

# Circular Central VIC: a regional circular scan

Results Webinar, July 2023



Mildura Rural City Council



# Acknowledgement of Country

I acknowledge that the City of Greater Bendigo is on Dja Dja Wurrung and Taungurung Country.

I would like to acknowledge and extend my appreciation for the Traditional Owners of the lands that we are all meeting on today.

Today, we pay our respects to leaders and Elders past, present and future for they hold the memories, the traditions, the culture and the hopes of their Peoples.

# Agenda

- **Acknowledgement of Country [5 minutes]**
- **Project background & rationale: why this project [10 minutes]**
- **Project process & methodology: how we approached the project [10 minutes]**
- **Results & findings: what the project revealed [15 minutes]**
- **Gaps & reflections: challenges, learnings and takeaways [10 minutes]**
- **Q&A [10 minutes]**

This project was supported by the Circular Economy Councils Fund. The Fund is delivered by Sustainability Victoria under the Victorian Government's circular economy plan, *Recycling Victoria: a new economy*.

Project funding was also provided by the City of Greater Bendigo and former Loddon Mallee Waste & Resource Recovery Group.



# Project background & rationale

## Why this project?

- Limited examples of this CE work in Australia, let alone Victoria.
- Narrative across local and state government continues to focus on waste, recycling and bins, rather than CE.
- Trying to restart the 'Regional Circular Economy Plan' discussion and identify opportunities for tangible CE actions.
- Ultimately trying to catalyse some action to move beyond number of bins, bin frequency, and deposit return schemes!
- Don't have all the answers, but it's a start.

# This project investigated circular economy opportunities for Central Victoria

Building on Loddon Mallee's regional Circular Economy Plan

The circular economy is a systems approach to:



**DESIGN OUT**  
waste and pollution



**RETAIN**  
value in assets and materials



**REGENERATE**  
natural systems

Aligning regional aspirations and priorities with real circular opportunities

Key enablers in Loddon Mallee's Regional Circular Economy Plan



Developing end use markets



Improved collaboration and communication



Improved Infrastructure



Behaviour change (industry and consumers)



Legislation, regulations or standards reform

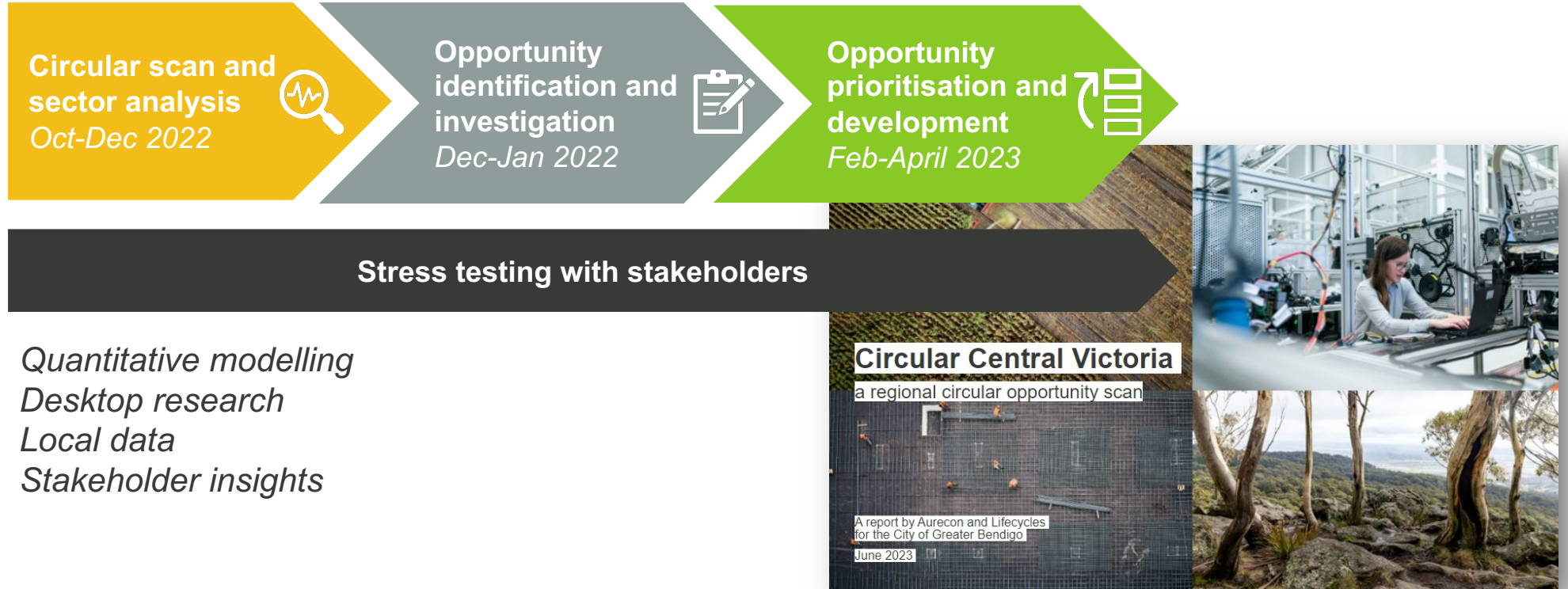


Other key changes including research and development, reskilling and job training

# The delivery combined **evidence** and **engagement** for maximum impact

## Key questions

- How do we unlock the benefits of a circular economy in Central Victoria?
- What are the most impactful opportunities and what do they look like at scale?
- What technology, collaboration and investment is needed?



# Mapping the supply and demand flows across key sectors to identify potential opportunities for **improved material circularity**

## Organics

Modelling: conversion of agricultural production data

Final flows calculated:

- Wheat straw
- On-farm produce waste
- Pig effluent
- Commercial food waste
- Food manufacturing waste



## Construction

Modelling: Input-output analysis and conversion to physical units

Final flows calculated:

- Construction inputs by material, sector, import/domestic
- Construction outputs by material and sector



## Consumer goods/ manufacturing

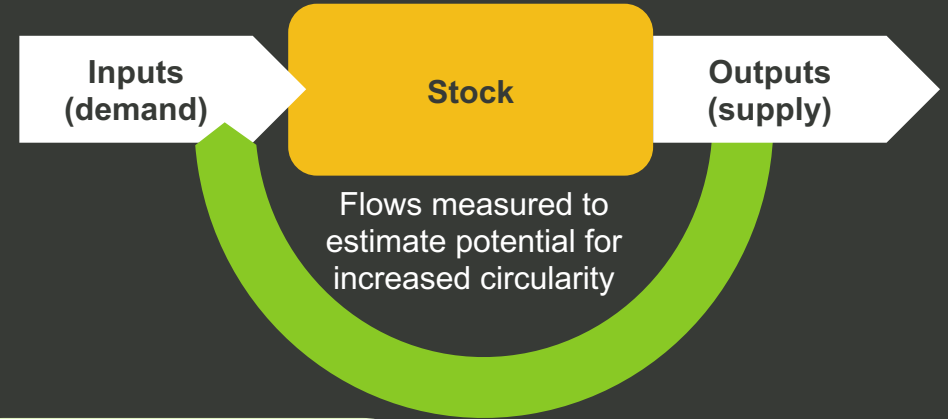
Modelling: Input-output analysis and conversion to physical units, expert consultation, bin audit data extrapolation

Final flows calculated:

- Top industry users of metals and plastics
- Silage plastics
- Household glass



## Circularity potential from inputs and outputs, including key data sources



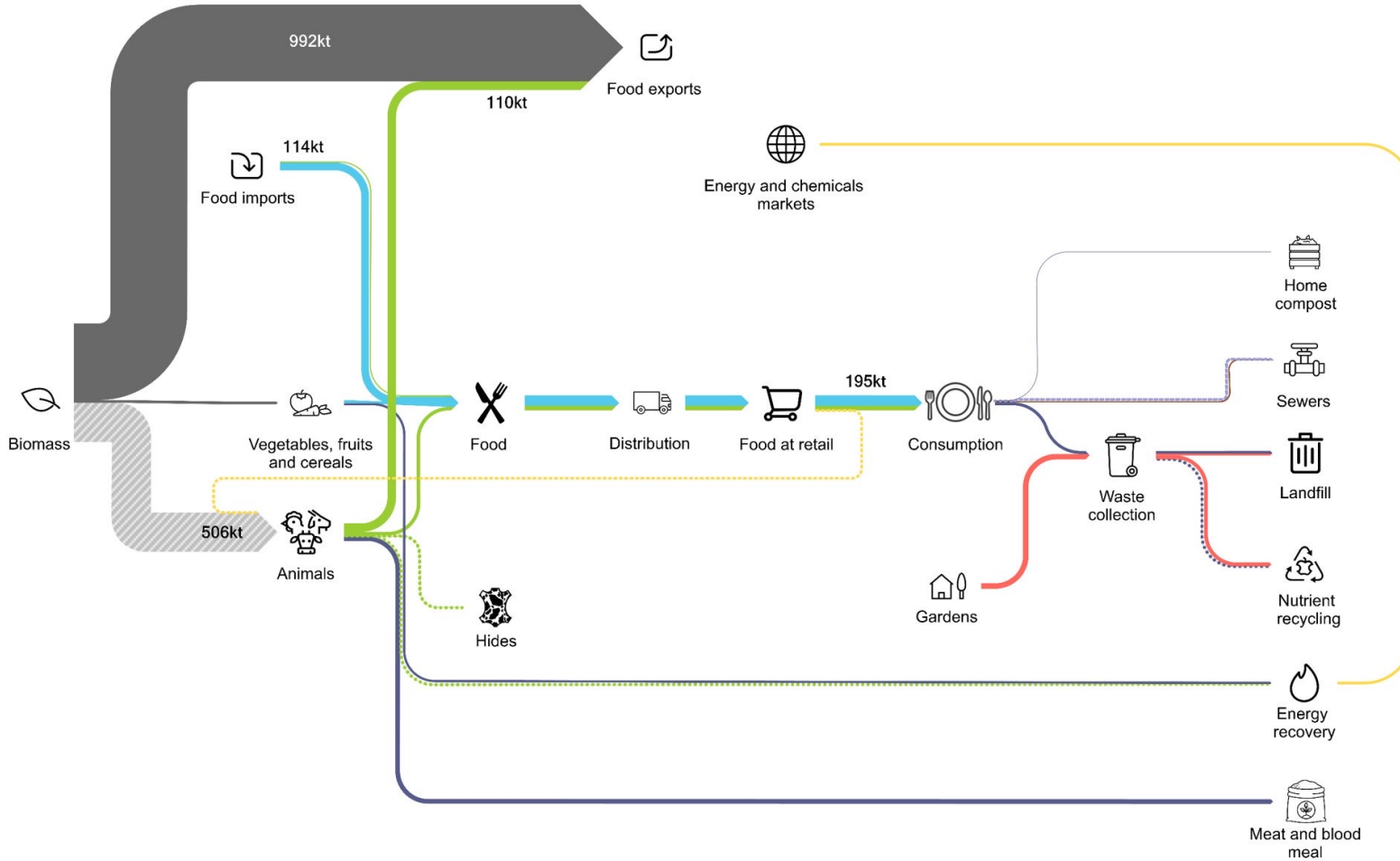
### Circular demand data sources

RMIT building materials study (RMIT Centre for design, 2006)  
 Existing internal models by Lifecycles  
 Loddon Mallee Economy summary tables 2022 (REMPPLAN, 2023)

### Circular supply data sources

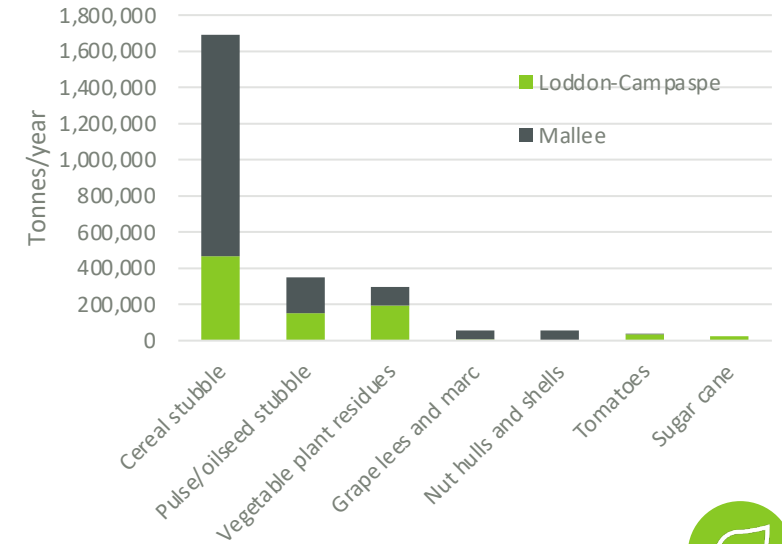
2020 National waste database (DCCEEW, 2020)  
 Agricultural Commodities, Australia 2020-21 (ABS, 2021)  
 National Food Waste Baseline (ARCADIS, 2019)  
 Bin audit data

# Circular scan findings - organics



Flows <10kt have been artificially widened and dotted.

The +6 million tonnes of crop biomass going into animal feed and exports were scaled to a quarter in this diagram to improve legibility.



## Key findings

1. Organic flows are dominated by **crop residues**
2. **On-farm produce waste, food manufacturing waste, and commercial food waste** present opportunities for transformation into high-value materials
3. **Animal effluent** flows present opportunities for increased energy recovery

## Recommendations

1. Target uses for cereal stubble flows
2. Target uses for on-farm fruit and vegetable waste
3. Further investigate uses for livestock effluent such as pig manure
4. Investigate options to use commercial and food manufacturing waste



# Circular scan findings - construction

## Key findings

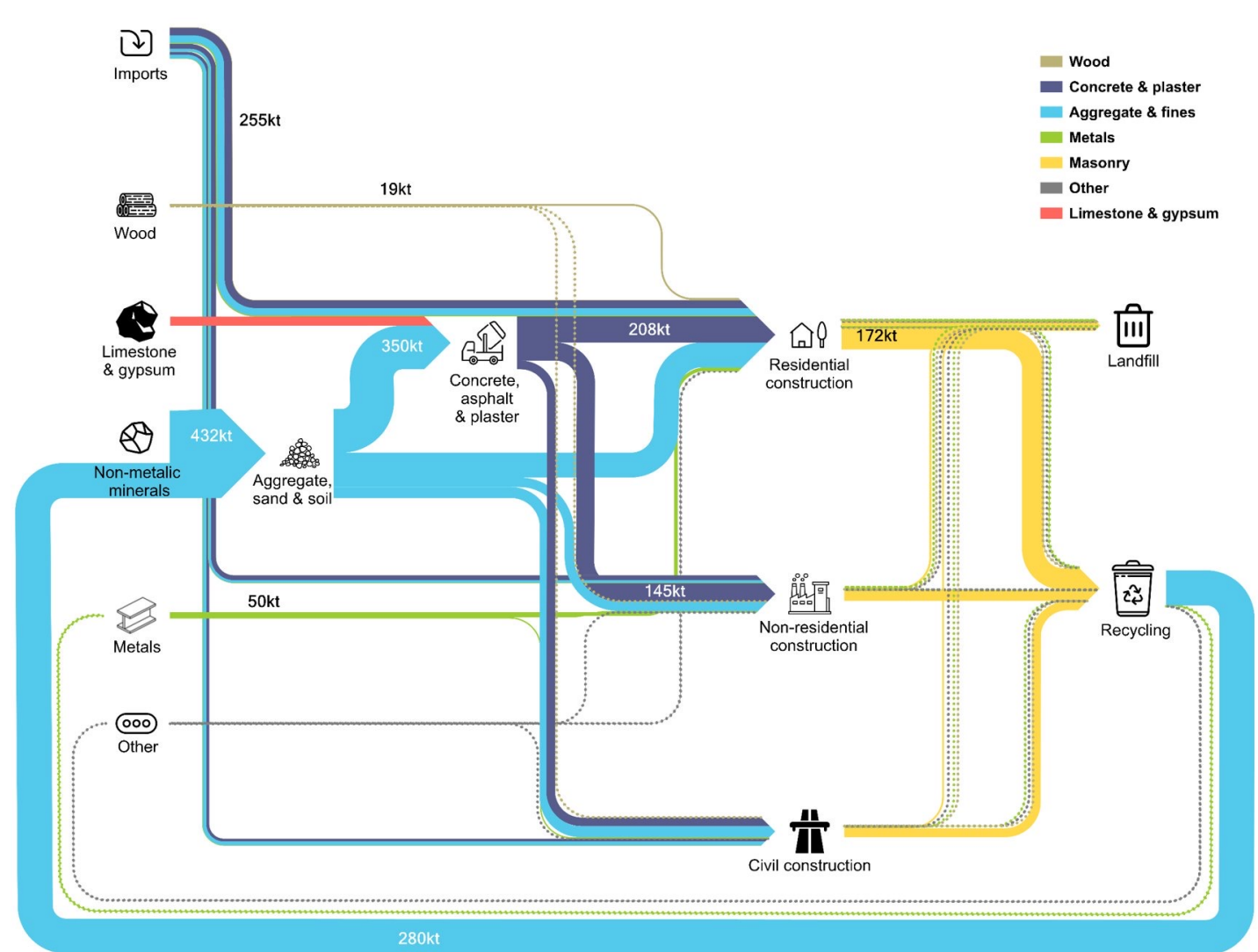
1. Flows dominated by **aggregates/concrete**
2. Material recovery across construction flows is quite high.
3. Material recovery is often low value – i.e. downcycling

## Recommendations

1. **Develop a system which supports reuse over recycling**
2. **Focus on material sourcing**
3. **Implement circularity principles which retain maximum value of materials**

*Flows <10kT have been artificially widened and dotted.*

*Different data sources have been used on the input and output sides, and hence the categorisation of materials varies as well. This is why the flows coming in and going out of the two construction types are not the same colours.*



# Circular scan findings – consumer goods and manufacturing

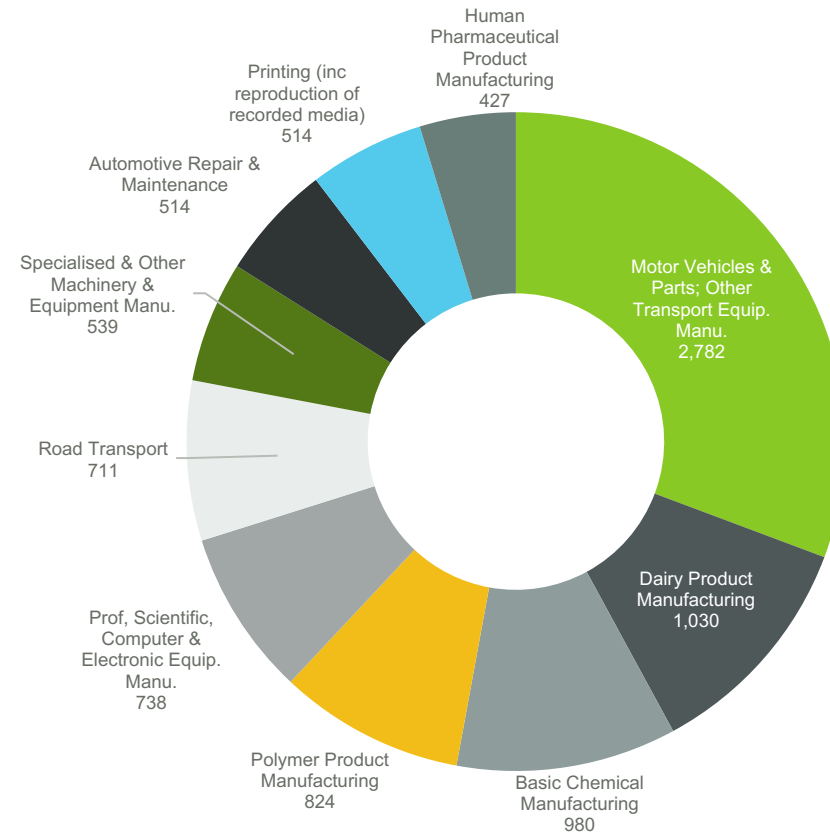
## Key findings

1. Several flows identified as key challenges: silage plastics, glass etc.
2. Biggest consumer of plastic in the region is motor vehicles, followed by dairy product manufacturing
3. Biggest consumer of metals is motor vehicles, followed by machinery manufacturing

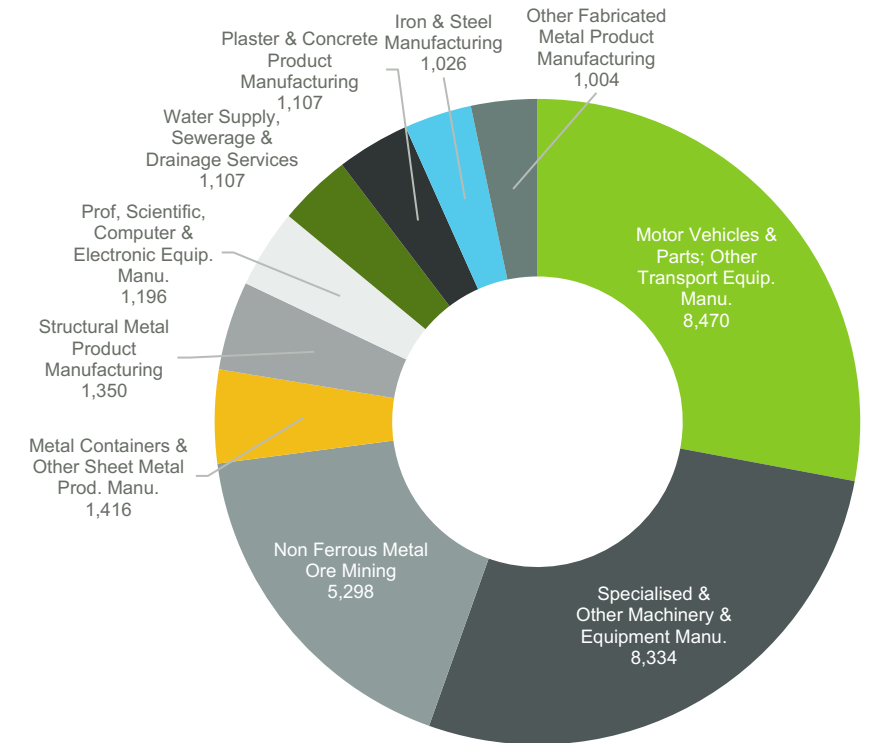
## Recommendations

**1. Target difficult to recycle products which require local solutions**

**2. Support industry to incorporate circular and recycled materials**



**Top 10 plastics-using sectors (excluding construction and trade)**



**Top 10 metal-using sectors (excluding construction and trade)**



## Organics

#1 – Insect protein derived from food waste

#2 – Creating local food waste hubs to upcycle food waste

#3 – Anaerobic digestion for animal waste



## Construction

#4 – Implementing circular procurement across the councils

#5 – Modular construction frames and fit out solutions

#6 – Wheat straw into sustainable building materials

#7 – Driving construction materials reuse in the region












## Consumer goods and manufacturing

#8 – Modular and transportable glass crushing infrastructure

#9 – Agricultural silage plastics recovery and recycling

# Snapshot of circular economy opportunities

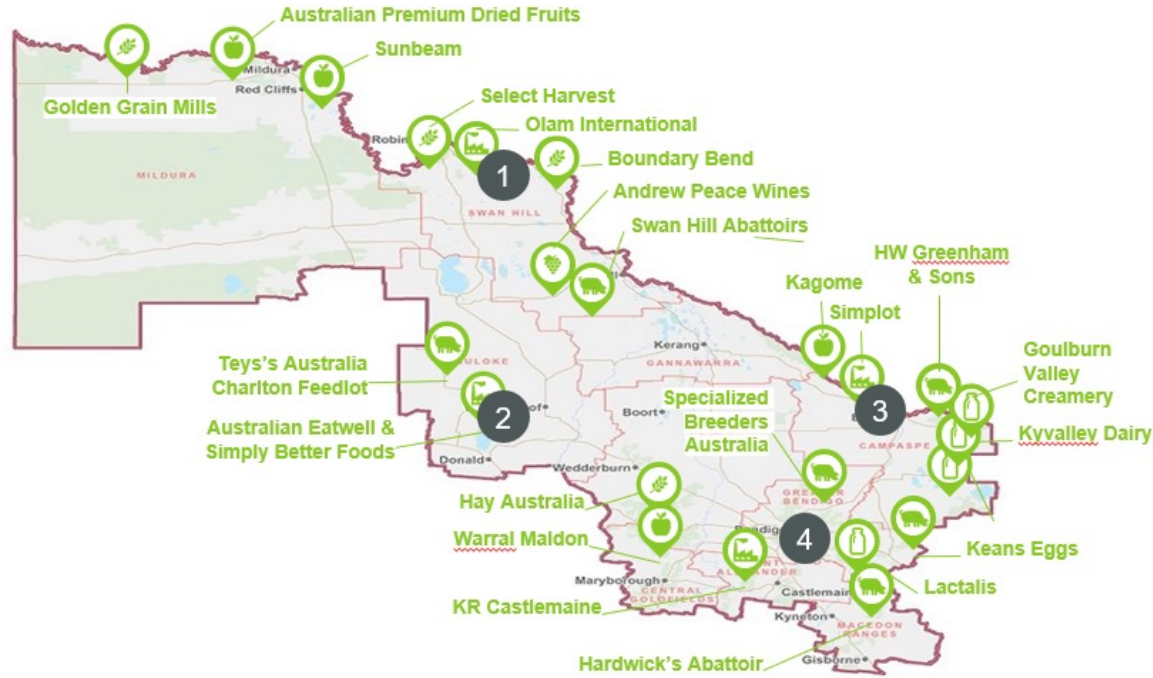
\$ Signifies the economic potential of the opportunity including regional investment, new job creation and new revenue streams.

Circular opportunity	Material input (p.a)	Circular economy intervention	Carbon benefit (p.a)	Potential economic benefit
 1. Insect protein derived from food waste	70,000t commercial + manufacturing food waste	Repurpose	65,000t CO <sub>2</sub> e avoided	\$\$
 2. Creating local food waste hubs to upcycle food waste	61,000t fruit + vegetable produce waste	Repurpose Reuse	9,700t CO <sub>2</sub> e avoided	\$\$
 3. Anaerobic digestion for animal waste	20,000t pig manure	Repurpose Regenerate	650t CO <sub>2</sub> e avoided	\$
 4. Implement circular procurement across the councils	N/a	Reduce	9,500t CO <sub>2</sub> e avoided	\$\$
 5. Local manufacturing of modular construction frames and fit out solutions	N/a	Reuse	Not estimated	\$
 6. Wheat straw in sustainable building materials	527,000t wheat straw stubble	Repurpose	330,000t CO <sub>2</sub> e avoided	\$\$\$
 7. Driving construction material reuse in the region	N/a	Reduce Reuse	Not estimated	\$
 8. Modular and transportable glass crushing infrastructure	9,900t kerbside glass	Recycling	245t CO <sub>2</sub> e avoided	\$
 9. Agricultural silage plastics recovery and recycling	1000t silage plastic	Recycling	2,800t CO <sub>2</sub> e avoided	\$
<b>All opportunities combined</b>	<b>667,900t of material</b>		<b>418,000t CO<sub>2</sub>e avoided</b>	



# Insect protein derived from food waste

Scaling black soldier fly larvae (BSFL) bioconversion technology to take food waste from commercial operations and manufacturing to create insect protein suitable for local stock feed.



## Benefits



### Circular economy

- 70,000t/ year material repurposed
- Moves food waste up the hierarchy



### Economic potential

- Expected additional revenue \$40-60M per year and create in the order of 300 – 500 jobs



### Environmental benefits

- 65,000t CO<sub>2</sub>e avoided /year

## Next steps

Establishing a collaborative investment or co-operative style business model between the relevant stakeholders could accelerate the implementation and achieve greater environmental benefits (industrial symbiosis).



- ✓ Engage with BSFL technology organisations to present the opportunity and gain interest

- ✓ Support technology development through permit and land approvals

- ✓ Educate farmers and producers on the process and benefits of bioconversion

- ✓ Advise and streamline regulatory pathway and approvals for establishing regional facilities



# Implementing circular procurement across the councils

This opportunity is to develop a set of targets supported by a circular procurement framework to support councils individually and collectively maximise reuse, modular design and recycled material use in their capital works programs.

Scope	Aim	Outcome
2022-23 budget \$280 million spent on capital works	Address existing barriers to recycled content procurement in local government	<ul style="list-style-type: none"> <li>Quantify end market demand for priority materials</li> <li>Integrate circular targets and specifications into procurement</li> </ul>

**Links to other circular economy opportunities including;**

- ✓ Modular glass crushing infrastructure
- ✓ Driving construction material reuse
- ✓ Modular fit outs

## Benefits



### Circular economy

- Reducing reliance on virgin materials (27% replacement of roads materials into recycled content)



### Economic potential

- Stimulate demand for local material suppliers and attract investment into material processing infrastructure

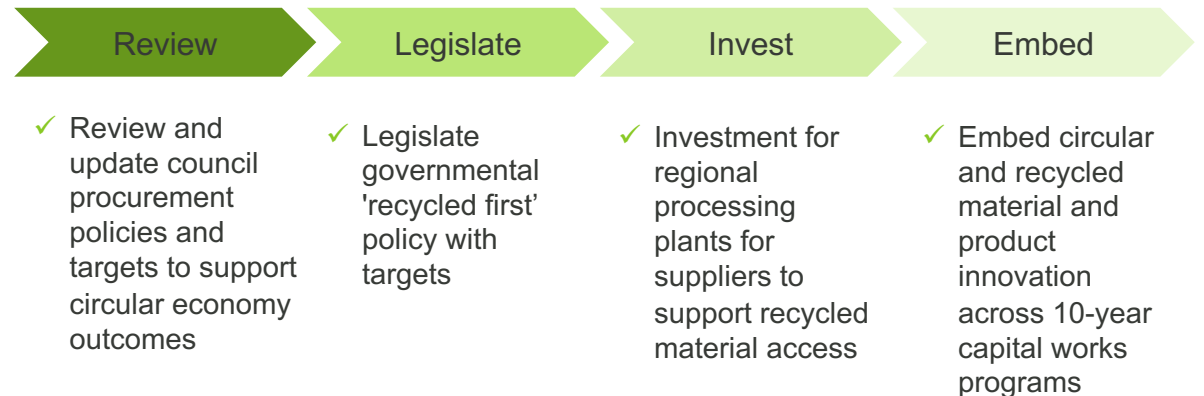


### Environmental benefits

- Potential carbon savings from procuring local, secondary materials, modular design, sustainable materials in future projects – estimated **9,500t CO<sub>2</sub>e** avoided

## Next steps

Establish a working group of procurement practitioners across participating councils and apply for state government funding to support development of procurement framework



## This project highlighted important learnings on how to develop circular economy solutions for regional Australia



Place is key to defining and implementing circular approaches



Focus on the strengths of the region – organics



Getting localised insights early to help frame circular opportunity investigations



Improving circularity in household consumer products is challenging, especially regional areas



Data quality is challenging but it is still possible to draw valuable insights from the available data



Bringing circular opportunities to life with local case studies

# Q&A





# For more info...

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