

# Fighting food waste

**Using the  
Circular Economy**









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# Contributors and acknowledgements

**KPMG and the Fight Food Waste Cooperative Research Centre (CRC) have produced this report to highlight opportunities in the circular economy.**



**FIGHT FOOD WASTE**  
Cooperative Research Centre

REDUCE • TRANSFORM • ENGAGE

The Australian Fight Food Waste CRC brings together industry, research and the community to capitalise on Australia's food waste opportunities.

The Fight Food Waste CRC is now the largest food waste research, development and extension public private partnership globally with 43 industry partners, eight university partners and eight state agencies participating in the cooperation. The CRC has funding to operate until 2028 ensuring focus and effort towards the National Food Waste Strategy, which has a goal of halving food waste by 2030.

Through three research and development programs, the Fight Food Waste CRC will REDUCE food waste across the supply chain, TRANSFORM unavoidable waste into innovative products and ENGAGE with industry and consumers to create behaviour change.



At KPMG, we believe that while growth is the fuel of development, how you grow matters. That's why we strive to do things in a way that gives 'now' the win it needs while setting the future up for a win too.

It's with this common purpose that more than 200,000 KPMG people in 153 countries and around 7,500 in Australia help companies plan sustainable pathways to value and growth. We offer deep expertise in Audit, Assurance & Risk Consulting; Deals, Tax & Legal; Management Consulting; Innovation, Solutions & Ventures; and tailored business services through KPMG Enterprise.

We foster a diverse, inclusive and forward-thinking culture and our employees give freely of their time and expertise to help fuel community wellbeing and growth that benefits us all.

Through our dedicated Circular Economy and Food and Agribusiness consultancy practices, KPMG specialists are focused on helping organisations grow more with a lighter impact on the planet.







# Foreword

Australia is a standout producer of high quality and safe food that the world wants yet we take for granted. We produce enough food to feed 60 million people in a country with a population of 25 million, yet the United Nations Food and Agriculture Organisation reports that 35% of this food grown for human consumption is wasted. In 2019 the Federal Department of Environment and Energy reported that this equates to 7.3 million tonnes per annum, enough to fill the Melbourne Cricket Ground to the brim near nine times. Shockingly this occurs at a time when more than 1 in 5 Australians are food insecure and food charities are struggling to meet the rising need for food relief. We can do better as a nation and adopting circular economy principles to prevent food waste is the first step.

The Fight Food Waste Cooperative Research Centre (FFW CRC) commenced in July 2018 with a vision of an Australia without food waste and a 10-year horizon. The benefits of achieving this vision are enormous. Winning the fight against food loss and waste can save Australia \$20 billion per annum through increased industry profitability and reduced food insecurity, as well as enhancing Australia's reputation as a sustainable food producer. The only way this can be achieved is through industry, governments at all levels, and society

working together with the countries leading minds on food waste reduction. The FFW CRC aims to create value out of food waste through treating it as a resource. Determining the best options for any resource stream is the role of our research community. Ensuring that by the end of our term industry and consumers alike re-value surplus food is our primary aim. Ultimately wasting food, no matter where in the supply chain, must become as socially unacceptable as littering.

Outlined in the following pages is information on food waste in Australia and globally, principles of the circular economy, as well as leading businesses in Australia that have adopted circular economy principles, some up to 90 years ago, and have developed successful businesses that manage food waste.

While the concept of the circular economy may be new to many, the principles behind it have long been utilised by many human civilisations, such as the Romans, where recycling of materials was common. Ultimately, circular bioeconomy principles come down to three key aims as highlighted by the Ellen Macarthur Foundation:

1. Design out waste and pollution.
2. Keep products and materials in use.
3. Regenerate natural systems.

These three simple principles are at the heart of the FFW CRC and can be directly linked to all of our research, development and extension projects.

I recommend this report to any individuals or organisations wanting to fight food waste using the circular economy and note that the Fight Food Waste CRC and KPMG are here to help you on your journey.

**Dr Steven Lapidge**  
**Chief Executive Officer**  
**Fight Food Waste Cooperative**  
**Research Centre**

**“Winning the fight against food loss and waste can save Australia AUD\$20 billion per annum through increased industry profitability and reduced food insecurity, as well as enhancing Australia's reputation as a sustainable food producer.”**

**Dr Steven Lapidge,**  
**Fight Food Waste CRC**

# Introduction

Food waste is a global issue costing over AUD\$1.75 trillion annually<sup>1</sup>.

In an effort to reduce poverty and inequality, encourage economic growth and recognise environmental impacts, the UN's Sustainable Development Goals include a target of halving food waste by 2030. Acknowledging our own AUD\$20 billion food waste problem, Australia has set a National Food Waste Strategy aligned to the UN target<sup>2</sup>.

Reducing food waste can have a positive benefit for the environment and communities. Beyond this, by adopting a circular economy approach to reduce, reuse and recycle food waste, there is the opportunity for new business models to emerge and financial benefits to be captured from what was otherwise being wasted.

While the concept of circular economy is not new, challenges like resource availability, volatile growing conditions, pressures on supply and margins in food production, as well as changing consumer preferences, are forcing us to rethink inefficient and wasteful linear models through our food supply chains.

## We can fight food waste using the circular economy

For businesses adopting circular models, benefits include greater efficiency and profitability, less waste and cost, better innovation and stronger relationships with customers.

However, for many the concept of circular economy models and the shift required in mindset and business processes can seem daunting. In Australia, there is a need for greater understanding of what circular economy means and how businesses are successfully adopting circular models.

By fighting food waste through a circular economy model, there is a real advantage to be gained for business, communities and the environments in which we live, work and grow.

The World Resources Institute through Champions 12.3 has reported that the average return on investment is 14:1 for the 700 companies involved in their analysis.

**World Resources Institute<sup>3</sup>**

### This report aims to:

1. Highlight opportunities to address food waste through the circular economy.
2. Highlight international ecosystems enabling circular economies.
3. Showcase successful home-grown business models and initiatives to inspire action.

1. Boston Consulting Group (2018) Tackling the 1.6-Billion-Ton Food Loss and Waste Crisis – values modelled from FAO Global Food Losses and Food Waste (2011).

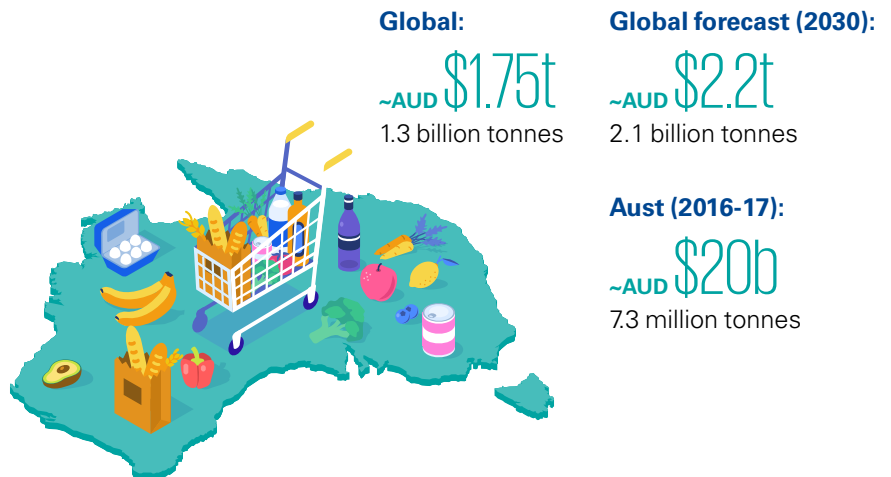
2. Arcadis National Food Waste Baseline (2019).

3. World Research Institute (2017) Champions 12.3 The business case for reducing food loss and waste.

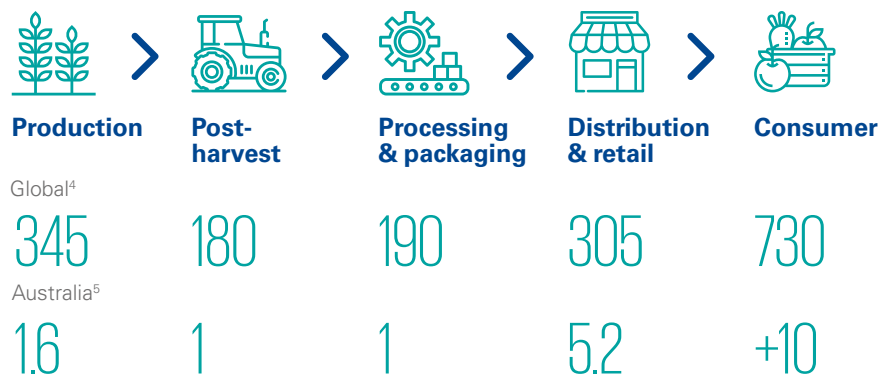
# Fighting food waste: The problem and opportunity

Food loss and waste is a global issue with estimated costs of almost AUD\$20 billion annually for Australia and AUD\$1.75 trillion worldwide. By reducing food loss/waste, there is the potential to not only reduce financial losses, but also to capture financial gains through new markets and revenue opportunities, and improve brand value.

## Food loss and waste per year



## Food loss and waste from farm to plate (\$Ab)



4. Boston Consulting Group (2018) Tackling the 1.6-Billion-Ton Food Loss and Waste Crisis – values modelled from FAO Global Food Losses and Food Waste (2011).

5. Arcadis National Food Waste Baseline (2019).



## FAO Global Food Losses and food waste

8% 

of global greenhouse emissions annually<sup>6</sup>

(caused by gases released from rotting food and also energy used in food production that gets wasted).

20%-30% 

of food is lost or wasted before reaching the consumer.<sup>6</sup>

It is inefficient to use financial resources, as well as land, water, energy and labour to produce food that is ultimately wasted or lost.



Target 12.3

Halve global per capita food waste

Australia to halve food waste by 2030



If food waste were a country, it would be the 3rd largest green house gas emitter behind China and USA<sup>6</sup>

Food waste is the highest growth opportunity for food and agribusiness in Australia based on 16 food and agribusiness opportunities analysed by Food Innovation Australia Ltd

28%-35%

forecast CAGR 2015- 2025<sup>7</sup>

 US \$2.7 trillion<sub>/year</sub>

By 2050, a circular economy for food could deliver up to US\$2.7 trillion per annum of benefits. \$700b resulting from reduced waste and value-added by-products, and the remainder from environment and health benefits.<sup>8</sup>

6. FAO Global Food Losses and food waste.

7. Size of the prize – An overview of 16 global opportunities for Australian food and agribusiness, FIAL November 2017.

8. Ellen MacArthur Foundation – Cities and circular economy for food.



# What is Circular Economy?

The circular economy is an economic model that aims to avoid waste and to preserve the value of resources (raw materials, energy and water) for as long as possible. Products and materials are continuously (re) circulated – as opposed to a linear model in which they are discarded as waste after use.



## **Circular**

Reduce. Reuse. Recycle.

vs



## **Linear**

Take. Make. Dispose.

**It's good for the environment and our communities.**  
**It's good for business.**

6 business benefits of the circular economy for SMEs<sup>9</sup>:

- 1 Reduced exposure to rising and the volatility of resource prices
- 2 Thinking circular stimulates innovation
- 3 Creates a green image
- 4 Opens new markets and opportunities for growth
- 5 Increased customer loyalty and more stable revenue streams
- 6 Environmental benefits through reduced use of raw materials, energy, and fresh water.

Five principles for a circular economy include:<sup>10</sup>

### **Principle 1:**

Waste no longer exists

### **Principle 2:**

Biological materials are renewable, technological materials not and should therefore be recycled

### **Principle 3:**

Try to reuse the product as a whole, if that is not possible parts of the product, and if that is not possible recycle the materials

### **Principle 4:**

First repair, then reuse, then refurbish and then recycle

### **Principle 5:**

Make use of renewable energy

9. Let's help SMEs to go circular, 2018 [https://ec.europa.eu/environment/sme/pdf/Training%20materials\\_English.pdf](https://ec.europa.eu/environment/sme/pdf/Training%20materials_English.pdf)

10. Guided choices towards a circular business model, [https://www.greencycle.si/wp-content/uploads/2018/03/guided\\_choices\\_towards\\_a\\_circular\\_business\\_model.pdf](https://www.greencycle.si/wp-content/uploads/2018/03/guided_choices_towards_a_circular_business_model.pdf)



There are a number of global sustainability mega forces that are driving a shift towards circular<sup>11</sup>. Challenges like resource scarcity, growing global population, rapidly reducing global stocks of natural resources and environmental decline are driving the need for change.

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

**Ellen MacArthur Foundation**

## Overview of global sustainability mega forces

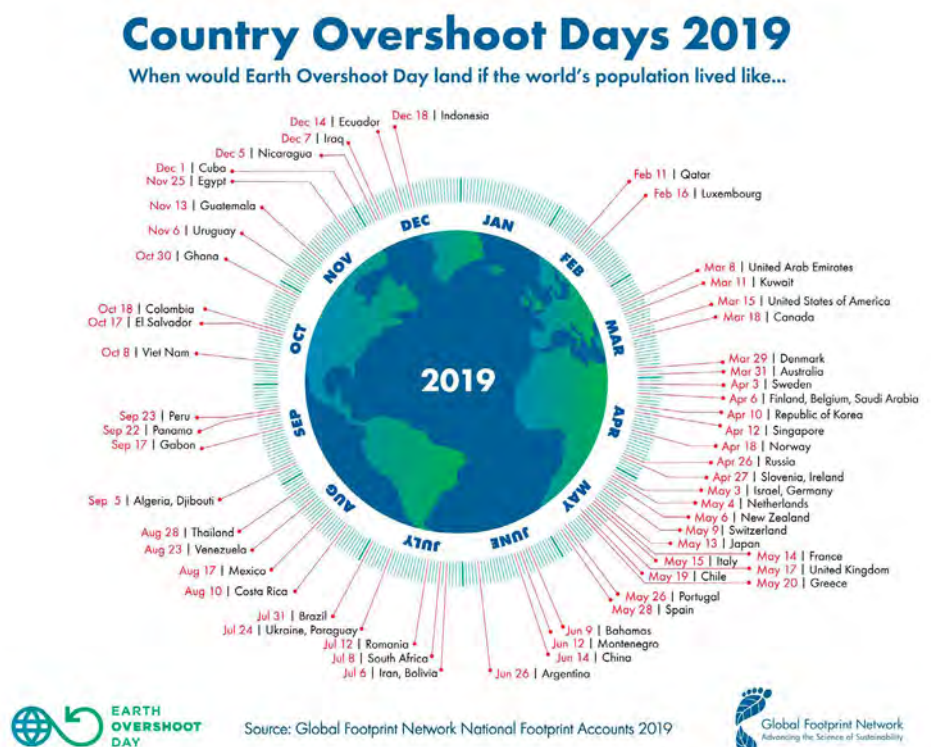


Source: [KPMG, Let's help SMEs to go circular](#), page 10.

According to the [Earth Overshoot Days](#) calculation, if the world's population lived like Australia did in 2019 we would have used more ecological resources than the planet is able to renew in a year by 31 March. That means we would need 4 earths if everyone in the world acted like Australians.<sup>12</sup>

The global date the world consumes more than the annual ecological resource renewals is 29 July 2019. In 2018, the date was 1 August. If food waste was cut in half worldwide, the Overshoot Day would be moved back by 10 days.<sup>13</sup>

## Earth overshoot day: a call to action



Source: [Overshoot Day \(2019\)](#), Country Overshoot day.

11. KPMG (2012), Expect the unexpected

12. Overshoot Day (2019), Country Overshoot day, <https://www.overshootday.org/newsroom/country-overshoot-days/>

13. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

With the growing strain on resources, they are becoming more and more difficult and costly to access. The linear model of “take, make, dispose” is not economically or ecologically sustainable. The pressure on resource access and environmental impact is driving a focus on the benefit of a circular model for reducing, reusing and recycling. The goal of circular is to unlock maximum value from inputs and outputs for the longest possible time.

Shifting towards a circular economy is one of the most important transformational challenges government, companies and communities are facing. It is also a key opportunity – enabling progress towards the UN Sustainable Development Goals including halving food waste by 2030 and zero hunger, improving resource efficiency (land, energy, water) and creating the potential for new economic models.

In addition to the benefit a circular model can have in reducing food waste and enabling a shift towards zero hunger, businesses and governments are recognising the potential of the circular economy to drive business competitiveness, sustainable economic growth and job creation through waste to value initiatives.

For businesses going circular, benefits include greater efficiency and profitability, less waste, reduced cost, better innovation and stronger relationships with customers and supply chain partners.<sup>14</sup> In contrast to the current ‘take-make-dispose’ model, the concept of circular economy is widely recognised to enable more sustainable business models through increased resource efficiency.

#### UN SDG Goal 12 target 12.3:

“By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses”

#### UN SDG Goal 12 target 12.5:

“By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse”



The UN Sustainable Development Goal 2 – Zero Hunger and 12 – Sustainable Consumption and Production set targets to fight food waste.<sup>15</sup>

14. KPMG (2019) Getting ahead in the circular economy, KPMG.

15. <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>





# What does Circular Economy mean for food?

In its simplest form, the circular economy principles of reduce, reuse and recycle apply to food as:



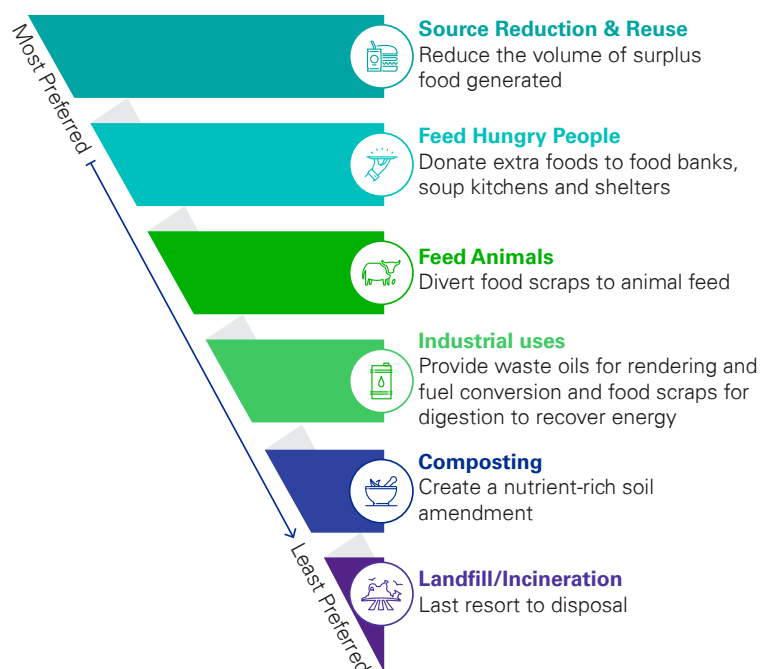
The 'Food Recovery Hierarchy' notes that to address food waste with a circular mindset, the preferred outcome is to reduce the volume of surplus food generated or reuse it. Least preferred is sending the waste to landfill.

Developed by FoodDrinkEurope, the illustration on the following page highlights the opportunities from farm to consumer to prevent and reduce food waste through circular economy models. To fight food waste through circular, it is key that the agri-food value chain work together in finding ways to keep food fresher for longer

## What are the farmers doing to reduce waste?<sup>16</sup>



## Food recovery hierarchy



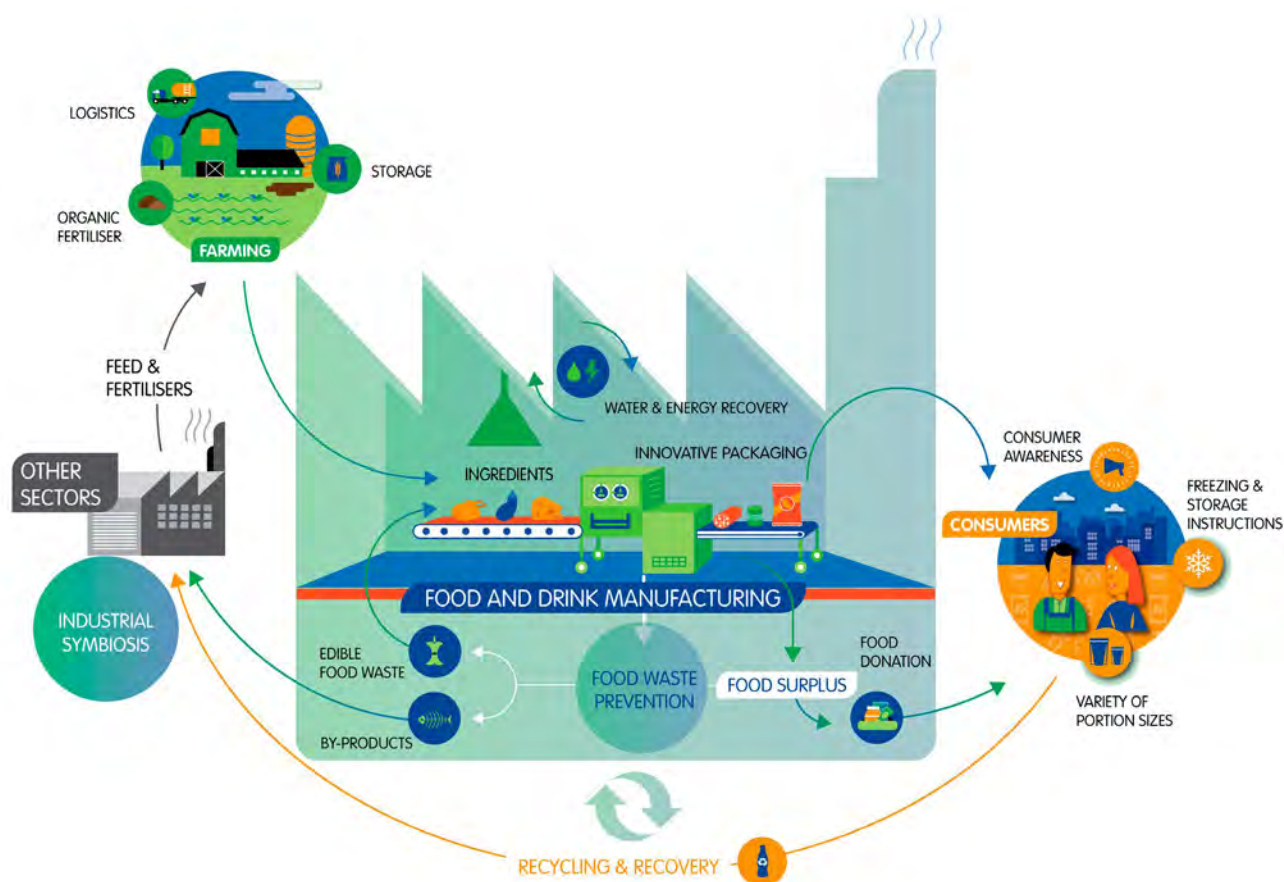
16. <https://www.rabobank.com.au/savings/2019/03/26/05/27/financial-healthbarometer-food-waste-infographic-2018/>

through improved storage conditions and logistics, creating products from all harvested produce, seeking opportunities to convert waste into energy, feedstock, fertiliser or other products, and in informing consumers about the process from farm to plate, the impact of food waste, portion sizes, and storage instructions.<sup>17</sup>

Food brands, retailers, chefs, and other food providers have a major influence on what we eat. In circular models, they have an important role in designing food products, recipes and menus that are healthy for people and the environment. This extends to food packaging that preserves food and is also compostable so it be recycled as

nutrients into the soil. Marketing and branding is also important to tell the story of the food to consumers so that benefits such as increased margins and new markets can be realised.<sup>18</sup>

## A Circular Economy for the food and drink industry



Source: <https://circulareconomy.fooddrinkeurope.eu/>

Governments, universities and research bodies, and financial institutes also have a role in circular as stakeholders in the food and agri value chain. For example, Governments can influence transitions to circular through policies, incentives and access to practical support and training. Innovation hubs connecting government, research and industry offer the ability to fast track research

and its use in circular business models. Universities and research bodies can also include circular principles and food systems in course curricula. Finally, financial institutes could incentivise circular economy business models by directing capital towards businesses with circular models or working towards circular.<sup>18</sup>

### EU Circular Agenda 2024

Product Environmental Footprint voluntary disclosures on labels by 2021, telling the whole lifecycle impact of the product will highlight circular businesses/products from exploitive/wasteful products.

17. <https://circulareconomy.fooddrinkeurope.eu/>

18. <https://www.ellenMacArthurFoundation.org/explore/food-cities-the-circulareconomy>



# Around the world: Enabling Circular Economy to fight food waste

Western Europe, Japan and China have led the way in enabling and encouraging circular economy models. These regions demonstrate that government has a key role to play in providing incentive and support for businesses to adopt circular business models.

Likewise, investment and financing models can enable a circular economy through promoting and rewarding those pursuing economic opportunities connected with circular models and thinking. For example, since 2014 Rabobank NL has been driving the Circular Business Challenge, in partnership with CSR Netherlands and KPMG. Over 50 businesses have participated in the challenge which aims to map opportunities for circular economies in regions and bring entrepreneurs together to develop new ideas/solutions and a circular action plan. The challenge inspires action and helps businesses to get started on their circular journey.<sup>19</sup>

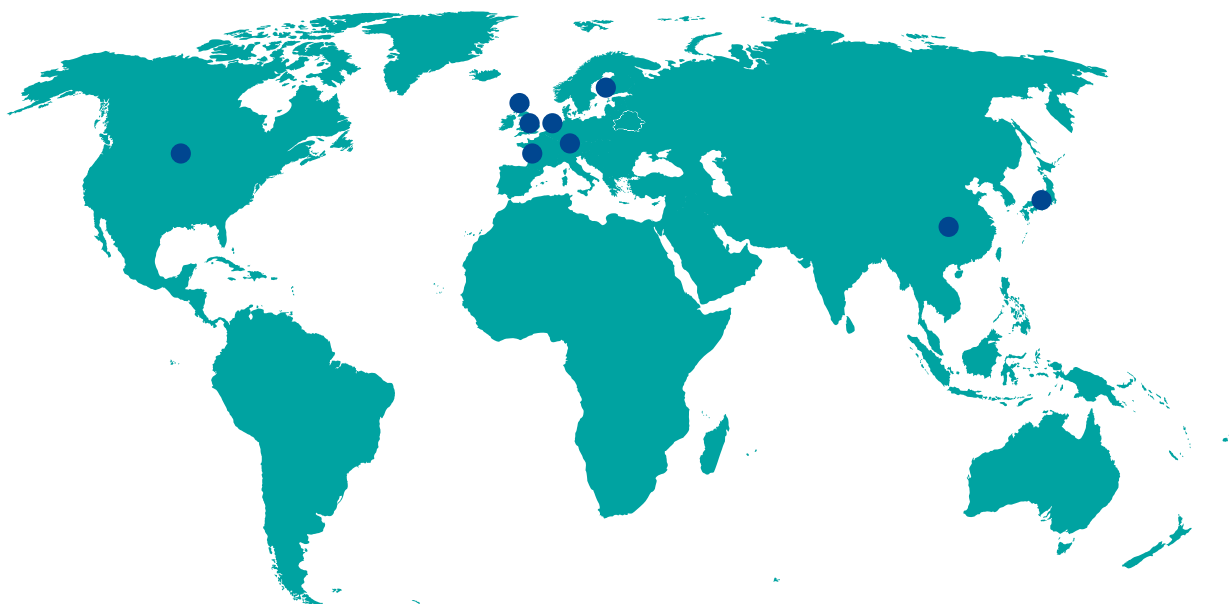
There are five core roles for government in enabling and encouraging circular economy models:<sup>20</sup>

- 1 Create a vision for the Region, State and Nation
- 2 Engage with stakeholders
- 3 Provide economic incentives
- 4 Influence urban management levers
- 5 Legislation and regulation
  - Empowering consumers – active engagement of citizens in changing consumption patterns
  - Information on products' durability and reparability can also shift purchasing decisions towards more sustainable choices
  - Consumer protection against false environmental claims etc.

19. <https://www.rabobank.com/en/about-rabobank/in-society/sustainability/circular-economy/rabobank-circular-economy-challenge/index.html>

20. [https://www.ellenmacarthurfoundation.org/assets/downloads/CE-in-Cities\\_Policy-Levers\\_Mar19.pdf](https://www.ellenmacarthurfoundation.org/assets/downloads/CE-in-Cities_Policy-Levers_Mar19.pdf)

The below provides a snapshot of Government activity and frameworks around the world aimed at enabling and promoting a shift toward circular. More information is provided in Appendix 1.



#### EU

- EU Circularity Agenda 2024
- Product Environmental Footprint
- EU Monitoring Framework for the Circular Economy
- First analysis of Europe's progress in achieving a more sustainable, regenerative economy
- EU Strategy for Plastics in a Circular Economy
- Resource-related policy goals with targets and indicators
- 'Let's help SMEs to go circular' project

#### Netherlands

- Goal to be completely circular economy by 2050 – 'A Circular Economy in the Netherlands by 2050'
- Actively seeking policy and incentives for businesses to go circular and working to remove legislative roadblocks
- *Food for the Circular Economy* policy brief
- Food Smart Facility - The Netherlands, Rabobank, the World Bank, IFAD, FAO and the Rockefeller Foundation

#### UK

- UK Govt Food Waste Measurement Roadmap - to halve food waste by 2030
- The Courtauld Commitment – voluntary agreement aimed at the UK grocery sector
- The UK Plastics Pact to create a circular economy for plastics

#### Finland

- Circular Economy roadmap to be a carbon-neutral circular economy by 2025
- Business Finland and the Ministry for Foreign Affairs have made the circular economy part of Finland's country image.
- Initiatives to building capabilities in sustainable food systems, bio-based economies and digitisation (data and new technologies)

#### Scotland

- Target to reduce food waste by 1/3 by 2025
- ZeroWaste Scotland
- £70 million for a Circular Economy Investment Fund and Service to support small and medium-sized enterprises (SMEs)
- Circular economy strategy – 'Making Things Last'
- Proposed Circular Economy Bill to drive towards net zero carbon emission by 2045

#### France

- 'National Pact to Combat Food Waste' in 2016, France made a commitment to reduce the phenomenon by half by 2025
- 'Loi Garot' The first national law against food waste particularly at the retail level

#### Japan

- 'Basic Act on Establishing a Circular Society' enacted law in 2000
- Food Loss Reduction Promotion Bill
- Food industry recycles about 85 per cent of its food waste

#### China

- Circular economy effort commenced 20 years ago
- Circular Economy Promotion Law
- China and the EU signed a Memorandum of Understanding on Circular Economy Cooperation

#### USA

- U.S. Food Waste Challenge
- National target to reduce food waste by 50% by 2030
- Food Loss and Waste 2030 Champions
- Joint agency agreement 'Winning on Reducing Food Waste Initiative'



# Current state of play in Australia

Solving the AUD\$20 billion issue of food waste in Australia will take a collaborative approach between supportive government initiatives, entrepreneurial spirit, active industry participation, applications of disruptive technologies, and input from academia and significant consumer behaviour change.

Momentum on the importance solving food waste has grown over the past and is rapidly transitioning from niche to mainstream. The 2017 *War on Waste*, a four part documentary aired on the ABC, catalysed the issue into the mainstream for consumers, leading to sales growth in products such as Evolution's Green Banana Resistant Starch powder and the introduction of new policies and process at retail, for example Woolworth's Odd Bunch range.

In 2017 the Federal government launched the National Food Waste Strategy outlining a framework for action towards halving Australia's food waste by 2030, a goal aligned with the UN Sustainable Development Goal 12.3. The National Food Waste Strategy was updated in 2018 to include consideration of circular economy principles.

The strategy outlines four priority areas to be pursued to meet this objective:

1. Policy support
2. Business improvement
3. Market development
4. Behaviour change.

Since the launch of the National Food Waste strategy, Food Innovation Australia Limited has been formulating the national implementation plan, monitoring and evaluation framework which is due to be released later this year. This framework looks to bring together industry, government and academia to create business solutions and supporting policy frameworks to drive change.

In May 2019, the Federal Government provided AUD\$1.6m in funding to Planet Ark to establish a National Circular Economy Hub and Marketplace which aims to be the "B2B's 'eBay'" to enable the circular economy and match buyers and sellers of waste resources.<sup>21</sup>

In October 2019, Yume's Katy Barfield won an *Australian Financial Review* 100 Women of Influence award in the Business and Entrepreneur category for her leadership and innovation in the food waste space.

The Australian Futures Project 2018 – *Wasting the Future* noted that government intervention is required to reduce the levels of waste sent to landfill. The approach to waste in Australia is linear with a focus on recycling and landfill with significant volumes of hard waste sent offshore. This practice has been impacted by regulatory changes in China, India and Australia, restricting the export of Australia's recyclable waste streams.

For traction to be made, there needs to be a greater focus on reducing waste rather than recycling or reusing it.<sup>22</sup> This concept is aligned with the food waste hierarchy that identifies the preferred option as reducing the volume of surplus food produced.

Momentum has also been building across state governments with a number launching (or due to launch) their circular economy policies and action plans in 2019.

21. <https://planetark.org/documents/doc-1864-circular-economy-hub-program-information>

22. <http://files.australianfutures.org/Wasting-The-Future-Final-Report-PDF.pdf>



### South Australia:

Through circular economy principles South Australians are transforming the way the economy uses and values resources. Top of the agenda is reforming household waste, reducing food waste through developing industry solutions, reforming packaging and single use items, developing the circular economy in business and preparing for waste resulting from natural disasters.<sup>23</sup>

In October 2019, the State Government launched an AUD\$11m research consortium for Agricultural Product Development led by the University of Adelaide, including a AUD\$4m Government Grant. Up to 40% of SA's primary production can end up as waste. The Consortium brings together 18 partners and is focused on turning this waste into high value products for markets such as pharmaceuticals, cosmetics and packaging.<sup>24</sup>

### Victoria:

The State has commenced shifting towards a circular economy and is currently developing a circular economy policy and action plan to be released in late 2019 through the Department of Environment, Land Water and Planning.<sup>25,26</sup> In September 2019 the Victorian Government hosted Global Table in Melbourne, bringing together leading international and Australian agrifood participants under one umbrella to create a conversation on solving the biggest food challenges and creating tomorrow's breakthroughs. A key focus of the event was achieving the UN Sustainable Development Goals and food waste and sustainable packaging was a key focus of the event.

### New South Wales:

Released its Circular Economy Policy in Feb 2019 – *Too Good to Waste*. The policy provides direction for circular with seven guiding principles,

defines the State Government's role in implementing circular economy principles across NSW and provides principles for implementing circular economy in the Government's processes and decision making.<sup>27,28,29</sup>

### Queensland:

In 2019, the State Government defined its waste vision and strategy towards a zero-waste society that leverages circular economy principles.<sup>30</sup> Earlier this year Queensland became home to Australia's first Circular Economy (CE) lab with an aim to help drive the state's transition to a new low-carbon and circular economy, delivering opportunities for industry and more jobs for Queenslanders. A key focus of the CE Lab is to consolidate industry, research and government partnerships and expertise to identify and deliver circular economy pilot projects. To date, the CE Lab has had five projects including two focused on

23. Green Industries: <https://www.greenindustries.sa.gov.au/circular-economy>

24. <https://www.adelaide.edu.au/newsroom/news/list/2019/10/22/making-high-value-products-from-agricultural-waste>

25. <https://engage.vic.gov.au/circulareconomy>

26. <https://www.environment.vic.gov.au/sustainability/circulareconomy>

27. <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/response-to-china-national-sword/circular-economy-policy>

28. <https://engage.environment.nsw.gov.au/circular>

29. <https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/recycling/19p1379-circular-economy-policy-final.pdf?la=en&hash=F80151EA9C2C3E27BA889D15D18041CDF7A4D25A>

30. <http://statements.qld.gov.au/Statement/2019/4/17/queenslands-shift-towards-a-circular-economy-steps-up-a-gear>



the food-agri supply chain. One looked at eliminating soft-plastics from food production and another at repurposing waste streams from the agri-food value chain.<sup>31</sup>

Queensland's Chief Entrepreneur and Co-chair of World Economic Forum Circular Economy working group, Leanne Kemp, is encouraging Queensland to become one of the WEF Lighthouse Circular Economy examples.

### Western Australia:

Waste Avoidance and Resource Recovery Strategy 2030 provides a long-term strategy and targets for the state for continuous improvement of waste management. The strategy outlines the vision for Western Australia to "become a sustainable, low-waste, circular economy in which human health and the environment are protected from the impacts of waste"; and the targets and enablers (knowledge, infrastructure and incentives) to achieve this vision.

### Tasmania:

In June 2019, the Government released a *Draft Waste Action Plan* for consultation. The plan proposed, among other targets, the reduction of organic waste sent to landfill by 25% by 2025 and 50% by 2030 and the introduction of a waste levy by 2021 (Tasmania is one of the few states without a waste levy in place).<sup>32</sup>

The Fight Food Waste CRC, now the largest food waste R&D Public Private Partnership globally with AUD\$63m cash, AUD\$57m in kind, 50 industry and 10 research partners is also a key mechanism to bringing together government, academia and industry to design and implement solutions to reduce waste.

Whilst momentum is building with Federal and State Government policies and initiatives directed towards circular economy and food waste, significant collaborative work from players across the food value chain is required to develop circular solutions towards tackling the issue of food waste.

31. <http://statements.qld.gov.au/Statement/2019/2/25/australian-first-circular-economy-lab-opens>

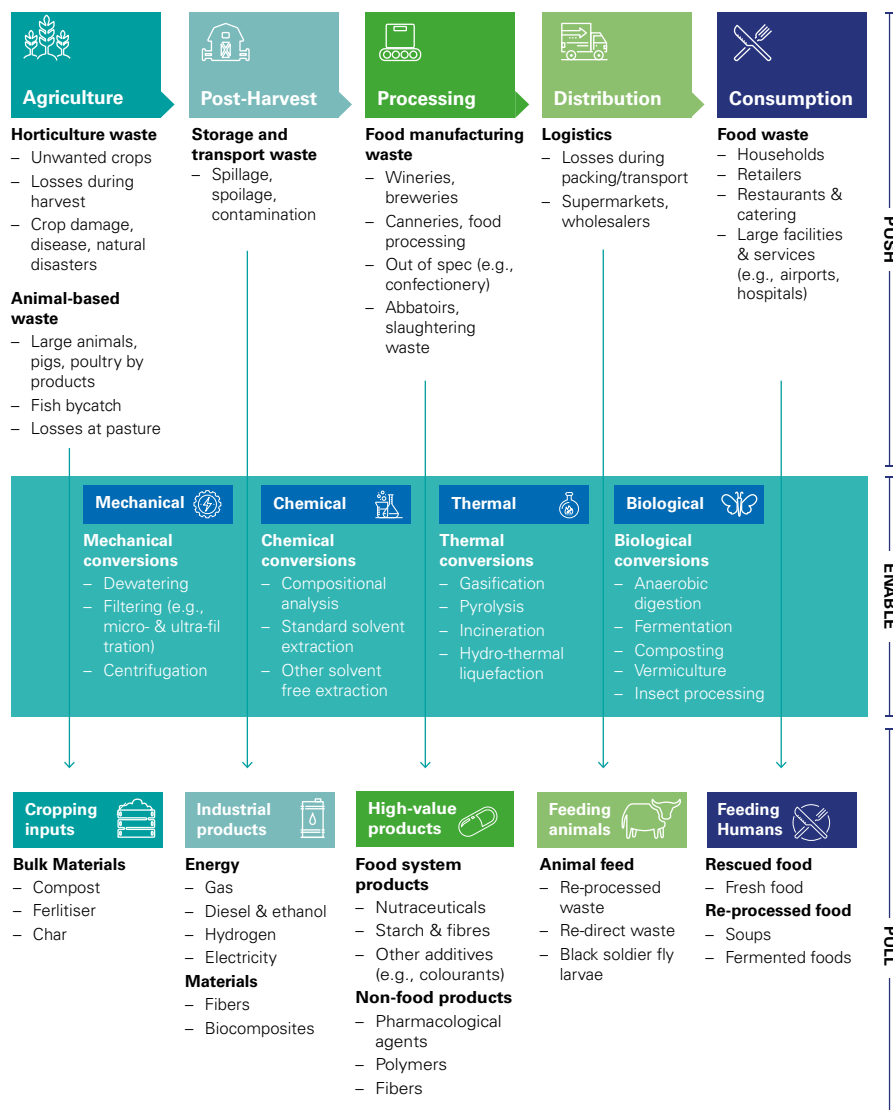
32. <https://dpiwwe.tas.gov.au/environmental-management/waste-action-plan>

# Circular Economy in Action

Industry also has an important role to play in tackling food waste. Throughout the agri-food supply chain there are opportunities to reduce, reuse and recycle waste. There are a number of businesses that are applying the principles of circular economy to tackling food waste and achieving financial benefit.

The below diagram developed by Fight Food Waste CRC highlights the opportunities to create value from food waste by applying circular economy principles to the agri-food value chain.

As the focus on food waste and circular models grows, so do the new businesses and solutions. The following section provides a spotlight on some Australian companies that are putting circular economy into action to fight food waste, and are benefiting from through new products, new markets, and new business models.



Source: Fight Food Waste CRC.



## Case study

# Woolworths

### Description of business

Woolworths Supermarkets is Australia's largest chain of grocery stores. It has 995 stores operating around the nation with around 115,000 staff in stores, distribution centres and head office.

The organisation purchases 96 per cent of fruit and vegetables and 100 per cent of its fresh meat from Australian farmers, and serves 28 million customers a year.

### Driver for establishing circular economy model

Collectively Australia wastes AUD\$20 billion worth of food a year, which is estimated to be 40 per cent of all food grown and manufactured in Australia for consumption in this country. Woolworths is committed to help reducing that number.

In a bid to tackle the food waste problem Woolworths announced in June 2019 that 100 per cent of its supermarkets now have an active food waste landfill diversion program in place. These programs include –rescuing surplus fresh food and distributing it to hunger relief charity partners, donating stock feed to farmers and sending the waste for commercial organic composting.

With these programs in place, Woolworths has recorded an average year-on-year reduction of eight per cent in food waste sent to landfill over the past three years.

### Business model – Circular initiatives

The chain has enlisted not-for-profit partners to redirect food still fit for human consumption into the mouths of those who need it the most. Any food that is no longer fit for human consumption is diverted to farms to be used as animal feed or commercial organic composting.

The company's Stock feed for Farmers program has been running for over 10 years.

Woolworths have also partnered with Tribe Breweries to create a circular economy beer – Loafer. This limited edition pale ale has been created with more than 350kg of left over bread and each sale represents a meal being delivered to vulnerable Australian's through its partnership with Feed Appeal.

All money raised through the purchase of Loafer beer goes directly to community food relief



#### Date Established

1924



#### Location

National



#### Business type

ASX listed,  
Grocery store chain



#### Company size

EDITDAR  
AUD\$6,063m



#### Number of employees

115,000

## Case study

charities to supply ovens, freezers, cool rooms, transport and other vital infrastructure to help them store, cook and share meals, which themselves are often cooked from rescued food to meet the growing demand for food relief.

Loafer' is available exclusively at BWS and Dan Murphy's stores across Australia. For every six pack sold (\$25), 50 cents is donated to Feed Appeal which equates to one meal. For every carton sold (\$73), \$2 is donated to Feed Appeal, which can help to feed a family of four.

### Business results

With these programs in place, Woolworths has recorded over 55,000 tonnes of food being diverted from landfill, and 10 million meals have been delivered to Australians in need across the country.

To date over 750 farmers and community groups from around the country have joined the Woolworths Stock Feed for Farmers program and last year Australian farmers received more than 33,000 tonnes of surplus food from Woolworths that is no longer fit for human consumption but suitable for livestock feed or composting.

### Where to next

Woolworths has a strong commitment toward Food Waste and has committed to working towards zero food waste to landfill. There is a desire to look at further opportunities to re-purpose products destined for landfill.

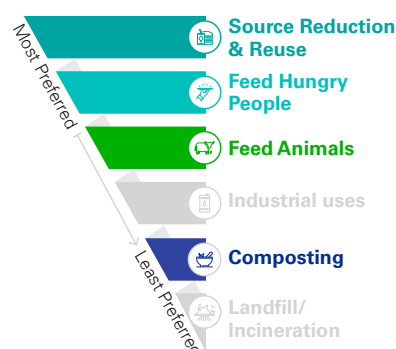
Woolworths have invested heavily in their team members to ensure that they have the education, training, resources and equipment to better identify and divert surplus food that can no longer be sold away from landfill and toward the most beneficial stream – be it food rescue for hunger relief, farmer donations for animal feed or commercial composting.

They are also the only retailer to have joined the Fight Food Waste Cooperative Research Centre. The Fight Food Waste Cooperative Research Centre brings together industry, research and the community to capitalise on Australia's food waste opportunities. There are three research and development programs which include reducing food waste across the supply chain, transforming unavoidable waste into innovative high-value co-products, and engaging with industry and consumers to create change.

### How to get involved / where to learn more:

Visit the Woolworths website for more information - <https://www.woolworths.com.au/shop/discover/community/food-waste>

### Element/s of the food hierarchy model addressed:



### Key benefits of Circular Economy activity

1. Redistributed 350kg of bread from landfill to be used in brewing beer, profits from which are donated to Feed Appeal
2. Eight per cent reduction in food going to landfill over the past three years.
3. Over 55,000 tonnes of food diverted from landfill

### Advice for others in adopting circular

1. Develop partnerships to create a circular value chain
2. Re-examine the concept of "value" to build the business case
3. Be aware that circularity is not 'one-size-fits-all'



## Case study

### Yüme

#### Description of business

Yüme is an award-winning social enterprise that created the world's leading B2B online marketplace for quality surplus products that connects Suppliers with Buyers. Yüme are the Airbnb of surplus food.

#### Driver for establishing circular economy model

At Yüme we are building a more transparent and connected food industry – forging new channels to market for the 4.1 million tonnes of food going to waste every year in the commercial sector in Australia. Yüme partners with businesses to do things differently leveraging technology to ensure edible food realises its maximum resource value – to be sold and consumed. Yüme suppliers include Kellogg's, Mondelez and Unilever and our buyers are the likes of Sodexo, Spotless, Accor and discount retailers.

#### Business model

Yüme collects a commission on products sold and generates other income through marketing partnerships and premium service packages.

#### Business results

Yüme is servicing buyers and suppliers nationwide. The company experienced threefold growth in the past 12 months and have returned \$4.5 million to Australian farmers and manufacturers through the sale of 1.3 million kilograms of food, saving an estimated 2,600 tonnes of CO2 emissions with embodied water value of 85 million litres.

#### Where to next

Yüme's vision is a world without waste. The current priority is to scale locally (volume of suppliers and buyers transacting on the platform), expanding further into the primary produce segment, before taking our solution (platform and know-how) to international markets.



#### Date Established

2016



#### Location

Melbourne



#### Business type

Social Enterprise



#### Company size

\$2-5 mil turnover



#### Number of employees

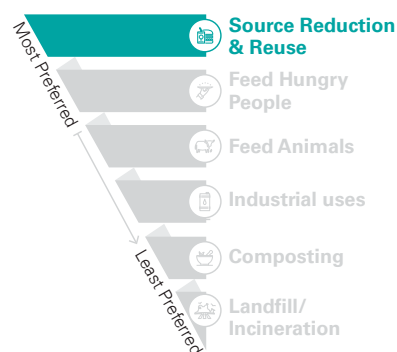
8

## Case study

There are also opportunities to deploy our technology expertise to transform supply and demand optimisation beyond surplus food.

Yüme is a commercial solution that operates at the top of the food waste hierarchy – improving the bottom line for both suppliers and buyers.

### Element/s of the food hierarchy model addressed:



### Key benefits of Circular Economy activity

1. Optimise resource use – stop the take-make-dispose mentality
2. Triple bottom line payback
3. Promotes collaboration

### Advice for others in adopting circular

1. Don't do it alone – partner and collaborate
2. Act now or you'll lose market share (avoid the cost of inaction)
3. Educate your stakeholders



## Case study

### Natural Evolution Food

#### Description of business

Natural Evolution Foods converts green bananas that were previously classed as food waste into nutritional gluten-free super foods, along with health supplements, baking products, beauty products and ointments, equine supplements.

#### Driver for establishing circular economy model

For many years Rob and his family were among the largest banana growers in Australia, specializing in a variety known as Lady Fingers. When the bananas were too bendy, too straight, or too big they didn't meet supermarket guidelines so were sent to waste. Each week, more than 450 tonnes of green bananas were being wasted in North Queensland and at least 5 tonnes per week was from Rob and Krista's farm.

But the fruit was good for eating and packed full of nutrients. In fact, cattle would break fences and wallabies would gather to eat the wasted green bananas. The wallabies would actually reach over ripe, yellow bananas just to eat the green ones.

In 2010, Rob accidentally drove over a hand of lady fingers and he saw what looked like dust. This drove him to ask and research could this be a flour?

After suffering mild coeliac symptoms and not being impressed with the majority of gluten free products on the market Rob and Krista began producing a small batch of 6kg of banana flour per week sold through his family's café. Green bananas are very difficult to peel making the work labour intensive and slow.

The first week it took the entire week for the gluten free "banana flour" to sell. The next week the flour was sold out by Wednesday. The following week, it was sold out Monday morning and before they knew it, word had spread and orders were being phoned in and demand was months ahead of their ability to supply.

#### Business model

Seeing an opportunity in the market, and with dedication and innovation, Rob designed the first and only peeling machine in the world. This increased output to approximately 300kg per week which also sold out weeks and often months in advance.



**Date Established**  
2010



**Location**  
North Queensland



**Company size**  
SME



**Number of employees**  
9



**Waste use**  
'out-of-spec' horticulture – bananas, sweet potatoes



**Products**  
prebiotics, GF flour, cake mixes, packaging, vodka

## Case study

In August 2014 Natural Evolution Foods received a grant from Commercialisation Australia to assist in building the world's first and only pharmaceutical grade banana flour factory – a 950 square meter food processing factory.

Since finishing the facility in late 2017, the business is able to produce approximately 8 tonnes of banana flour each week. Natural Evolution Foods sources green bananas and gold sweet potatoes from the Tablelands region. It takes 10 tonnes of banana waste to produce 1 tonne of flour which is processed on site using the patented 'Nutrolock' technology.

Not only did they need to invent and build the peeling, processing and drying equipment for a product that had never been created before – which took more than five years – they also had to find and educate their market.

It was a rather unconventional approach to finding and establishing communication to the market. Over many years of research and listening to people from all over the world the internal Natural Evolution team was ready to officially launch their commercial products.

Natural Evolution Foods product range has now expanded to include cake and baking mixes, gold sweet potato flour, protein powder, beauty products and healing ointments, and fiber supplements for horses.

Products are available to customers around the world via Natural Evolution's website and also in stores across Australia, as well as in New Zealand, Japan, England, Singapore and Canada.

What began as a purpose and use for tonnes of wasted bananas each week has evolved into a new market for all growers.

### Business results

Natural Evolution has opened up a new market for previously wasted bananas and sweet potatoes. Rob and Krista now run the first and biggest commercial production of banana flour in the world.

For his enthusiasm and vision Rob has received numerous accolades for his inventions and food processing techniques. Krista has also been recognised receiving the title of the 2018 Agrifutures Rural Woman of the year.

Natural Evolution Foods began by transforming waste bananas into a highly nutritious food source and is now revolutionizing the banana industry where bananas are being grown for the sole purpose of flour production.

### Where to next?

Natural Evolution Foods is now considering how their patented processing technology can be used for other wasted foods in the industry. They are also working towards a larger facility based in Walkamin due for completion early 2021.

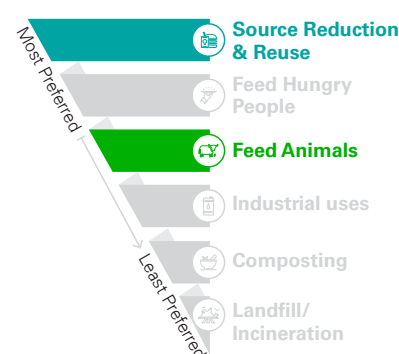
### Key benefits of Circular Economy activity (reduce, reuse, recycle)

1. Value-adding process for green banana waste
2. Reduced waste to landfill
3. Access to new national and international markets and customers

### Advice for others

1. Be inquisitive – just because it has always been that way, doesn't mean it should always be that way.
2. Don't be afraid to say no – surrounding yourself with the right team that aligns with your company and personal values.
3. It's a journey – the goal posts often shift and change and you need to be able to pivot to ensure you get the goal in!

### Element/s of the food hierarchy model addressed:



## Case study

### Tarac Technologies



#### A closed loop system creating value from solid and liquid winemaking residuals

##### Description of business

Tarac Technologies takes waste created during the winemaking process and transforms it into value added products for local and export markets.

Through Tarac's closed loop system, the company also ensures minimum environmental impact and waste from its own processing by-products.

##### Driver for establishing circular economy model

Tarac Technologies was established in 1930 by ex-CSIRO scientist Alfred Allen at his home in the heartland of the Australian Wine Industry – the Barossa Valley, South Australia.

From the beginning, Tarac has been committed to sustainability and environmental resilience of the Australian Wine Industry. This is reflected in the company's vision and core values as well as ISO 14001 environmental management system accreditation. Tarac works to proactively manage and implement resource efficiency measures and also encourage their

clients and supply chain partners to adopt sound sustainable management practices.

Tarac's motto is:



rethink *recycle* reformulate *revalue*

##### Business model

Tarac's sustainable system starts on the land in the form of grapes and finishes on the land in the form of stock feed products, irrigation water and soil conditioners. Waste from winemaking is transported to one of Tarac's 4 sites, located near winemaking regions in South Australia and New South Wales, for treatment and value-adding processing.

Tarac treats over 135,000 tonnes of grape marc, more than 40 million litres of liquid waste and approximately 7,000 tonnes of solid waste annually; about 70 percent of the solid and liquid residuals produced by the Australian wine industry.



##### Date Established

1930



##### Location

SA & NSW



##### Number of employees

60



##### Waste used

wine industry,  
grape marc



##### Products

value adding to solid  
and liquid winemaking  
residuals



## Case study

Solid residuals are treated to recover grape alcohol, brandy spirit and tarrates. These products are returned to the wine industry. Liquid residuals from wineries are treated at a waste water treatment plant co-owned by Tarac and a major local winery in Nuriootpa. The facility, known as the North Para Environment Control (NPEC), is considered to be one of the most efficient and effective waste water treatment plants in Australia. Treated water is used to irrigate local vineyards and pasture near Tarac's Samuel Road, Nuriootpa site, and to replace use of mains water in Tarac's processes.

By applying a closed loop system, Tarac also recycles and reuses its own by-products. Waste water from Tarac's own processes is recovered, treated at the same plant and re-used for Tarac's own processes. Solid residuals from Tarac's processes are turned into stock feed, mulch, soil conditioners and other products for the agricultural and horticultural industries.

In addition to the wine industry, Tarac supplies products to other industries including craft distilleries and other alcoholic beverage producers, food, homeopathy & naturopathy.

### Business results

With almost 90 years experience, Tarac is the leading manager of winemaking residuals in Australia.

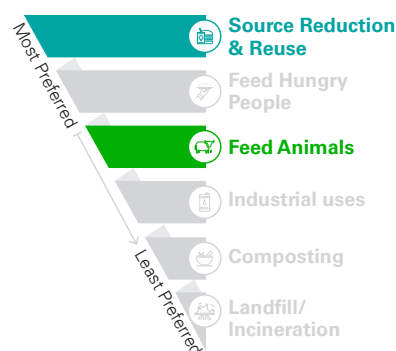
Tarac has been recognised for its contribution to the wine industry and sustainability through a number of awards including Banksia Sustainability Awards and Australian Business Awards.

With an eye on the environment and the Australian wine industry's waste challenge, Tarac's business solves major waste disposal and environmental issues and in doing this contributes to the long term sustainability and resilience of the Australian wine industry.

### Where to next

1. Driving further efficiency gains
2. Extracting more value from raw materials
3. Responding to rising costs of energy
4. Looking for sustainable growth opportunities

### Element/s of the food hierarchy model addressed:



### Key benefits of Circular Economy activity

1. Removes a waste disposal problem for wineries saving money and reducing their environmental liability
2. Valuable products are created for the use of the Australian wine industry delivering a sustainable revenue stream for Tarac
3. Through recycling water, Tarac is able to reduce its need for water from the Murray Darling Basin.

### Advice for others in adopting circular

1. Be prepared to make a long term commitment to achieve results.
2. Attitude and commitment are key.

## Case study

# Mackay Sugar

## Sugar by-products to bioenergy

### Description of business

Mackay Sugar, a Member of Nordzucker Group, is Australia's second largest sugar milling company, producing 690,000 tonnes of raw sugar a year. They also have a 25 per cent interest in sugar refining within Australia and New Zealand in a joint venture with Wilmar.

Sugar milling produces valuable by-products which Mackay Sugar is processing for its 'green projects' focused on bioenergy.

### Driver for establishing circular economy model

Mackay Sugar is committed to ensuring their operations are done in an environmentally responsible manner. They have a 'nothing is wasted' business approach – reusing and recycling their by-products to create 'green' products with a carbon positive footprint, that also enables Mackay Sugar to grow its business and products.

Recognising the growing market opportunity and interest in renewable energy, Mackay Sugar worked to create value from sugar milling by-products molasses and bagasse.

### Approach to fighting food waste through circular

The two main by-products of sugar production are biomasses - bagasse, the fibre left over from crushing the sugarcane, and molasses. Bagasse is used for biofuel and molasses is used as supplementary stock feed.

### Business results

Through using bagasse, Mackay Sugar is largely energy self-sufficient with excess energy produced being redirected to the national electricity grid. Their 38 megawatt Racecourse Cogeneration Plant (situated at their Racecourse Mill) produces enough renewable electricity to power about 30 per cent of Mackay year-round. The plant is also reducing Queensland's greenhouse gas emissions by 150,000 tonnes equivalent carbon dioxide (CO<sub>2</sub>e) each year, and unlike solar and wind, is not intermittent.



#### Date Established

1988



#### Location

Mackay, Queensland



#### Business type

Sugar, molasses and electricity producer



#### Company size

AUD\$400m+



#### Number of employees

600



[View 'Nothing is Wasted Cycle' Factsheet](#)



[View Cogeneration diagram](#)

## Case study

### Where to next

Mackay Sugar is undertaking a five year refurbishment of their three Mackay sugar mills and will be improving energy and processing efficiency to maximise output from the Racecourse Cogeneration Plant. There is considerable scope to increase surplus bagasse quantities through improved energy efficiency and increase renewable electricity production.

Mackay Sugar will continue to monitor opportunities for using their molasses for liquid biofuel production, however the advent of electric vehicles may impact this market. Molasses is an excellent renewable carbohydrate feedstock for chemicals currently derived from fossil fuels – developments in this market will also be monitored.

Improved water management is another focus for Mackay Sugar, with longer term plans to operate their mills using a larger percentage of the water that comes to site within the cane. This will reduce the need for supplementary river water, and reduce outflow to their water treatment ponds.

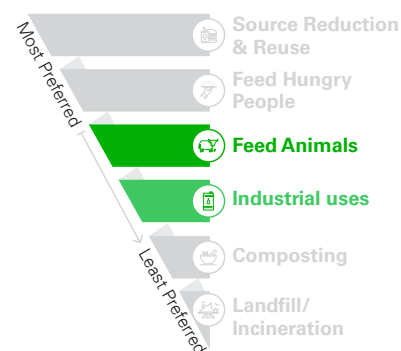
### Key benefits of Circular Economy activity

1. Largely energy self-sufficient, including production of refined sugar, using renewable fuel.
2. Reduced carbon emissions.
3. Return mill waste products (ash and mud) to cane-land as soil nutrients.
4. Molasses used as animal feed and as a feedstock for renewable ethanol production (by Wilmar).

### Advice for others in adopting circular

1. If process waste can be recycled to aid production of the input crop (eg sugarcane), yields can be improved and fertiliser costs reduced.
2. Avoid waste disposal costs.
3. Reduce environmental impact as much as possible (inputs and outputs).
4. Consider biomass-to-energy opportunities (thermal or electrical) to increase revenue or reduce energy input costs.

### Element/s of the food hierarchy model addressed:





## Case study

### Peats Soil

Organic waste to carbon-rich compost, mulch and bioenergy



#### Description of business

Peats Soil is a second-generation, South Australian based company focused on receiving, processing and marketing recyclable organic resources in bulk and bag forms.

Peats Soils also created the BiobiN, a mobile, on-site capture and containment bin that starts the composting process for organic waste (fruit, vegetable and meat) and manages the odour. They have also developed processes for creating biogas and biodiesel.

#### Driver for establishing circular economy model

Peter Wadewitz, Managing Director of both Peats Soils & BiobiN® Technologies, started making potting mix for his father when he was in his early teens. This grew into a nursery and the move to organics was driven by the State Government decision to focus on recycling organics.

Close to 15 years ago, Peter developed the BiobiN® that enables the composting of organic waste to start before being collected by Peats. In 2005, Peter demonstrated the BiobiN® on the show 'New Inventors'.

#### Business model

Peats Soil receives and processes green organics from Adelaide council kerbsides and from businesses with the BiobiN including hotels, supermarkets, schools, office buildings, food processors and manufacturers. Peats processes the green organics to create soil improvement products for agribusinesses, households and businesses.

Peats manages and processes 100,000 - 150,000 tonnes of organic waste annually.

The patented BiobiN® aeration system starts the composting process of organic material, reducing bacteria and other pathogens. The composting process maximises the amount of organic material that can be collected by the BiobiN®.

Once the waste is collected by Peats, the processed or partially processed organic material can be added to products such as soil conditioners, compost and biofuels – providing a valuable supply of nutrients, carbon and organic matter to agricultural soils, landscape supplies and alternative fuels.



#### Date Established

1974



#### Location

South Australia



#### Company size

AUD\$18m+



#### Number of employees

95



#### Waste use

Food and Garden Organics



#### Products

- Compost
- Mulch
- Biogas
- Biodiesel
- BiobiN

## Case study

This compost goes back to gardens, farms and vineyards as organic and carbon-rich material to improve soil health.

Peats also capture the methane gas produced by rotting organic material to create biogas for renewable energy production, and dirty fat from food service and supermarkets to create biodiesel.

Peats works to continually improve their processes and products applying insights from their customers in the farming community and also working with company scientists and industry professionals to ensure products are certified and tested to meet Australian standards.

### Business results

Peats has built over 500 BiobiNs with most in use around Australia. There are also BiobiNs in China, USA and UAE, markets that present big opportunities for organic waste capture and conversion.

In May 2019, Peats opened its fourth composting and renewable energy manufacturing at Whyalla, South Australia.

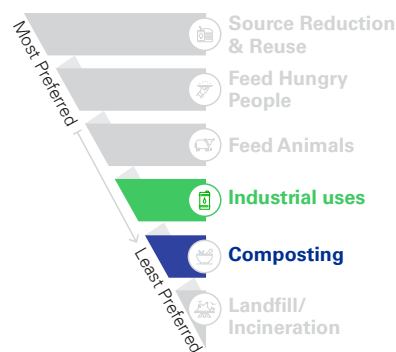
### Where to next

The company's vision is to be a world leader in sustainable and innovative organics recycling to produce valuable landscaping, garden and horticulture products.

The Whyalla renewable energy plant is planned to be fully operational by 30th June 2020. The site will process green, organic and food waste, digest the waste using Anaerobic Digestion, to produce both biogas for sale into the grid and a compost product that can be sold to surrounding agricultural markets for soil improvement and carbon enhancement. Compost product can be palletised for using in an air seeder on farm.

Peats is working to have its 25 strong truck fleet run on the biodiesel produced through the onsite biodiesel plant and the whole operation powered by biogas from an anaerobic digestion process.

### Element/s of the food hierarchy model addressed:



### Key benefits of Circular Economy activity

1. High quality compost restores nutrients in the soil.
2. Reduced food waste in landfill
3. Alternate energy sources through biogas and biodiesel
4. Reduced the requirement for water use of up to 60% on key agriculture crops

### Advice for others in adopting circular

1. The opportunities are huge and now is the time to take action.
2. Requires a coordinated approach across all levels of government and industry
3. Need to build additional composting capacity in regional areas







# Fight Food Waste CRC

If you are interested in fighting food waste and benefiting from the circular economy, the Fight Food Waste CRC is here to help. You can either:

1. **Contact the Fight Food Waste CRC** (08 8313 3564 or enquiries@fightfoodwastecrc.com.au) or go to our website [fightfoodwastecrc.com.au](https://fightfoodwastecrc.com.au) to obtain simple advice.
2. **Present your opportunity to the SME Solutions Centre** ([fightfoodwastecrc.com.au/project/sme/](https://fightfoodwastecrc.com.au/project/sme/)) when funding rounds are open and apply for up to \$50,000 (matching funding required) to develop new products or processes within your business to eliminate waste.
3. **Become a participant** in the Fight Food Waste CRC to undertake larger research, development or extension projects, as well as benefit from networking with like-minded organisations and receiving regular information on what is happening globally in the fight against food waste.

A list of existing Fight Food Waste CRC participants can be found at [fightfoodwastecrc.com.au/about-us/participants/](https://fightfoodwastecrc.com.au/about-us/participants/).

Should you prefer to discuss your options in person contact Dr Steven Lapidge, CEO of the Fight Food Waste CRC at [steven@fightfoodwastecrc.com.au](mailto:steven@fightfoodwastecrc.com.au).

# KPMG Circular Economy Services

Shifting from a linear to a circular model presents opportunities and benefits for businesses, communities and the environment.

KPMG specialists bring together skills in supply chain advisory, sustainability, strategy, innovation, customer and marketing, business modelling and finance to help your organisation along the circular economy journey, no matter what stage you are at.

As well as supporting individual business from a variety of sectors, KPMG brings experience working with organisations such as:

- **World Business Council for Sustainable Development** – developed a circular metrics framework that helps companies measure and benchmark their circular performance
- **European Commission** – provided training to advise government on strategies to stimulate circular economy and delivered training to small and medium enterprises to help them go circular
- **Rabobank NL** – partnered to deliver the Rabobank Circular Economy Challenge aimed at supporting Dutch businesses on their circular economy journey.

## KPMG's circular economy services include:

- **Research and trends analysis** to give insights on market activity, regulatory opportunities and risks and stakeholder expectations.
- **Identifying and assessing circular risks and opportunities** through material flow analysis to identify opportunities for circular, solutions to enable circular and model the financial benefits and costs.
- **Developing strategy** and determining what is needed to implement these solutions, including skills and competencies.
- **Developing metrics** to measure circular performance set goals, targets and performance monitoring metrics.
- **Providing education and training** to help build circular capabilities.
- **Facilitating external collaborations** to accelerate the transition to circular through open innovation challenges for problem solving, or targeted connections to researchers, commercial partners, and others.
- **Implementing strategy** including change management support, and measurement and reporting of circular impacts.
- **Assessing circular** and sustainability reports prepared by organisations to communicate progress against metrics.



## Linear risks are real

Co-authored by Circle Economy, PGGM, KPMG, WBCSD, and EBRD, the report aims to raise awareness and create a constructive dialogue with the financial and business community to better understand and model 'Linear Risks' – the exposure to the effects of linear business practices which will negatively impact an organisation's ability to continue as a going concern. It also aims to increase awareness on how circular economy can provide a solution to mitigate these 'Linear Risks'.

# Contributors

Thank you to the following people for their contribution to this report:

- Dr Steven Lapidge, Fight FoodWaste CRC
- Ben van Delden, KPMG
- Adrian King, KPMG
- Amanda Goddard, KPMG
- Scott Valentine, KPMG
- Marie-Claire Renault, KPMG
- Lucy Gubbins, KPMG
- Adrian Cullen, Woolworths
- Alex Holt, Woolworths
- Krista Watkins, Natural Evolution Foods
- Roslyn Aikman, YUME
- Julie Rawlings, Tarac Technologies
- Jeremy Blanks, Tarac Technologies
- Peter Gill, Mackay Sugar

# Looking for more inspiration?

- **Fight Food Waste CRC**, [fightfoodwastecrc.com.au](http://fightfoodwastecrc.com.au)
- **KPMG – Let's help SMEs to go circular**, [ec.europa.eu/environment/sme/pdf/Training%20materials\\_English.pdf](http://ec.europa.eu/environment/sme/pdf/Training%20materials_English.pdf)
- **KPMG – Circular Economy Services**, [home.kpmg/xx/en/home/insights/2019/04/circular-economy-services](http://home.kpmg/xx/en/home/insights/2019/04/circular-economy-services)
- Ellen MacArthur Foundation – Food Initiative, [ellenMacArthurfoundation.org/our-work/activities/food](http://ellenMacArthurfoundation.org/our-work/activities/food)
- **Food Drink Europe Ingredients for a circular economy**, [circulareconomy.fooddrinkeurope.eu](http://circulareconomy.fooddrinkeurope.eu)
- **Circular CoLab**, [circularcolab.org/us-circular-economy-report](http://circularcolab.org/us-circular-economy-report)
- **Too good to go**, [toogoodtogo.com/en](http://toogoodtogo.com/en)
- **Danish Food Cluster**, [danishfoodcluster.dk/members](http://danishfoodcluster.dk/members)
- **Winnow, cutting food waste with artificial intelligence**, [circularitycapital.com/winnow-portfolio](http://circularitycapital.com/winnow-portfolio)
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- **The Plant (USA)**, [plantchicago.org](http://plantchicago.org)
- **The state of circular economy in America**, [circularchange.com/s/USCEStudy\\_FullReport.pdf](http://circularchange.com/s/USCEStudy_FullReport.pdf)
- **Holland Circular Hotspot**, [hollandcircularhotspot.nl/en](http://hollandcircularhotspot.nl/en)
- **Planet Ark**, [planetark.org](http://planetark.org)



# Appendix 1

## International enabling ecosystems

Around the world, Governments are driving activity to enable and promote a shift toward circular. The following provides examples of some of these activities from around the world.

### EU

- EU Circularity Agenda 2024 – In 2015, the EU Action Plan for the Circular Economy was adopted and outlined plans to move towards circular economy, to improve competitiveness, create jobs, and enable sustainable growth.<sup>33</sup>
- Product Environmental Footprint – a methodology for measuring the environmental impact of products, as well as includes a set of principles for communicating the environmental performance of products.<sup>34</sup>
- EU Monitoring Framework for the Circular Economy (2018) – 10 key indicators covering each phase of the lifecycle of products as well as competitiveness aspects<sup>35</sup>
- Environmental Indicator Report of 2012 – first analysis of Europe's progress in achieving a more sustainable, regenerative economy, using six key indicators to assess resource efficiency and a further six addressing ecosystem resilience<sup>36</sup>.
- Sixty three legally binding targets and 68 non-binding objectives were set across nine environmental policy areas that the EU member states have to meet<sup>37</sup>
- EU Strategy for Plastics in a Circular Economy – EU-wide policy framework adopting a material-specific lifecycle approach to integrate circular design, use, reuse and recycling activities into plastics value chains<sup>38</sup>
- The EU has established resource-related policy goals extending as far ahead as 2050 as part of its Europe 2020 strategy. In many cases, these goals are accompanied by relevant targets and indicators to track implementation<sup>39</sup>.
- In September 2018 'Let's help SMEs to go circular' project was released. This was a project of the European Commission DG environment in conjunction with KPMG provided training support and materials to small-medium enterprises. It was noted that Small-medium enterprises (represent 99% of all EU businesses) were having difficulty in transitioning to circular due to more limited organisational, technological and financial capacity and access to (pre-) financing for

circular solutions. To date, 28 SME support organisations (for example chambers of commerce and sector associations) have received training to establish or expand their support programmes on the subject of circular economy.<sup>40</sup>

### Netherlands

- Goal for The Netherlands to be a completely circular economy by 2050. "A Circular Economy in the Netherlands by 2050," a government-wide programme for circular economy was released in September 2016. The document marks the start of a coordinated and focused effort towards circular with a shared vision and agreed pathway. Five economic sectors and value chains have been identified as priorities for the transition to circular, including biomass and food, and transition pathways have been developed.<sup>41</sup>
- Once a year the Ministry of Infrastructure and Water Management will hold the National Circular Economy Conference (in Dutch), and the Netherlands Environmental Assessment Agency (PBL) will publish a progress report every two years.

33. [https://ec.europa.eu/environment/circular-economy/index\\_en.htm](https://ec.europa.eu/environment/circular-economy/index_en.htm)

34. <https://europa.eu/european-council/en/policy/4-eu-product-environmental-footprint.html>

35. <https://ec.europa.eu/eurostat/web/circular-economy>

36. [http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/favourable-alignment-of-enablers/?doing\\_wp\\_cron=1572381733.9413309097290039062500#hide/fn-49](http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/favourable-alignment-of-enablers/?doing_wp_cron=1572381733.9413309097290039062500#hide/fn-49)

37. [http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/favourable-alignment-of-enablers/?doing\\_wp\\_cron=1572381733.9413309097290039062500#hide/fn-49](http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/favourable-alignment-of-enablers/?doing_wp_cron=1572381733.9413309097290039062500#hide/fn-49)

38. [https://ec.europa.eu/environment/circular-economy/pdf/report\\_implementation\\_circular\\_economy\\_action\\_plan.pdf](https://ec.europa.eu/environment/circular-economy/pdf/report_implementation_circular_economy_action_plan.pdf)

39. [http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/favourable-alignment-of-enablers/?doing\\_wp\\_cron=1572381733.9413309097290039062500#hide/fn-49](http://reports.weforum.org/toward-the-circular-economy-accelerating-the-scale-up-across-global-supply-chains/favourable-alignment-of-enablers/?doing_wp_cron=1572381733.9413309097290039062500#hide/fn-49)

40. [https://ec.europa.eu/environment/sme/circular\\_economy\\_boost\\_en.htm](https://ec.europa.eu/environment/sme/circular_economy_boost_en.htm)

41. <https://www.government.nl/documents/leaflets/2016/09/22/a-circular-economy-in-the-netherlands-by-2050>

- The Dutch Government is actively seeking policy and incentives for businesses to go circular and working to remove legislative roadblocks with a focus on:<sup>42</sup>
  - Fostering legislation and regulations – this involves reviewing legislation to identify any laws that cause roadblocks for the transition to a circular economy. These roadblocks will, wherever possible, be transformed into incentives.
  - Intelligent market incentives – for example financial benefits for companies that use resources as sustainably and efficiently as possible, and higher prices for products manufactured in a way that is harmful to the environment
  - Financing
  - Knowledge and innovation
  - International cooperation
  - Investments being made in businesses working toward a circular economy
- The Government's aim is that by 2030, 50% of materials to be reused as far as is possible, and for waste to be converted into usable raw materials where possible.
- The Government has committed €8 million in 2020 for programmes to advance the transition to a circular economy in a variety of sectors. To incentivise circular projects that reduce carbon emissions, the Government plans to make a one-off sum of €80 million available in 2020 for circular projects from groundworks, roadbuilding and hydraulic engineering.
- In April 2017, PBL Netherlands Environmental Assessment Agency released a policy brief *Food for the Circular Economy* that focused on policy needs and opportunities

presented by a circular approach to food production, waste and value from by-products.<sup>43</sup>

- The Ministry for Infrastructure has open lines of communication so people can identify and raise challenges to achieving a circular economy.
- Food Smart Facility – The Netherlands, Rabobank, the World Bank, IFAD, FAO and the Rockefeller Foundation are working together to develop a global framework to tackle food loss. This includes 'country heat maps', which show losses within the main food production chains in each country and which allows it to identify scope for action and investment.

## UK

- UK Govt Food Waste Measurement Roadmap - to halve food waste by 2030<sup>44</sup>
- The Courtauld Commitment is a voluntary agreement aimed at improving resource efficiency and reducing waste within the UK grocery sector. The agreement is funded by Westminster, Scottish, Welsh and Northern Ireland governments and delivered by the Waste and Resources Action Programme (WRAP). It supports the UK governments' policy goal of a 'zero waste economy' and climate change objectives to reduce greenhouse gas emissions<sup>45</sup>
- The UK Plastics Pact<sup>46</sup> is a trailblazing, collaborative initiative that will create a circular economy for plastics. It brings together businesses from across the entire plastics value chain with UK governments and NGOs to tackle the scourge of plastic waste.

## France

- In France, major legislation passed in 2015 on energy transition was a first significant step in raising public awareness about the issue of waste and moving toward a more circular economy.<sup>47</sup>
- "National Pact to Combat Food Waste" in 2016, France made a commitment to reduce food waste by half by 2025.<sup>48</sup>
- The first national law against food waste, known as the "Loi Garot", establishes a set of measures to reduce and manage this problem, particularly at the food retail level<sup>49</sup>

## Finland

- In 2016, Finland released its Circular Economy roadmap aimed at outlining the plan to be a carbon-neutral circular economy by 2025. The roadmap was developed with input from various sectors, companies, government departments and researchers and pilot projects were identified in the Circular Economy Roadmap
- An updated roadmap was released in March 2019 to recognise the need for revised goals and actions. Examples of actions identified in the Roadmap include impact investing and financing for internationally competitive circular solutions, and tools for industry to transition to circular.
- In an effort to position Finland leader in circular economy, initiatives are focused on building capabilities in sustainable food systems, bio-based economies and digitisation (data and new technologies)
- Business Finland and the Ministry for Foreign Affairs have made the circular economy part of Finland's country image.<sup>50</sup>

42 <https://www.government.nl/topics/circular-economy/encouraging-a-circular-economy>

43 <https://www.pbl.nl/sites/default/files/downloads/PBL-2017-Food-for-the-circular-economy-2878.pdf>

44 <https://www.igd.com/articles/article-viewer/t/food-waste-in-2019-whats-new-whats-happening/t/21526>

45 <http://www.wrap.org.uk/content/what-is-courtauld>

46 <http://www.wrap.org.uk/content/the-uk-plastics-pact>

47 <https://theconversation.com/the-rise-of-the-phenix-giving-a-second-life-to-food-waste-97407>

48 <https://media.sitra.fi/2017/02/28142644/Selvityksia121.pdf>

49 <https://theconversation.com/the-rise-of-the-phenix-giving-a-second-life-to-food-waste-97407>

50 <https://media.sitra.fi/2019/03/20110330/kiertotalouden-tiekartta-tiivistelma-en2.pdf>

## Scotland

- The Government has a target to reduce foodwaste by 1/3 by 2025.<sup>51</sup>
- ZeroWaste Scotland was established in 2014 to provide leadership, practical support and inform policy and investment for a circular economy in Scotland. The not for profit is funded by the Scottish Government and the European Regional Development Fund
- In 2016, the government committed £70 million for a Circular Economy Investment Fund and Service to support small and medium-sized enterprises (SMEs) to develop technologies, business models and infrastructure for circular and help existing businesses redesign their process in order to move towards a circular economy.<sup>52</sup>
- In 2016, the circular economy strategy “Making Things Last” was published with a focus on waste prevention and four key areas: 1. Food and drink and the bio-economy, 2. Remanufacture, 3. Construction and the build environment, and 4. Energy infrastructure.<sup>53</sup>
- In September 2019, the Government proposed a Circular Economy Bill with a plan to drive towards net zero carbon emission by 2045. The Bill is open for consultation and includes plans for a “Green New Deal” to drive investment into projects that will support the net zero carbon emission goal.<sup>54</sup>
- In May 2019, the Government introduced the Food Loss Reduction Promotion Bill which will come into effect by the end of 2019. The Bill includes the establishment of a food loss reduction body in the Cabinet Office that will be responsible for policy development on the issue. The Bill establishes October as the annual Food Loss Reduction month and requires Government to investigate food loss and enable initiatives that support entities such as Food Bank.<sup>55</sup>
- The Japanese concept of “mottainai” refers to regret at allowing a resource to go to waste without using its full value.<sup>56</sup>
- The Japanese food industry recycles about 85 per cent of its food waste, which are turned into animal feed, fertilizer or methane.<sup>57</sup>

## China

- China’s circular economy effort commenced 20 years ago as a way to improve the economy, protect the environment and reduce the demand on natural resources.<sup>58</sup>
- A number of policies have been introduced to encourage the development of circular economy systems. For example, In 2008 the Standing Committee of the 11th National People’s Congress (NPC) formalised aspects of the Circular Economy concept in a Circular Economy Promotion Law<sup>59</sup>
- In 2018, China and the EU signed a Memorandum of Understanding on Circular Economy Cooperation to set a platform for greater sharing of best practice and continued focus, investment and improvement related to circular economies.<sup>60</sup>

## USA

- In 2013, US Department of Agriculture and the Environmental Protection Agency launched the U.S. Food Waste Challenge for stakeholders in the food value chain to share best practices on ways to reduce, recover, and recycle food loss and waste. The goal was to have 1,000 participants by 2020. By the end of 2014, the U.S. Food Waste Challenge had over 4,000 active participants
- In 2015, aligned with the UN Sustainable Development Goals, the United States government has set a national target to reduce food waste by 50% by 2030.
- Recognising that a shift to reducing food waste needs active participation from the whole value chain, the US Department of Agriculture has named 25 major food manufacturers, retailers and food service and hospitality organisations as Food Loss and Waste 2030 Champions. Each champion has committed to a reduction in food loss and waste within their own operations and is required to report on progress through their company websites.<sup>61</sup>
- In October 2018, a joint agency agreement titled *Winning on Reducing Food Waste Initiative* was signed by the U.S. Department of Agriculture (USDA), the U.S. Environmental Protection Agency (EPA), and the U.S. Food and Drug Administration (FDA). This is a formal commitment to a shared vision of reducing food loss and waste and an agreement to coordinate actions (for example research, policy discussion, public-private partnerships, and methodologies for measuring food waste) and leverage government resources.<sup>62</sup>

## Japan

- The Japanese Government enacted the law entitled “Basic Act on Establishing a Circular Society” in 2000.

51. <https://www.zerowastescotland.org.uk/reduce-food-waste>

52. <https://resource.co/article/scotland-invests-%C2%A370-million-develop-circular-economy-10877>

53. <https://www.gov.scot/publications/making-things-last-circular-economy-strategy-scotland/pages/2/>

54. <https://resource.co/article/scottish-government-table-circular-economy-bill>

55. <https://zenbird.media/new-japan-law-to-aid-food-banks-and-spread-food-loss-awareness/>

56. <https://www.abc.net.au/radionational/programs/philosopherszone/avoiding-waste-with-the-japanese-concept-of-mottainai/6722720>

57. <https://www.sitra.fi/en/articles/japan-finland-show-off-circular-economy-wcef2018/>

58. [https://www.youtube.com/watch?v=r-36deRWjx0&list=PLXT\\_ozykGVanA0x8nK7BP7AHNP9Ln2B4P&index=10](https://www.youtube.com/watch?v=r-36deRWjx0&list=PLXT_ozykGVanA0x8nK7BP7AHNP9Ln2B4P&index=10)

59. <http://www.indigodev.com/Circular1.html>

60. <https://www.ellenMacArthurfoundation.org/news/china-eu-agreement-paves-way-for-global-adoption-of-circular-economy>

61. <https://www.usda.gov/foodlossandwaste/champions>

62. <https://www.usda.gov/foodlossandwaste/winning>



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