone, so there's nothing circular about that. You can't ever get it back; you used that energy.

However, waste behaviours were also raised in the context of consumer habits. This was more about how we purchase products, not just how we dispose of them.

What really impacts waste is actually acquisition behaviours and purchasing. Both acquisition behaviours and waste behaviours are habitual behaviours...The majority of stuff that we throw out we acquired through quick judgment – like a lot of our grocery stuff that goes into the bins every week. These are habitual automated behaviours. What you do this time is likely to be whatever you did last time, whatever you last saw someone doing. And some of the neuroscience says we don't even access that part of our brain where our knowledge or our values are. You can tell someone the right thing to do but when they go to do it they don't even check.

What we're not getting right is we're not changing people's behaviour really. That's what it comes down to. People don't feel hurt really by what's going on. They don't believe. Look where we're living, you know, we are living in a pretty beautiful place. It's not impacting on people as much as it could be. People get tired, they get overloaded; all that usual stuff.

There was also concern that there are entire marketing and advertising industries dedicated to prompting people to consume, to buy the newest, the brightest and the most convenient.

In the United States the top ten per cent of graduating psychologists go into marketing, so the ten per cent brightest people who understand you and how your brain work go into a field of convincing you to buy stuff that you don't need. And what sort of individual person really has the capacity to hold-out against that sort of artillery being thrown at you every day?

A common theme was the importance consumers place on simple solutions and convenience

One thing that is probably very important is to make it as easy as possible for customers to access new models or to change to new models or even just for like simple things as to recycle the clothes rather than just throwing them into landfill. At the moment there is the opportunity for example to buy second hand clothes. There is the opportunity to like give your clothes to charity shops and so on. But most of the time this is much more inconvenient than just like buying something new. If you want them to become mainstream and not just relevant for like a certain portion of the population that cares a lot, then it needs to be like super easy and super convenient and I think if it would be like easier to buy second hand clothes than buy new clothes and a lot of people would buy second hand clothes.

We've identified that some of the main reasons why people waste food is busy lives, low prices, overabundance and convenience, and all of that contributing to us losing our value and connection with food.

The recent plastic bag ban by major supermarkets in some Australian states was topical. It was seen as significant from a behaviour change point of view, although potentially having no environmental benefit.

They've taken away the plastic bags. That is behaviour change. That's huge. And then if they charged more than 15 cents for a bag, say three dollars then people will go, oh, shit, I need five bags... It's all good and well to do that, and that will change some behaviour, but then you've got to look at it as the whole system design for that. It's taking it to that next step. Where does that product go, and what will it get replaced with?... What do you do with plastic bags? What do you do once you finish with that single use plastic bag? You put that in your bin as a bin liner. You then wrap your waste in it. Does it just mean the people go out now and buy packs of 200 bin liners that are plastic? And we're still really at the same point. There's still that potential environmental impact. And there's still a requirement for somebody to be able to manage the waste.

4 IDEAS FOR A BETTER FUTURE

In addition to digging in to why the waste system is the way it is today, interviews and the literature were consulted about what could be done to change the waste system for the better tomorrow. The following includes suggestions from reports as well as interviewees.

4.1 SHIFTING MINDSETS

4.1.1 PARADIGM SHIFT TO A CIRCULAR ECONOMY

The need for transformation to a circular economy was a common thread even if some interviewees expressed cynicism.

We're over-consumers. It's going to take a paradigm shift in everything that we do.

The circular economy is about boosting productivity, earning jobs and fostering sustainable economic growth and global competitiveness. It's all about closing that loop on product lifecycles, and that's through greater recycling and greater use.

According to the Ellen MacArthur Foundation (2015), “a circular economy is one that is restorative and regenerative by design and aims to keep products, components, and materials at their highest utility and value at all times, distinguishing between technical and biological cycles. This new economic model seeks to ultimately decouple global economic development from finite resource consumption”. This is in contrast to “today’s linear ‘take, make, dispose’ economic model, which relies on large quantities of cheap, easily accessible materials and energy, has been at the heart of industrial development and has generated an unprecedented level of growth”. Figure 7 below has been sourced from the Ellen MacArthur Foundation.

Figure 7. Vision of a circular economy (Ellen MacArthur Foundation, 2015)

PRINCIPLE

1

Preserve and enhance natural capital by controlling finite stocks and balancing renewable resource flows



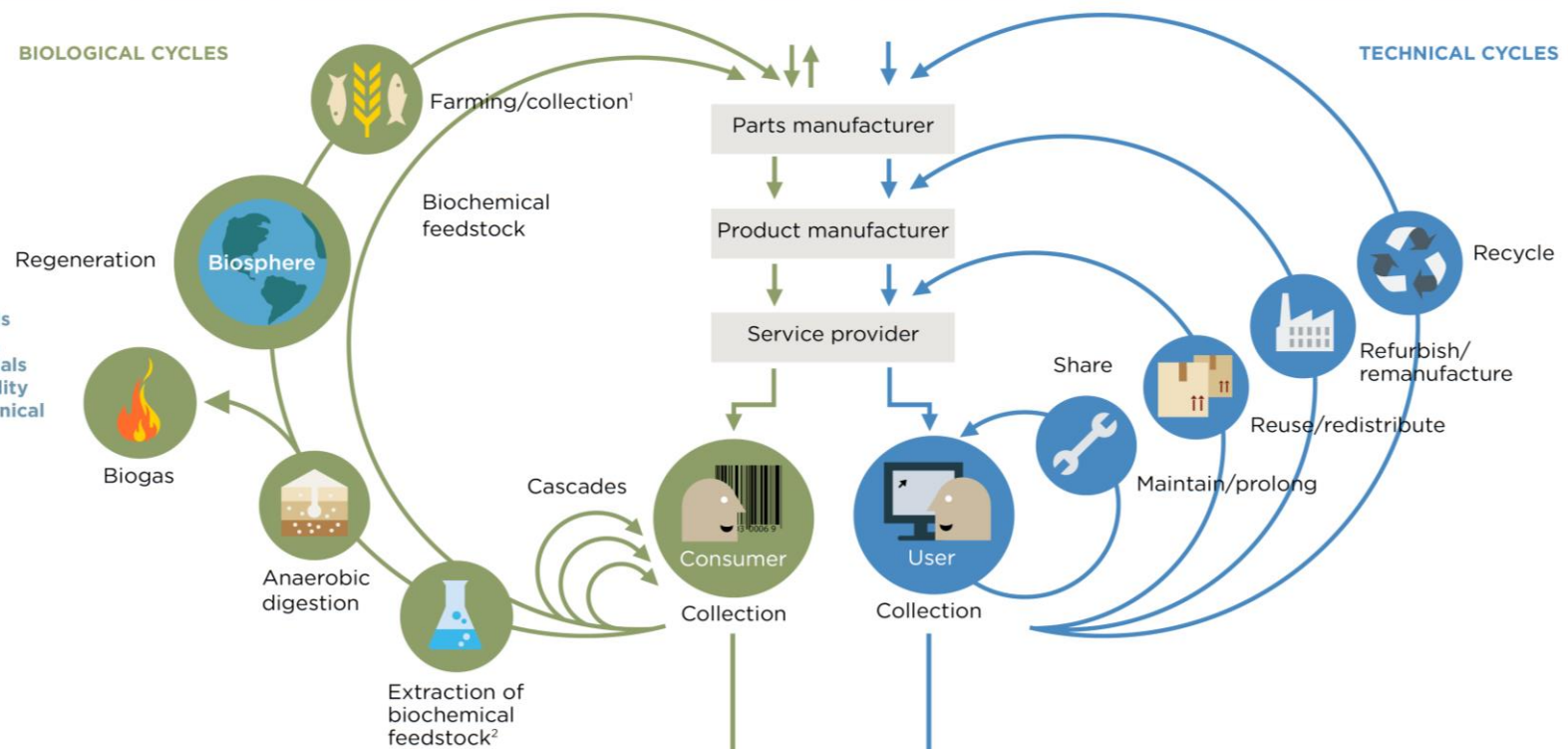
Renewables flow management

Stock management

PRINCIPLE

2

Optimise resource yields by circulating products, components and materials in use at the highest utility at all times in both technical and biological cycles



PRINCIPLE

3

Foster system effectiveness by revealing and designing out negative externalities

Minimise systematic leakage and negative externalities

1. Hunting and fishing
2. Can take both post-harvest and post-consumer waste as an input

Interviewee reservations about whether a shift would be possible are not unfounded. While great in theory, creating a circular economy is a complex task. Required actions include consumer behavioural change, new business models, modified supply chains, upgraded logistics, and significant economic reforms. It relies on new processes, new connections and new ways of linking different parts of a supply and manufacturing chain (Australia Post, 2017). This is no small undertaking.

What we're trying to do is change how our economy works and the way to think differently about materials, to think differently about business models and thinking of waste as a resource. It's thinking more about the whole system.

Despite the magnitude of the challenge, political support for the circular economy is growing around the world. Examples include Germany (Closed Substance Cycle and Waste Act), Japan (Basic Law for Establishing a Recycling-Based Society), China (Chinese Circular Economy Promotion Law) and greater Europe (European Circular Economy Package) (Australia Post, 2017). As with other aspects of the waste system, Australia was seen to be at least a decade behind the leader countries.

The UK are leading it. They've fully embraced energy from waste. They have their organics collections in place and they're recycling a lot of that organic fraction back onto farms. And the supermarkets are very proactive as well. We're just a decade behind.

The thing that's really interesting about the circular economy approach is that it really is looking at the entire system that creates waste and not just looking at the places where waste actually happens and what happens with that; it's looking at how those things get in the first place and why they become waste...Europe's only just starting to get to grips with a lot of this stuff and we seem to be at least ten years behind Europe in most things.

4.1.2 CHANGING WHAT AND HOW WE MEASURE VALUE

Linked to the circular economy was the challenge of relying on economics to tell us what is good value. This would take a paradigm shift as well as further development of alternative approaches to wellbeing.

We actually need to focus on value. We have to be able to look at it from a value perspective of everything we do, not just the cheapest perspective. That's the thinking that needs to happen around our industry, or all industries. It's not just cost, it's value, and you have to see the big picture in it.

It could start with recognising current externalities and accounting for costs from the life cycle of a product.

If you have lifecycle costing done properly - which is very hard to do, but we've got to make a start somewhere - the costs will work. But if you're costing normally, it's not going to work. Lifecycle costing and lifecycle analysis is pretty key to making this circular economy work in the first instance.

4.1.3 CHANGING THE LANGUAGE OF WASTE

The language issue came up as something that could be addressed. This was about how we communicate the whole idea of using secondary (rather than virgin) materials and how illogical it

is that we use so much energy and resources to create a product and then use it once or for one purpose and then throw it in landfill. It was about creating a vision of a secondary market.

I think it's a whole language change that's needed, in recognition that it's a secondary resource. It actually replaces virgin material in processing.

4.1.4 MOVING THE FOCUS ON FROM RECYCLING TO REUSE

There was a frustration that recycling was receiving more attention than reuse.

For Australia for so long we've been focused just on recycling. Recycling is great, but from a waste management hierarchy, you know the triangle that's got all the different things, and it's got two parts to the triangle, and the first one is waste prevention or waste reduction and then the second one is waste management and waste recovery. Recycling fits below that line so, actually it should be our lower priority focus and what we should be trying to do is all the stuff above the line which is reducing and preventing the waste in the first place...I get what people are trying to say about recycling that it's not wasted because we're making great things out of it, but technically if it needs to be recycled it's already waste and what we should be doing is preventing things from becoming waste in the first place.

4.2 REIMAGINING STRUCTURES AND PROCESSES

A huge emphasis in the literature and in interviews was placed on regulatory reform and the need for government to create the space for change.

4.2.1 SETTING A CLEAR VISION

Given the lack of national harmonisation in Australia, it was felt that a clear vision and strategy was even more important.

We've got massive opportunities. But you need a leader who is very clear about where they want to go and hold their nerve through some of this. Because it's not straight away going to help the bottom line in terms of money. It will in time, but they need to have a vision. You actually have to take a long-term view and see the opportunities.

I see these as all massive opportunities, and it's all about vision and government plays such an important role in setting the vision.

There is not a strong national waste policy. Having a very strong national framework, with the material flows and the data behind it, would go a long way to making the whole system transparent... when you've got so many local governments working individually, it doesn't make sense not to have a holistic, whole of government framework in which this essential service can operate.

At the most recent meeting of environment ministers, there was a commitment from the Commonwealth to refresh or develop a new national strategy on waste. The current strategy expires next year and it's due by the end of the year. I think if it that's done properly, that could really focus national attention on how could we coordinate activities across the states and what's the role of the Commonwealth in all of this.

In the absence of government vision and leadership, some interviewees felt that business could play a greater role.

A lot can happen if you get a champion in a company that's big enough. It's about having a major brand make a stance. If one company does it well, you'll find the other companies jump on board.

I do think it takes some corporate champions and leaders. I think there is some of that momentum building. The alternative is, you bring it together with the threat of regulation. So you say, "look, we'll give you three or four years until you sort this out as an industry and come to the table and engage with us, or otherwise we'll regulate." The experience is that drives innovation.

When it came to leadership, supermarkets were given credit for their recent leadership around food waste and plastic bags. As one interviewee described it "Supermarkets are managing all the stakeholders at both sides, their manufacturers and customers".

4.2.2 SETTING MANDATORY TARGETS

Linked to having an overarching vision was the need to go beyond principles and voluntary agreements. There was strong appetite for clear targets and potentially a pathway to mandatory commitments.

Where national strategies or global strategies work the best is when you set targets. Even if you haven't worked out your implementation pathway, setting the target is a strong symbol of accountability and transparency for improving. Some strong targets around recyclability and about how much of that is actually recycled and how much of it is manufactured using recycled content would drive some significant change.

It absolutely means targets, setting a plan and setting targets for stopping waste to landfill, basically. And encouraging recycling, tackling package waste. We've seen all this happen in the EU. It's happened in some States in America, and other countries around the world – northern European countries – where they've actually done that. They've set targets.

We've got to get down to mandating. It should be mandatory that if you've got a recycled option, like recycled glass as opposed to virgin [sand], you should be using it. Then we need to actually mandate recycled content of packaging. In Europe now, recycled content is getting mandated. We need policy settings in place that develop a circular economy in Australia... I think it's inevitable. Japan started this in 2000. Europe has been doing it since 2008. The EU is talking about putting a requirement in trading policies that you have a circular economy. So it is inevitable that we think this way. We're seeing suites of policies come along but we've just got to get to that next step.

Most industry players hate voluntary schemes because you get free riders. Some people sign on and other people don't and the people that don't sign on can free ride and therefore have reduced costs. In all of my discussions with industry players, once they realise the government is actually going to do something and it's going to be regulated, then they say they definitely prefer a compulsory scheme so everybody's in rather than a voluntary arrangement (i2).

It will have to come from changes in regulatory settings. There's only so much goodwill from companies.

It was emphasised that regulation doesn't have to be about compliance or prevention. It can also be about creating the market and incentives to change behaviour.

Regulation can be innovative; it doesn't have to be devastating. Regulation can be innovative and it can transform in a positive way the way we live, and as long as there's a roadmap and a transition time.

And regulation doesn't have to be seen as something new, unusual or complicated. It is about looking at the regulations that already exist and considering how to improve or adjust existing settings.

There's huge numbers of environmental taxes, if you like, or incentives that exist in this country that you know we don't even really notice but they're just subtle things that make people do things differently. Then, of course, there's the stick: "Don't throw your cigarette butts out of the car." And our tax system is a huge mechanism for you know social engineering, if you like. You want people to invest in property? Let them negatively gear. And it's a simple tool. They're all really simple things that can be used.

Areas such as food waste and product packaging where seen as potential entry points for change.

The easy wins, you would think, are in the packaging space - a circular economy for commonly used items within Australia such as the beverage containers that we use, whether they're glass or plastic. They're the logical starting points, for me. There's also another area of food and garden organics. We throw into landfill an awful lot of food, and it cases an awful lot of greenhouse gases. And we also have soils deficient in phosphorous and other minerals. We're importing fertilisers to put on our soils, and we're landfilling fertilisers that could be put on our soils.

The focus at the moment is on consumer waste. So food, soft plastic, single use plastic, and packaging. So I'd start with those... I would mandate recycled content in new packaging, at least. And I would send a very clear signal through either a regulation or a target that said to the large food and beverage manufacturers that they must produce their packaging from 100% recycled content. I would also then have governments around the country procure responsibly to ensure the products that they were procuring were recyclable and made of recycled content where that was feasible as well.

4.2.3 MARKET DEVELOPMENT

Waste was spoken about as an industry and a market, not just a disposal service. Areas of focus included developing the infrastructure and logistics for alternative systems and supply chains, as well as developing the economic playing field for companies to play. Lastly, business model development within companies was raised.

In terms of creating better systems, it is poorly recognised that there really isn't a single system or supply chain for waste. There are many materials each with different markets and economic drivers as well as many processing methods, technologies and approaches to dealing with those materials. To improve waste overall requires understanding these different material flows and what drives them. While better sorting at source is a good start, this is about more than that.

It's a system for everything. That is what it really needs to come back to. A system for textiles, a system for plastic. And then, I guess, whatever's left over, it's an energy system.

Million tons of recyclables get shifted offshore because we don't have the industry or we don't have the demand for that raw material here... People look outside of China now but they don't look really within Australia for that demand. They're looking to India or Indonesia or somewhere else for that demand.

I'd like to see the feedstock flow properly. Currently, we export a lot of our waste. That's not really going to change that much. But you could minimise it by pelletising and flaking plastics, for example. Ewe don't do much about that secondary processing. I think we need to do that. If we don't do it ourselves, companies from other countries will.

Infrastructure and logistics were highlighted as important pieces of the puzzle.

If we got serious about it there would have to be investment in infrastructure here. And the government does have a lot of money to throw into this. There's, say, 2 million, maybe more, tons of waste going to landfill, at say close to \$140 a ton at the moment, that's \$300 million in revenue each year.

In Australia, the logistical piece is a major game changer. When you look at waste coming out of Broken Hill, the recycling is shipped to Sydney, for example, for processing. So the thing would be to have little micro factories, for want of a better term. It's industrial ecology.

4.2.4 NEW BUSINESS MODELS

Linked to market development was the need to change industries so that products are designed differently and people start making their money from leasing, repair and servicing, not just production. For example, for textiles, the Make Fashion Circular Initiative suggests that disrupting the current linear pathway for clothes would require new business models that are not centred on ownership and are based on offering additional services and value durability such as sales with warranties, clothing-on-demand, clothing resale, or repair services (Ellen MacArthur Foundation, 2017).

Things like re-use and sharing are very niche. I guess the challenge is how do you ever get them to scale? How do you actually get enough businesses leading the way or enough consumers demanding from businesses to start changing the design of these products? I would look at the design side and I would say, "How do we make our companies sell different types of products to people?"

I wish government and business would set incentives that are more long term rather than short term. A lot of circular economies strategies like introducing new business models are very likely to be of benefit in the long term, but it might lead to short-term disadvantages.

Smart companies, particularly overseas, are not waiting for laws and regulations for them to internalise the downstream costs of their product. They are actually doing that voluntarily and using that as a marketing position.

4.2.5 PRODUCT STEWARDSHIP AND DESIGN RULES

Linked to business models was the need to design goods that work within a circular economy framework. The idea of using single fibres was raised, Nike an example where they have created a shoe used a single fibre so that it is easier to recycle or reuse.

It would be great to have everything made out of the one material. It has to start with design. Everything has to start with design.

Another was a mobile phone that could actually be disassembled and repaired.

In the UK there's a mobile phone provider who's developed a phone that can be dismantled into all its component parts – it's designed for disassembly and remanufacture. And so, when your phone breaks you know which thing broke and you can pull your phone apart, pull out the one thing that is broken and either send it off to be repaired or replace it and put the phone back together and everything else keeps working. You don't have to throw the whole thing out. And that's one of the key principles about the circular economy is this design for disassembly and remanufacture. But it's such a huge change because businesses need a new business model because a phone company now no longer gets to sell you a new phone every two years. They sell you one phone and then they sell you a new piece every two years or three years. So, how do they make their money?

The challenge with changing how products are designed in the first place is that many products are imported. This would require careful consideration of possible rules for product design and international cooperation. Even just designing products that could be recycled, let alone disassembled or more durable would be a good start.

The first place I start these conversations is we have to get absolutely serious about designing for recyclability. Now I accept the fact that a lot of design happens overseas, but to the extent that the Australian government and states can influence design here, then they can and they should. If you were looking to do anything in waste, it would be around the broad category of extended producer responsibility, who makes this stuff and how do they take responsibility for its end of life recycling? By and large, designers of products are getting off scot-free and it's the consumer that's ending up paying for the end of life disposal and recycling of materials.

Currently there is a focus on packaging but it needs to go lot further than that.

There is a national packaging covenant. But that's just for packaging material, and we're talking about an everything covenant.

If you give people stuff that doesn't break or that doesn't need to be thrown out they won't throw it out at scale.

4.2.6 CAUTION ON ENERGY FROM WASTE

Another topical issue is energy from waste. This is being talking about in Australia in terms of both organics being turned in to energy as well as residue waste being incinerated for energy. Almost everyone said the focus should be on organics into energy, and incineration as a last resort.

Energy from waste is the skeleton in the room. The worry is that while it's seen as a short-term measure to fix our current problem, it may lock in long-term contracts. Because waste contracts go for like 10 or 15 years. It is a technology of last resort. And it's the lowest value you can get. I'm not saying there's not a place for energy from waste, and refuse-derived fuel, and all those things. But you've got to get the policy settings right for that.

It's really only potentially organic waste. And it has to be in a framework that's sustainable, because otherwise if we're just burning municipal waste to create energy, we're not tackling

the bigger issues of carbon emissions, other pollutants, and we're certainly not changing behaviour.

The problem is you build a facility that's going to run for 50 years, you build it to deal with a certain amount of waste and then you have to feed that waste to it for 50 years. Your short-term solution becomes a long-term problem. And that's what happens in like Europe, they've got a lot of this. Their recycling has not increased even though their technical recyclable capabilities have been going up. When they say, you know, "Germany recycles 95 per cent" where they mean recover and they mean incineration and recycling.

Organic stuff is different. There's a lot of great stuff that can be done with that where food gets turned into compost or other things that can go back to growing food. So you actually capture some of those nutrients, the nutrients cycle.

4.3 UNLOCKING NEW PATTERNS OF BEHAVIOUR

When it came to behaviour, there was again a focus on government leadership and consumer behaviours. There was also a call for greater cross-sector collaboration.

4.3.1 CONSUMERS AS POTENTIAL DRIVERS

Consumers were seen as potentially powerful - if they changed their spending habits to reflect their values.

I really believe that consumers have huge power. Consumers could say "no, I'm not going to take these things wrapped three times in plastic".

In the food space, several campaigns have been launched in Australia to change behaviour such as the Victorian Government's Love Food Hate Waste and OzHarvest's Fight Food Waste, which is a national consumer behaviour change campaign. Collaboration around messaging is increasing as advocates realise that traction will require consistent and constant clear messaging. Whether it will work is another question. Evidence from the UK has shown that it is possible to influence behaviour and reduce food waste through effective communications. Whether this is true for other kinds of waste is unclear.

We haven't got a lot of evidence of waste avoidance in the country, and I think that's a big missing gap for all of us, is how do you actually reduce waste?

When it comes to recycling, some work is also being done to look at how to alter waste behaviours through actions such as the use of different types of bins and structures both inside the house and outside.

Research that's been done in Australia and also in the EU and Japan and stuff like that says the more source separation that happens actually the more people recycle, like the more volume they recycle and the better quality they recycle. So, all this stuff about co-mingling kind of the justification is "Oh, we're going to make it easier for people so they'll recycle more" but because of this stuff about our brain not doing it properly, the three-bin system has higher recycling and lower contamination than the two-bin system.

One interviewee raised the example of the Japanese town of Kamikatsu where residents sort their waste in to 45 different categories. The town has a goal of producing zero waste by 2020 (Sturmer, 2018).

4.3.2 COLLABORATION ACROSS SECTORS

Collaboration keeps coming up as an important step to transforming the waste system in Australia. This is already happening in different contexts such as the work to convene actors from across the food supply chain to forge to National Food Waste Strategy. Another example is Australia Post and the Revamp Network. In July 2016 Australia Post brought approximately 70 customers and key stakeholders together from a range of industries to share their insights and knowledge on ways to create value from unwanted materials, with a focus on e-waste and textiles. Using a range of design thinking tools and applications, the group came up with 15 'big' ideas. Australia Post prioritised the ideas that had the greatest opportunity to scale. Three ideas were pursued:

1. Charity valet service – a service that allows people to sell their unwanted, higher value fashion items for a good cause
2. Sustainable uniforms – a 'one-stop-shop' for organisations to securely decommission uniforms and move used stock via a social enterprise to charitable recyclers and other such marketplaces for resell, and
3. eWaste delivery box – development of a purpose-built box that makes it easy for householders and small businesses to recycle their e-waste.

The group was invited back together in November 2016. Approximately 30 stakeholders attended this meeting where Australia Post established the Revamp Network to provide a collaborative forum for stakeholders to share ideas and participate in opportunities that help drive better circular economy outcomes (Australia Post, 2017).

In terms of international examples, the UK Waste and Resource Action Partnership was cited as a good model for how collaboration can improve waste.

There are many examples but one area which was seen as a gap was genuine collaboration and between government and industry.

There's not enough industry-government dialogue, particularly in this space. There's not a lot of roundtables with industry and the Department of Industry and EPA around the table. EPA has been the only active government agency. And they're really only interested in environmental outcomes. They're not interested in fixing the business model. They don't have the skills to fix the business model. Here's a typical example. They've set up a national taskforce. They've got 10 or more government agencies all working on terms of reference to fix what is fundamentally an industry problem. They haven't consulted with industry. They didn't consult with industry as to what the problems were, what the terms of reference for the working group should be, what would industry need. They just went off and did it themselves. So that's one of the fundamental problems. There's very little industry-government collaboration on stuff. There's no dialogue.

Australian governments are not very good at working with businesses to co-design roadmaps, future States, and co-design legislation and policy. And you really notice it when you work in other countries and see how other countries and their political leaders engage with businesses. If we could do better on our relationships between the private sector and councils and state government, then state government and councils could be more empowered to tackle these issues.

Lack of collaboration was also highlighted at a local government level.

Even though councils are interested in talking to each other and have their own mechanisms for doing that through conferences and sharing it's still so piecemeal. The thing to do would be to pick particular councils or particular things and invest heavily in one space to see how it works and then trying it in a few different places rather than trying to let everybody try their own thing and then implement it or not themselves.

What the federal government's saying and what they're doing at a council local level is very disconnected and very different. So, I think that there's, yes, a really great opportunity there for really a lot of cohesion and collaboration.

4.3.3 AVOID REINVENTING THE WHEEL

Throughout the literature and conversations with interviewees, many examples were given where a breakthrough or change was being made in another country, town, sector or business. The European Union, the United Kingdom, Japan, China and others were cited for their initiatives on the circular economy, reducing greenhouse gas emissions, valuing resources and creating new industries and jobs.

It is important to realise that there is much work already being done. The challenge is then how to capture these insights and also potentially join up across fragmented efforts.

It's about not reinventing the wheel. What's worked well overseas? How can Australians or businesses learn from what other organisations and governments have been doing for ten years now that we're not spending the same amount of money and time and resources and we can actually fast-track our experience. Because 2030 is literally around the corner.

5 CONCLUSION

While we all might have different visions for the future, we all know it needs to be different from today.

For me, this is what the future looks like. In my home (and my home might be an apartment or a house) I get free energy from the sun. I don't pay for usage for any energy, but I do pay a fee to have the kit cleaned and maintained. My water is recycled for most of my uses. I get pure rainwater filtered for drinking. Again, it's free for usage. I pay a service fee, but it's free for usage. My waste is the same. I'm now growing all of my vegetables with very simple systems that fit down the side of the house. I share them with my community. I'm relying on my supermarkets for what I can't grow. This comes delivered to me fresh because I don't need to get things covered in plastic. I can get them as if they were being delivered straight from the garden. If I order nuts, I can put them straight into my jars. And where I can't, I can leave containers and things out for people to fill. And when I do go to the supermarket, all packaging is recyclable and it all has its own very clear process that I understand. I know where it's got to go and I know which bin it goes in. And there is no landfill and manufacturers are responsible for their waste.

What this report has shown is that the Australian waste system is stuck in its current state due to a number of factors. Key challenges include:

Outdated mindsets:

- Language of waste
- Public perceptions
- A focus on recycling over waste avoidance
- New ideas but not new pathways

Clunky structures and processes

- Lack of value chain diversity
- Complex product composition
- Perverse incentives
- Inconsistency and uncertainty across jurisdictions
- Lack of targets
- Reducing consumption as the elephant in the room
- Lack of market development
- Absent product stewardship and design rules
- Lack of transparency and data
- Weak national strategies

Unhelpful patterns of behaviour

- Lack of courage and leadership
- Consumer waste behaviours

Despite these challenges, all is not lost. There were many ideas and opportunities for a better future. Examples include:

Changing mindsets:

- Paradigm shift to a circular economy
- Changing what and how we measure value
- Changing the language of waste
- Moving the focus on from recycling to reuse

Rethinking structures and processes:

- Setting a clear vision
- Setting mandatory targets
- Market Development
- New business models
- Product Stewardship and design rules
- Caution on energy from waste

Unlocking new patterns of behaviour:

- Consumers as potential drivers
- Collaboration across sectors
- Avoid reinventing the wheel

Waste is not just about rubbish or disposal or even just recycling. Waste is a mirror into our lives and wider society. Changing waste means transforming how we live. It's a challenge worth tackling.

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