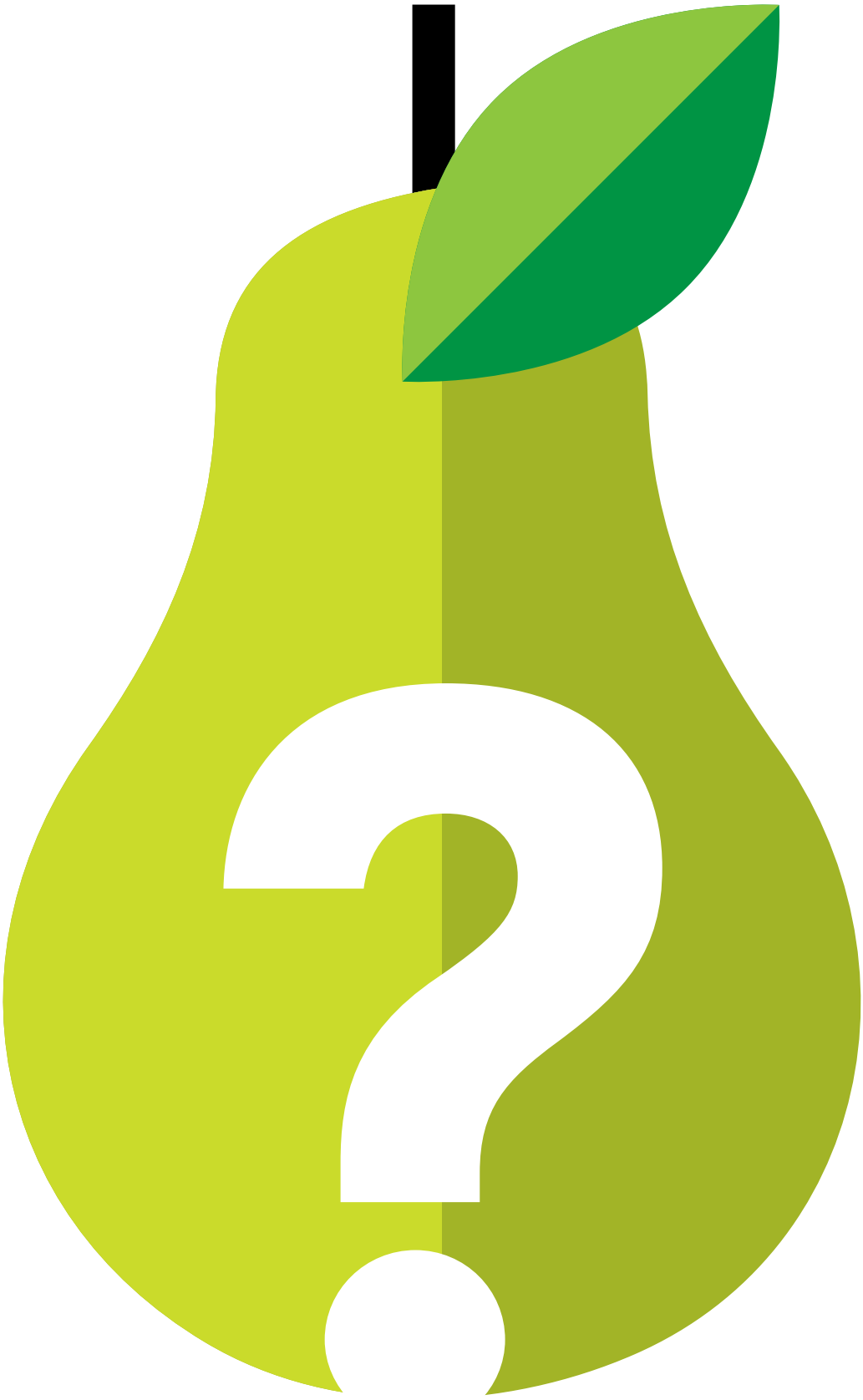
National Food Waste Strategy Feasibility Study

Can we halve Australia's food waste by 2030?

FIAL

The Food and Agribusiness Growth Centre

2021



It is feasible to halve Australia's food waste by 2030, but it will require unprecedented action by governments, industry and the community.

About this study

In 2017 the Australian Federal Government published the *National Food Waste Strategy*[1] to provide a framework to support collective action towards reducing food waste.

The Strategy outlined the definition of food waste and committed to a target of halving Australia's annual food waste by 2030, in line with the requirements of the United Nations Sustainable Development Goal Target 12.3 (SDG 12.3). The Food and Agribusiness Growth Centre, trading as Food Innovation Australia Limited (FIAL), was tasked with supporting the Australian Government to implement the Strategy. In 2020 FIAL published *A Roadmap for reducing Australia's food waste by half by 2030*[2].
This included a recommendation to undertake a Feasibility Study to provide more granularity on the feasibility of achieving the target and the associated actions and investment required.

The objectives of this Feasibility Study were:

- Update and improve the **National Food Waste Baseline** including articulation of key food waste hotspots and environmental impacts.
- Test different **scenarios** to understand whether they are feasible, including the impact of key considerations such as the **definition of food waste**.
- Establish a delivery trajectory for the **recommended scenario**, including interim targets and milestones.
- Collate a **clear evidence base** that can be used by policymakers and industry to underpin a rapid acceleration of action towards the 2030 target.

How the National Food Waste Strategy defines Food Waste:

- Solid or liquid food that is intended for human consumption and is generated across the entire supply and consumption chain.
- Food that does not reach the consumer, or reaches the consumer but is thrown away. This includes edible food, the parts of food that can be consumed but are disposed of, and inedible food, the parts of food that are not consumed because they are either unable to be consumed or are considered undesirable (such as seeds, bones, coffee grounds, skins, or peels).
- Food that is imported into, and disposed of, in Australia.
- Food that is produced or manufactured for export but does not leave Australia.

1 Commonwealth of Australia (2017), National Food Waste Strategy
2 Food Innovation Australia Limited (2019), A Roadmap for reducing Australia's food waste by half by 2030

How do we know we can halve Australia's

Project methodology

1.

Best practice review & intervention list

Review current international best practice on approaches to food waste prevention. Apply them to the Australian context to create a longlist of potential interventions

2.

Baseline update & hotspot analysis

Update the national food waste baseline and associated hotspots

3.

High-level scenario analysis

Group the interventions into four high-level delivery scenarios to assess feasibility and most appropriate intervention levers

4.

Recommended scenario development

Develop a recommended scenario, combining most effective interventions to define a feasible delivery trajectory

5.

Business case

Develop a Cost Benefit Analysis and business case for funders to deliver the recommended scenario

food waste by 2030?

Accessing supporting material and underlying data sets

This document includes the key results extracted from the full report. The full report and associated appendix, which outlines the detailed project methodology, can be found at **https://www.fial.com.au/sharing-knowledge/food-waste** The underlying data sets can also be freely accessed through the National Food Waste Strategy Feasibility Study Data Dashboard. This interactive dashboard has been designed to enable industry and government stakeholders to interrogate and filter the baseline, hotspots and scenario data and extract key insights relevant to a specific sector, commodity, or intervention type.

View Dashboard

The 2021 National Food Waste Baseline

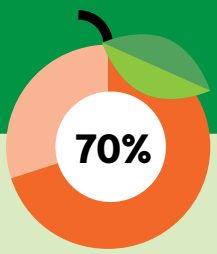
The National Food Waste Baseline provides a benchmark against which progress towards the target can be measured and a basis for identifying food waste hotspots across the food value chain.

The baseline data was collated from a range of existing studies compiling 2018-2019 data; supplemented by additional data sets collected from industry and households in 2020. A mass balance approach was used to measure food waste and losses across the food value chain.

Australia produces:

7.6m tonnes[3]

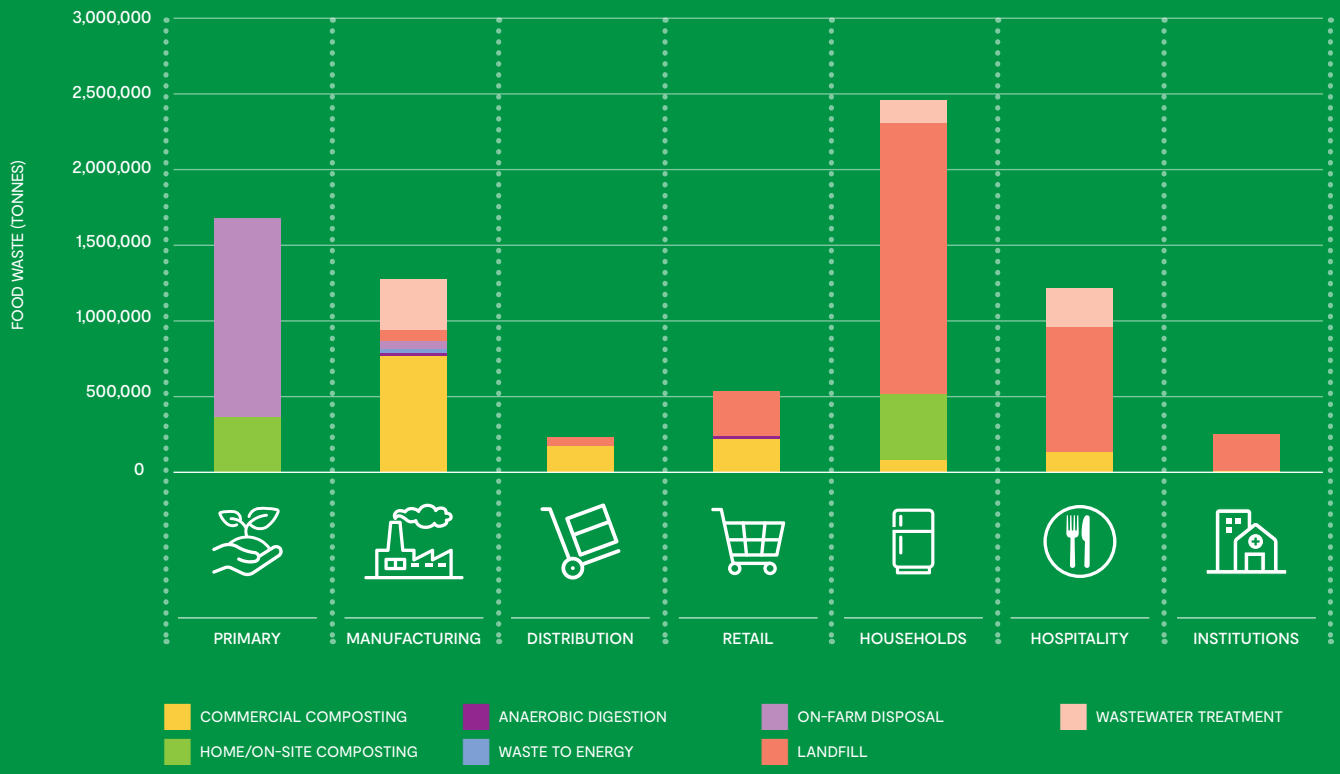
of food waste per year or 312kg per capita



APPROXIMATELY 70%
OF THIS IS **EDIBLE** FOOD

Where does food waste occur and where does it end up?

Food waste by value chain sector:



3 This is the revised from the 7.3m tonnes provided in the previous baseline. Further differences between the 2019 and 2021 baseline can be found in the full report.

What foods are we wasting?*

The impacts of 18 food commodity groups were assessed against 5 impact categories; climate change, water scarcity, food waste wet tonnes, land occupation & cost.

	TONNES OF WASTE	GHG EMISSIONS CO_2e
RED MEAT	WARM	HOT
POULTRY	WARM	WARM
EGGS	COLD	COLD
CHEESE	WARM	HOT
MILK	HOT	HOT
SEAFOOD	COLD	WARM
BREAD	COLD	COLD
VEGETABLES – FRESH, ROOT	HOT	COLD
VEGETABLES – FRESH, OTHER NON-ROOT	HOT	COLD
FRUIT	HOT	COLD
VEGETABLES – FRESH, BRASSICAS	WARM	COLD
CEREAL PRODUCTS	WARM	COLD
COMPLEX PRODUCTS	HOT	HOT
VEGETABLES – PROCESSED	COLD	COLD
WINE AND BEER	HOT	WARM
COFFEE & TEA	COLD	COLD
SUGAR	COLD	COLD
NUTS	COLD	COLD

HOT WARM COLD

* Results from applying UN Life Cycles Analysis — Hotspot Methodology, showing aggregated results across all seven stages in the food value chain.

What we could do with the food we waste?

IN 2019, 1 IN 5 AUSTRALIANS HAD EXPERIENCED FOOD INSECURITY IN THE PREVIOUS 12 MONTHS†

IN 2020, DEMAND FOR FOOD RELIEF INCREASED BY AN AVERAGE OF 47%

CURRENTLY, 43% OF ALL FOOD INSECURE AUSTRALIANS ARE GOING A WHOLE DAY WITHOUT EATING AT LEAST ONCE A WEEK

COMPARED TO 30% IN 2019

FOOD INSECURITY CAUSES A DECLINE IN MENTAL HEALTH

† Foodbank (2020), 2019/2020 Hunger Report

What is the impact of the food we waste across its lifecycle?

$36.6 billion

COST OF WASTE TO THE AUSTRALIAN ECONOMY

$19.3 BILLION OF THESE COSTS COME FROM HOUSEHOLDS OR APPROXIMATELY $2,000 - 2,500 PER HOUSEHOLD PER YEAR.

25m+ hectares

WASTED TO GROW AND MANUFACTURE FOOD

BIGGER THAN THE LANDMASS OF VICTORIA (22.7m HA)

2628.3 gigalitres equivalent

THIS EQUATES TO 286 LITRES OF WATER PER PERSON PER DAY

17.5m tonnes

OF CO_2 GENERATED FROM THE PRODUCTION AND DISPOSAL OF FOOD THAT IS WASTED IN AUSTRALIA (EXCLUDING EXPORTS)

EQUIVALENT TO 3% OF AUSTRALIA'S ANNUAL EMISSIONS

Food waste reduction scenario analysis

If we maintain our current rate of progress and ambition, we will not meet our target.

Drawing from a long list of 47 tried and tested food waste reduction interventions, four distinct food waste reduction 'scenarios' were developed.

The scenario analysis was designed to:

- Identify the most effective policy and industry 'levers' that can be pulled to **maximize food waste reduction** in the Australian context
- Identify which 'levers' provide the **most effective financial and environmental return on investment**
- Define if it is even **technically 'possible'** to halve food waste if we were to apply all available resources.

Given these objectives, the scenarios did not account for various details such as double counting and staggering the start times of interventions, which is considered in the final recommended scenario.

The four food waste reduction scenarios:

1. **Current Progress Maintained (CPM):**
   Continuing the current trajectory including a full and successful implementation of initiatives already committed to, planned or likely to increase in a 'business as usual' context.

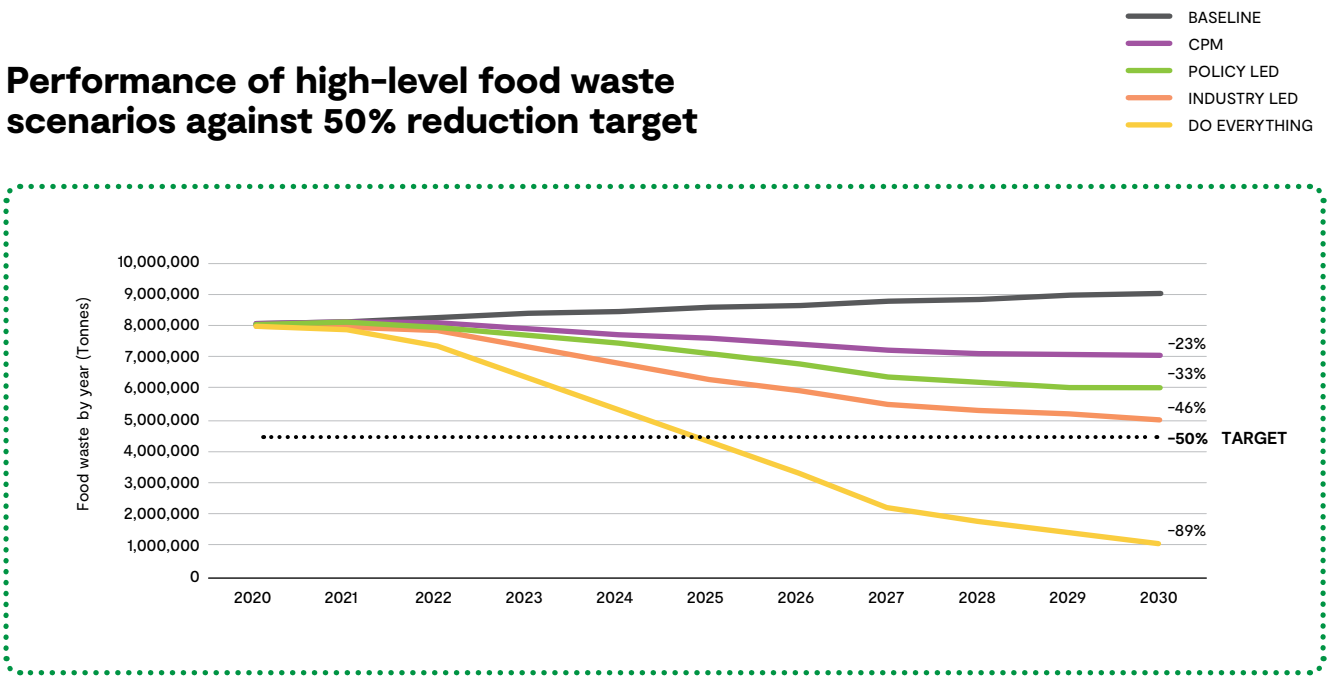
2. **Policy Led:**
   Focus on legal and regulatory tools, such as deployment of fiscal and financial incentives and development of key infrastructure.

3. **Industry Led:**
   Focus on private sector action across the entire value chain with an increased focus on voluntary agreements and market-based changes to the waste system.

4. **Do Everything:**
   Significant but plausible investment in innovation, fiscal and financial incentives, high regulation, high impact trajectory for voluntary agreement, high citizen engagement and industry involvement.

For the purposes of the scenario analysis, minor adjustments were made to the current and future baseline in line with current and projected population growth. This placed the 2020 baseline at 7.9mt and the 2030 baseline at 9.2mt. The impact of the initiatives in each of the scenarios was modelled against the projected baseline. A full breakdown of the initiatives included in each of the scenarios and their modelled impacts can be viewed on the *Feasibility Study Data Dashboard*.

Performance of high-level food waste scenarios against 50% reduction target



SCENARIO	PERCENT REDUCTION FROM 2030 BASELINE	ESTIMATED TOTAL INVESTMENT ($bn)	ESTIMATED $/T AVOIDED
CURRENT PROGRESS MAINTAINED	23%	$5.5 – 6.5	$634.03
POLICY LED	33%	$7 - 8	$530.32
INDUSTRY LED	46%	$4 - 5	$213.25
DO EVERYTHING	89%	$10.5 – 11.5	$285.02

Key learnings:

- If we 'do everything' it is technically possible to halve Australia's food waste within 6-7 years. However, the budget and resources to do this are likely prohibitive.
- No single lever on its own, Industry Led or Policy Led, will be sufficient to halve food waste by 2030.
- Industry led initiatives provide the most cost-effective approach to reducing food waste, once a supportive policy framework is in place.
- Combining policies that support and stimulate the private sector with voluntary, industry led initiatives produces the combination of 'levers' with the best chance of halving food waste by 2030 within a feasible investment range.

Recommended food waste reduction scenario

Key insights from the high level scenario analysis were used to inform the design of a recommended scenario.

The recommended scenario further considered the effectiveness and cost efficiency of each intervention, where in the value chain they would deliver impact, the interrelationships between interventions, the start date and overall feasibility of implementation.

Diverting surplus food that cannot be eaten by humans to animal feed was modelled on the remaining waste after other prevention interventions were implemented to ensure that true prevention at source was being prioritised.

The final 23 interventions can be broadly grouped into three distinct categories:

Behaviour change campaigns:

Nationwide campaigns that directly target key behaviours in households and businesses to reduce food waste.

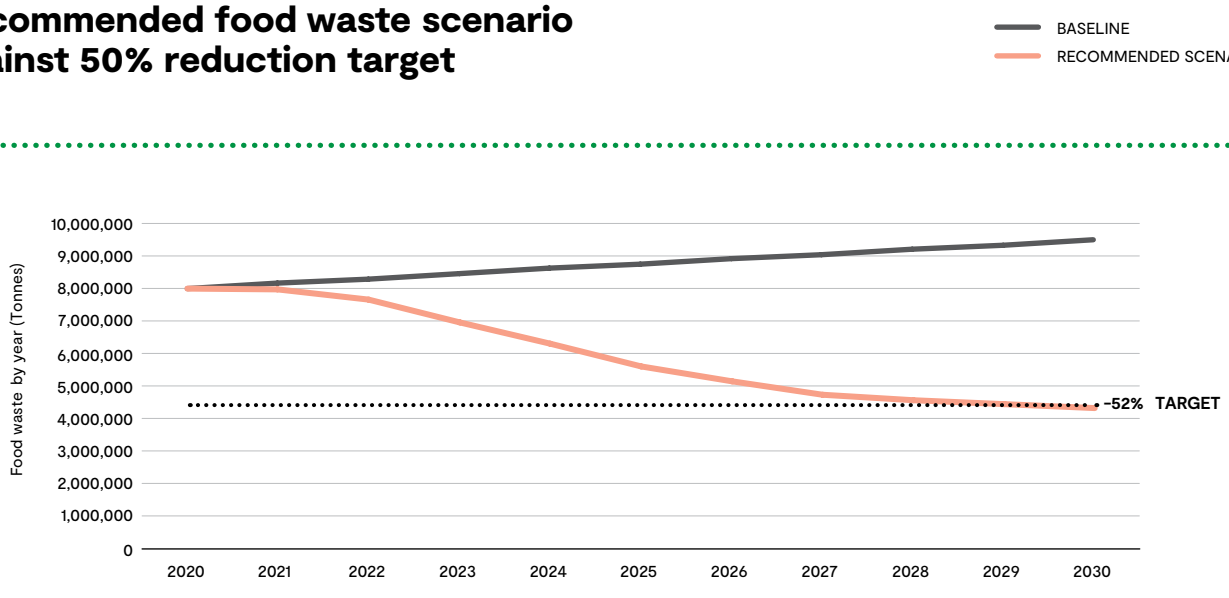
Policy Led interventions:

Creating an enabling policy framework to facilitate industry action with legislative and regulatory change, R&D, infrastructure development and grants.

Industry Led interventions:

Private sector led activities driven by market forces and support from government.

Recommended food waste scenario against 50% reduction target



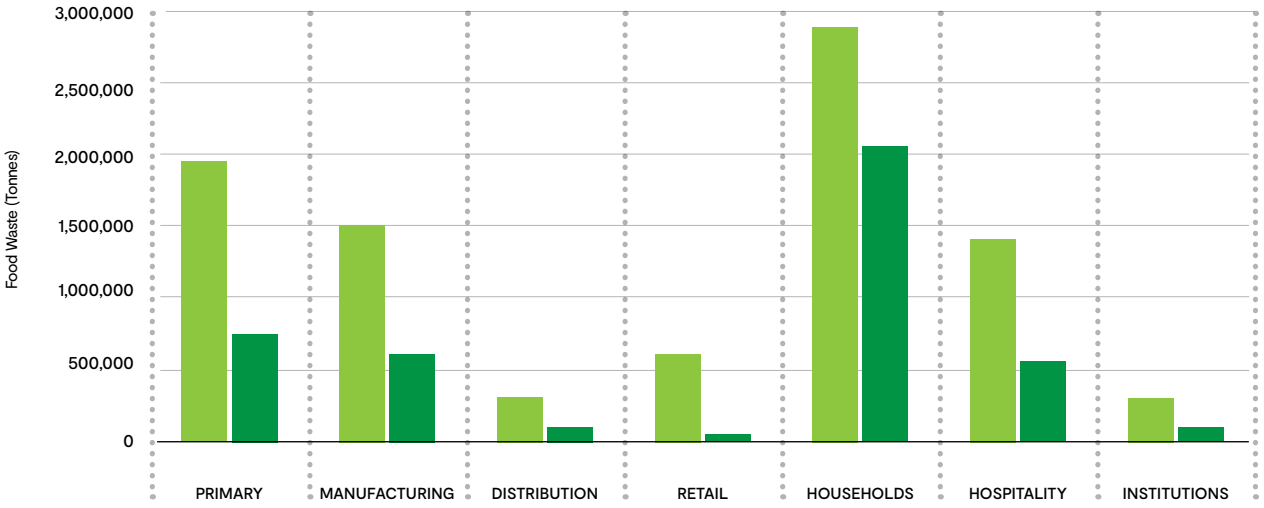
Cumulative impact of interventions in the recommended scenario

NATIONAL CAMPAIGNS
INDUSTRY LED
POLICY LED
ANIMAL FEED

Over the course of 10 years the recommended scenario reduces food waste by approximately 22.5m tonnes.

Food waste by stage in supply chain baseline vs recommended scenario

2030 PROJECTED BASELINE (DO NOTHING)
2030 RECOMMENDED SCENARIO



Key results

It is feasible

to halve Australia's food waste by 52% by 2030 if the recommended scenario is fully implemented at the described scale and pace.

This scenario would see effectively the elimination of food waste in wholesale-retail

and reduction by greater than half across all other stages in the value chain except households.

Household food waste will need to be reduced by a minimum of 30%

for any feasible chance of halving Australia's total food waste.

What happens if we exclude inedible food waste from the definition?

If the definition of food waste in Australia was changed to exclude inedible food waste, the 50% target **could be feasibly reached by 2027** under the recommended scenario.

The 2030 business case for action

For every $1 spent society gets ~ $7 back

The costs:

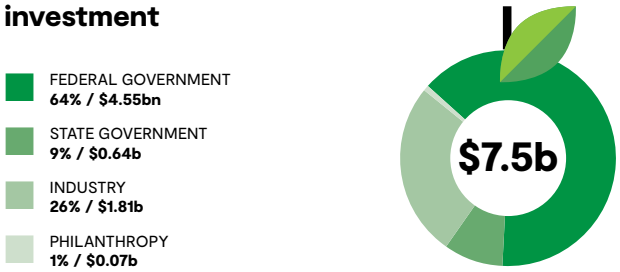
$2 billion

of new money invested to halve food waste

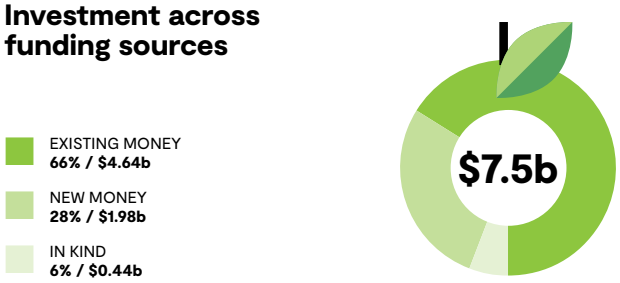
A total of ~$7–7.5bn is required to halve food waste by 2030. $4.6bn is already committed or planned, requiring an additional $2bn in new money and $0.5bn in in-kind investment.

Who pays:

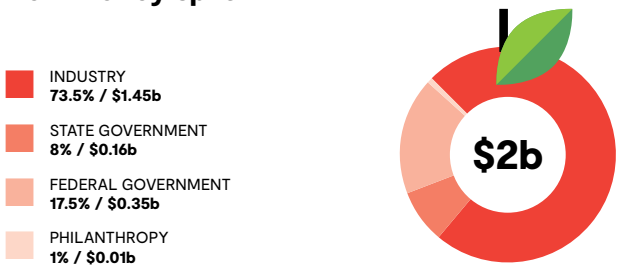
Recommended scenario investment



Investment across funding sources



New money split



The benefits:

$58 billion

Net benefit back to society

For every $1 spent on food waste interventions this scenario **delivers a minimum of $7 benefit back to the economy**. This return on investment will only increase as the social cost of carbon and landfill costs increase over time.

22.4 million

tonnes of food waste avoided

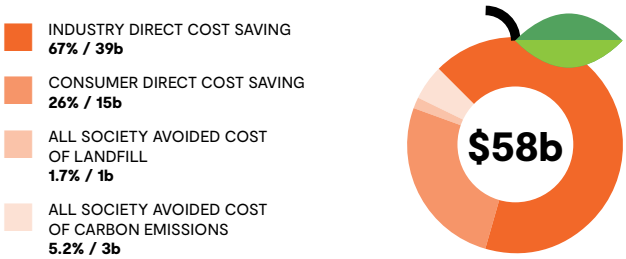
50.5 million

tonnes of CO_2 emissions avoided

Which is equivalent to taking half of Australia's vehicles off the road for a year.

Who benefits:

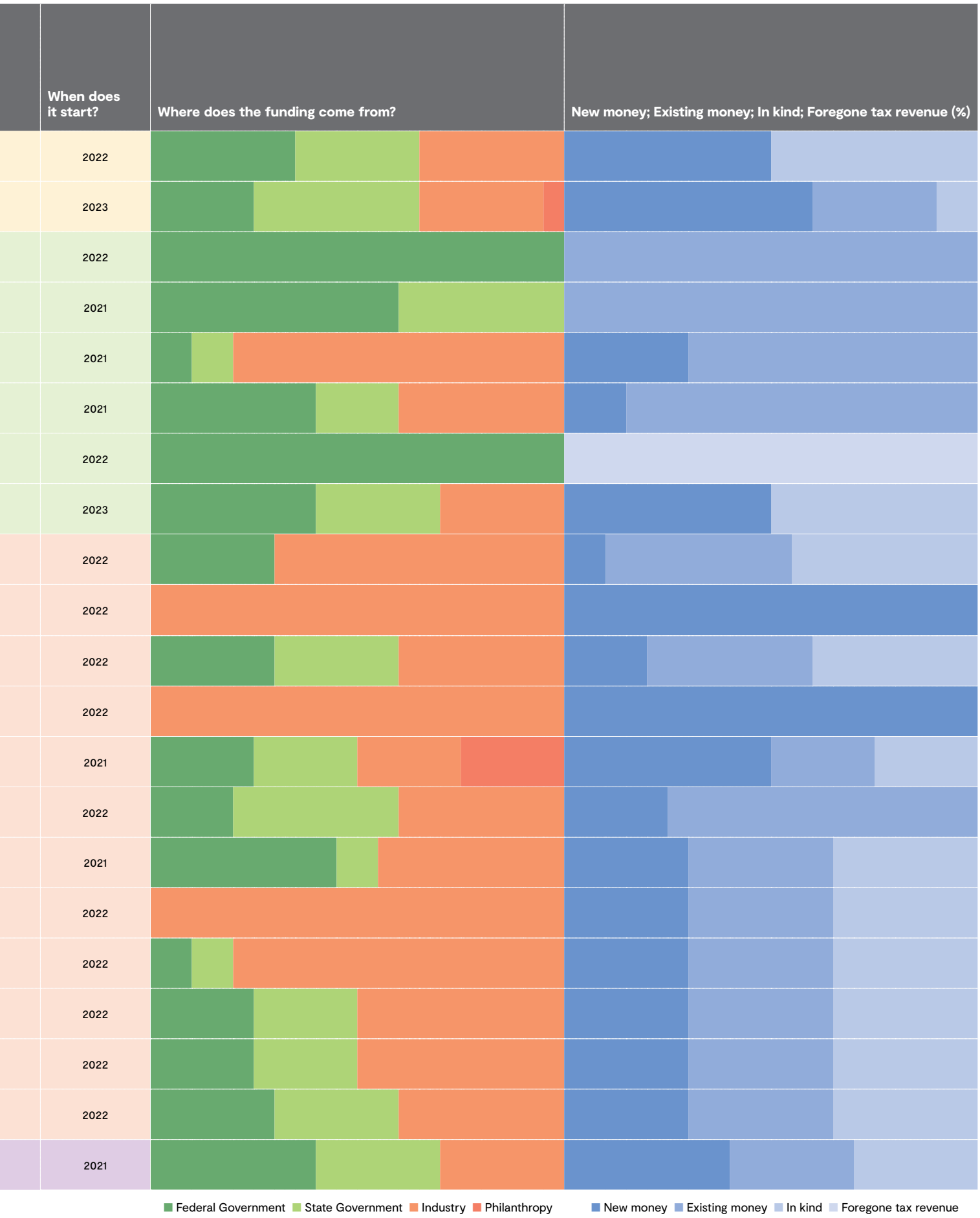
Total $58 billion



Under the recommended scenario, while Industry will contribute the majority of the new investment ($1.45bn), they will also be the stakeholder group to benefit most, realising over $39bn estimated savings through avoided spend and efficiency gains. Furthermore, full implementation will support the government's commitment to emission reduction and contribution to the UN SDGs.

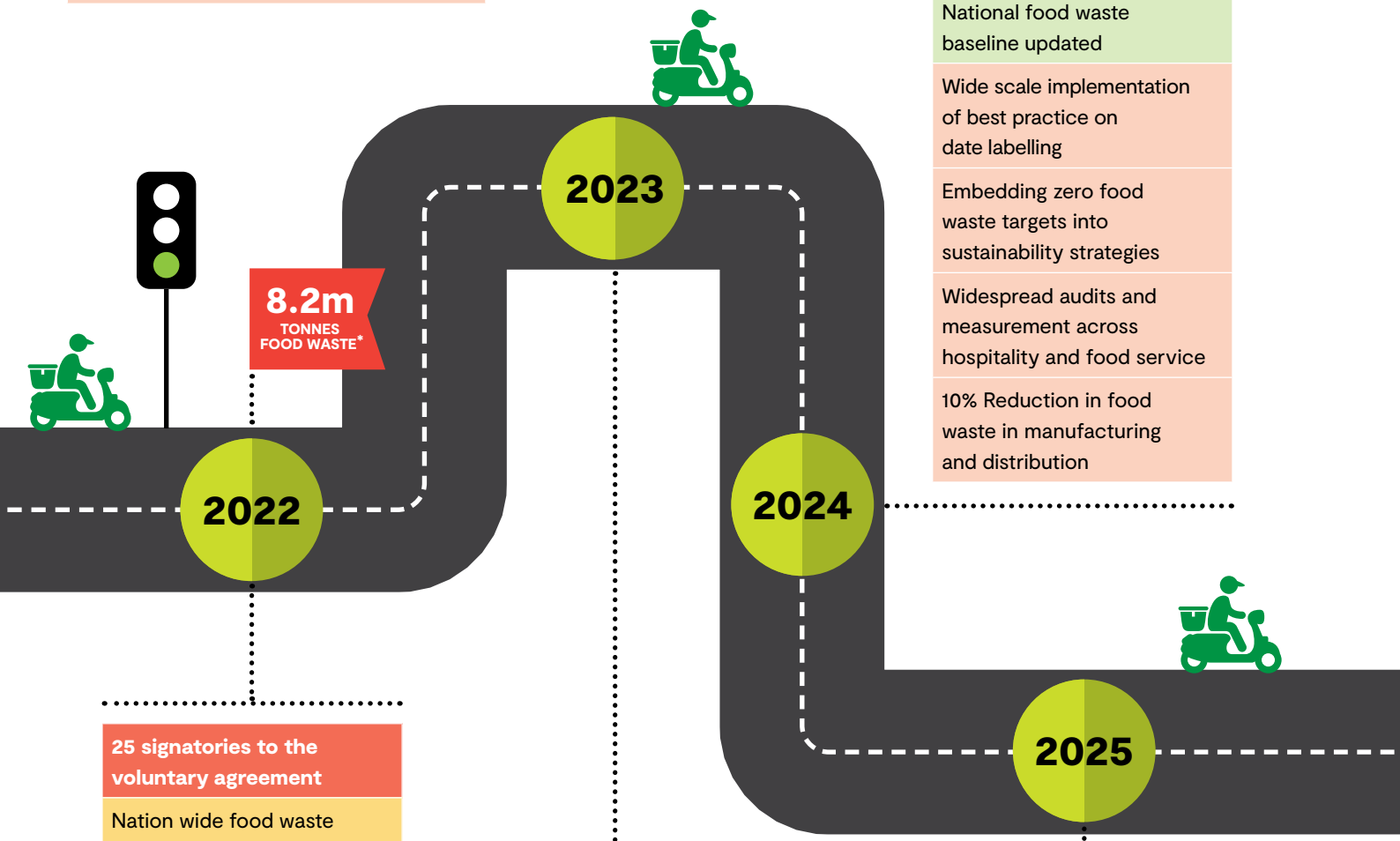
Interventions summary table

	What is it?	Who could lead the intervention?	Primary	Manufacturing	Distribution	Wholesale–Retail	Household	Hospitality	Institutions
NATIONAL CAMPAIGNS	Food waste prevention campaign for hospitality & food service (HAFS) professionals	Private sector – hospitality & food service companies; a new nationwide behaviour change campaign						✓	✓
	Nationwide consumer facing campaign	All levels of Government – Private sector, Civil society; a new nationwide behaviour change campaign					✓		
POLICY LED	Investment in national infrastructure	Federal & State government	✓	✓	✓				
	Grants for FLW prevention & research	Federal government; State government; Research sector	✓	✓	✓	✓		✓	✓
	Lean manufacturing	Private sector – manufacturing	✓	✓				✓	✓
	Nutrient extraction from wastes	Research sector; Private sector – grocery retail and manufacturing	✓	✓					
	Tax credits or incentives for food donation and food waste measurement technologies	Federal government	✓	✓	✓	✓		✓	✓
	Tackling unfair trading practices	Federal government	✓	✓					
INDUSTRY LED	FLW measurement	Stop Food Waste Australia, Federal & State Government	✓	✓	✓	✓		✓	✓
	Measurement technology for hospitality & food service businesses	Private sector – hospitality & food service						✓	✓
	Whole crop harvesting	Private sector – primary production Private sector – all retail and manufacturing	✓						
	Stabilisation of surplus food	Private sector – manufacturing		✓	✓	✓			
	Resale and donation of surplus food	Civil society; Private sector – all retail, manufacturing and primary production; Private sector – digital & technology Federal government	✓	✓		✓		✓	✓
	Food cold chain improvements (from farm to fork)	Private sector – cold food chain, all retail and manufacturing Independent entity; Citizens	✓	✓	✓	✓	✓	✓	✓
	The Voluntary Agreement Program	Stop Food Waste Australia	✓	✓	✓	✓	✓	✓	✓
	Extending shelf life	Private sector – all retail and manufacturing				✓	✓	✓	✓
	Retail operational efficiency	Private sector – hospitality & food service				✓		✓	✓
	Extending use by dates (safely)	Private sector – hospitality & food service; Food standards				✓	✓	✓	✓
	Improved date labelling	Private sector – hospitality, food service & grocery retail				✓	✓	✓	✓
	Menu planning for waste prevention	Private sector – hospitality & food service						✓	✓
ANIMAL FEED	Food waste to animal feed	Private sector – all retail, manufacturing, primary production, animal feed manufacturers; Research sector; Federal government; State government; Independent entity	✓	✓	✓	✓		✓	✓


When does it start?
Where does the funding come from?
New money; Existing money; In kind; Foregone tax revenue (%)
2022
2023
2022
2021
2021
2021
2022
2023
2022
2022
2022
2022
2021
2022
2021
2022
2022
2022
2022
2022
2021
Federal Government
State Government
Industry
Philanthropy
New money
Existing money
In kind
Foregone tax revenue

Roadmap to success

Key metrics of success
National Campaign Intervention
Policy Led Intervention
Industry Led Intervention



8.2m TONNES FOOD WASTE*

7.5m TONNES FOOD WASTE

2022

25 signatories to the voluntary agreement

- Nation wide food waste campaign calendar agreed
- First round grants for food waste prevention and research allocated
- Cold food code for produce developed

* increased from baseline based on projected population growth

2023

- Employee campaign designed and launched
- Tax credit exemptions for donations
- National food donation targets set

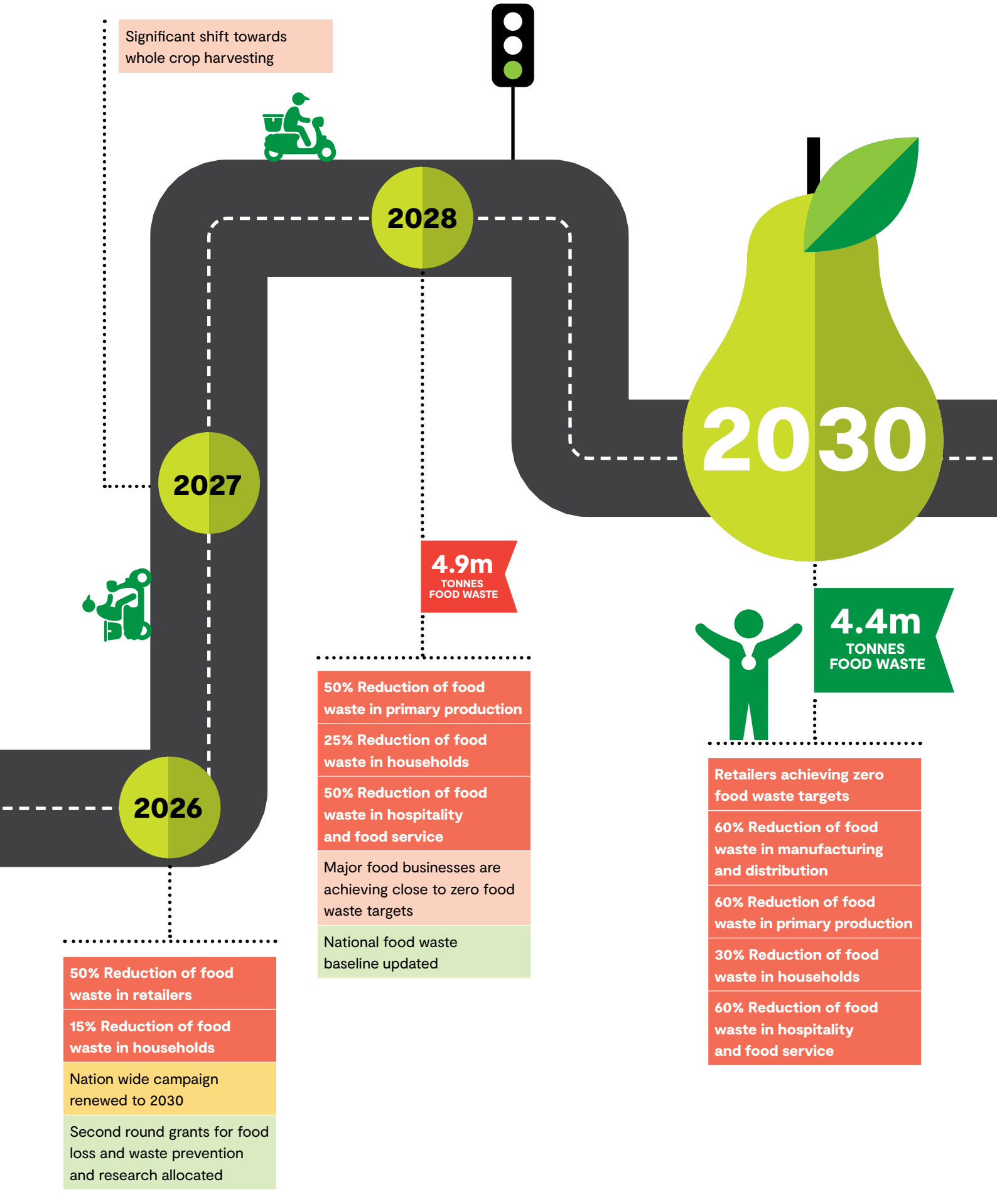
2024

50 Signatories to voluntary agreement

- Consistent nation wide consumer campaign
- National food waste baseline updated
- Wide scale implementation of best practice on date labelling
- Embedding zero food waste targets into sustainability strategies
- Widespread audits and measurement across hospitality and food service
- 10% Reduction in food waste in manufacturing and distribution

2025

- Primary production has reduced food waste by a quarter
- Cold food code for meat and dairy implemented


Significant shift towards whole crop harvesting
2026
50% Reduction of food waste in retailers
15% Reduction of food waste in households
Nation wide campaign renewed to 2030
Second round grants for food loss and waste prevention and research allocated
2027
2028
4.9m
TONNES
FOOD WASTE
50% Reduction of food waste in primary production
25% Reduction of food waste in households
50% Reduction of food waste in hospitality and food service
Major food businesses are achieving close to zero food waste targets
National food waste baseline updated
2030
4.4m
TONNES
FOOD WASTE
Retailers achieving zero food waste targets
60% Reduction of food waste in manufacturing and distribution
60% Reduction of food waste in primary production
30% Reduction of food waste in households
60% Reduction of food waste in hospitality and food service

Acknowledgements

Commissioned by

The Food and Agribusiness Growth Centre, trading as Food Innovation Australia Limited (FIAL) (2021)

FIAL
The Food and Agribusiness Growth Centre

Project delivery consortium

Edge Environment (Consortium Lead), Lifecycles, WRAP and 3Keel

EDGE

lifecycles.

wrap

3keel

Project advisory group

A select panel of experts was engaged throughout the project to advise on methodology, assumptions, and results. This included representatives from:

- CSIRO
- OzHarvest
- Australian Food Cold Chain Council
- State, Territory & Federal Governments
- Fight Food Waste Ltd