

# Loddon Mallee Future Energy Forum:

## Bioenergy in Loddon Mallee

Kelly Wickham

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# Sustainability Victoria programs



## TAKE2

Victoria's climate change pledge

**Climate change**



**ResourceSmart Schools**



**Boosting business productivity**



**Home upgrades**



**Community power hubs**



**Commercial built environment**



**Waste education**



**Social impact investment**



**Organics collections**



**Resource Recovery Infrastructure**

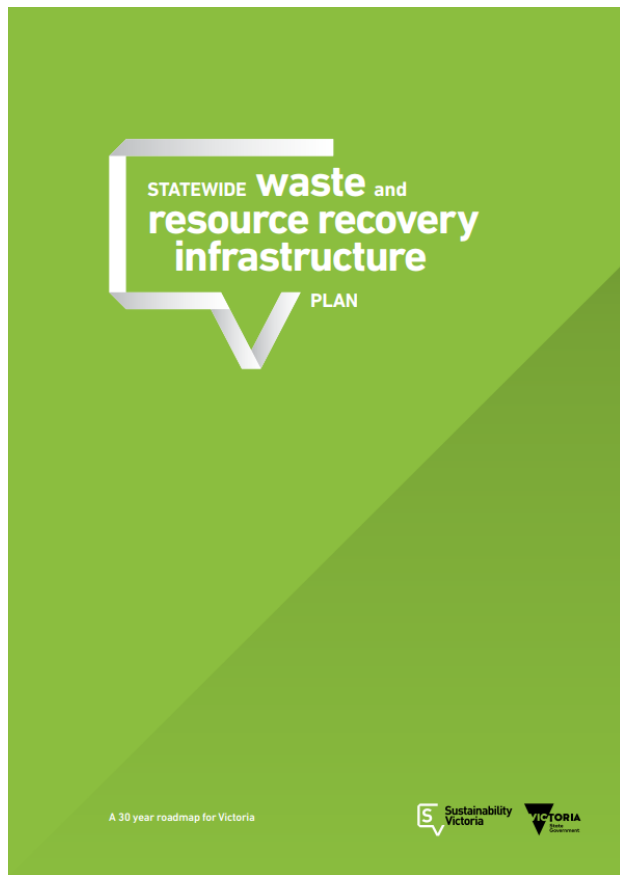


**Household chemicals collections**



**Information / guidance**

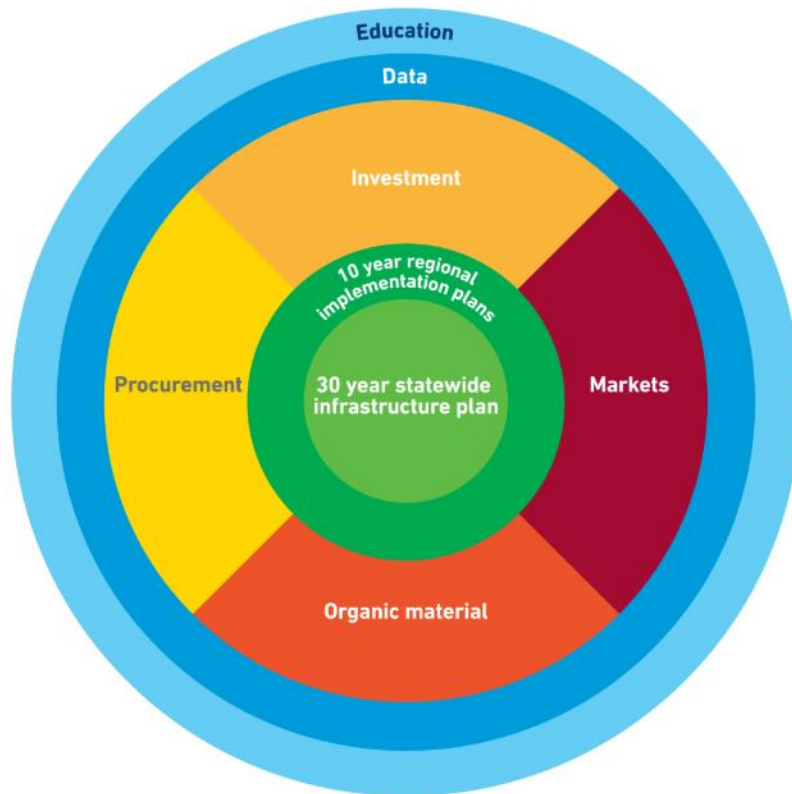
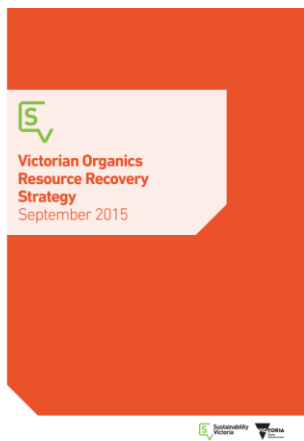
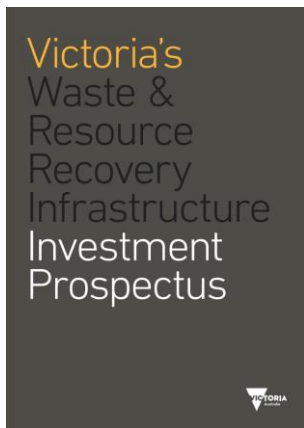
# Waste and resource recovery planning



## State Infrastructure Plan

- EP Act requires SV to develop a *Statewide Waste and Resource Recovery Infrastructure Plan*
- Provides a clear, long term (30-year) vision for waste infrastructure in Victoria
- Supported by 7 regional implementation plans
- Plan provides for waste to energy infrastructure to treat **residual waste** “*where higher order recovery options are not practicable*”

# Waste and resource recovery planning



# What is bioenergy?

Figure 1: Biomass to bioenergy process

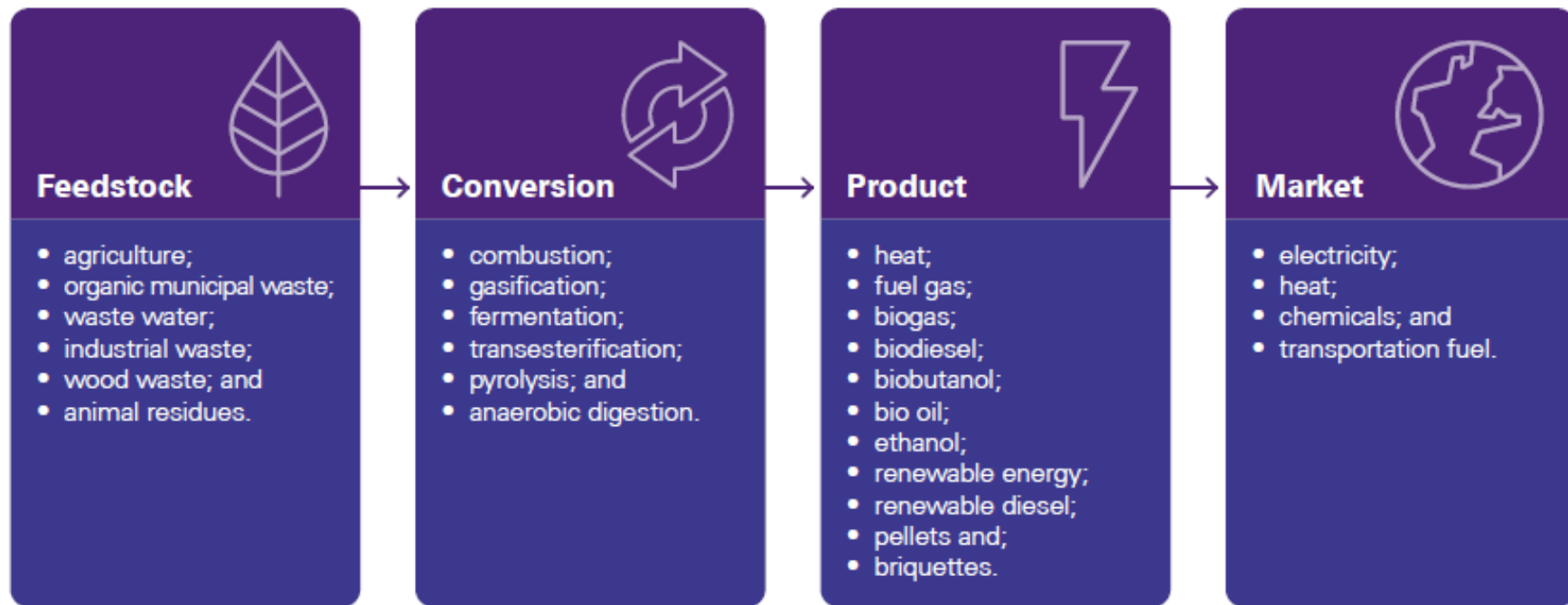




Figure 2: Biomass fuel sources



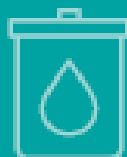
## **Agricultural**

Sugar (bagasse);  
and oils.



## **Organic Municipal Waste and Agro-Industrial Waste**

Residential and  
industrial waste.



## **Waste Water**

Recycled waste  
water containing  
biodegradable  
organic matter.



## **Wood Waste**

Wood scrap, bark,  
sawdust and other  
common forms of  
wood waste.

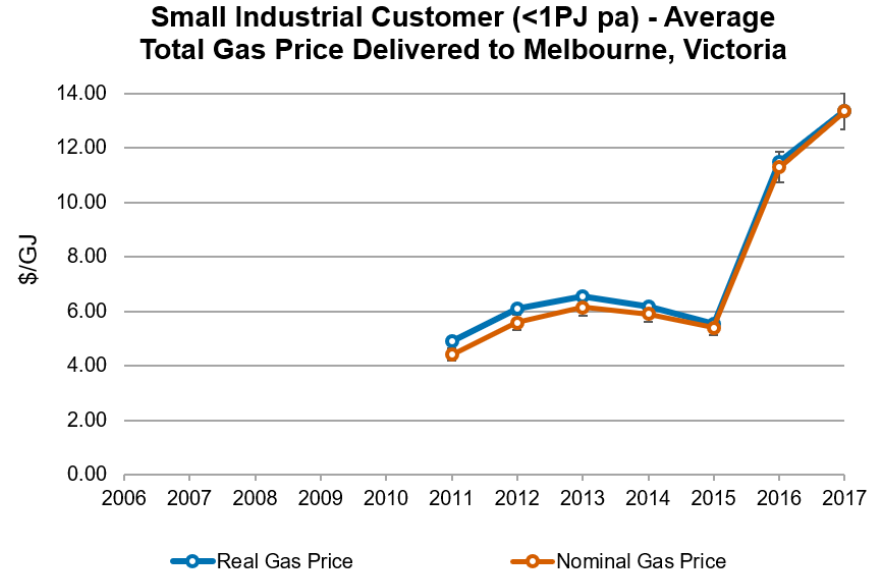


## **Animal Residues**

Primarily waste  
from intensive  
livestock  
operations.

# Bioenergy, a natural gas substitute

- Bioenergy is an ideal substitute for natural gas and provides the additional benefit of producer power where a Combined Heat and Power plant is cost effective.
- Australian Paper has been operating a facility for over 20 years that provides 50 MW of energy services
- This is not new technology to Victoria rather its emergent status is relative to the capability of industry to deliver.



# Our resources

## Victoria's Waste

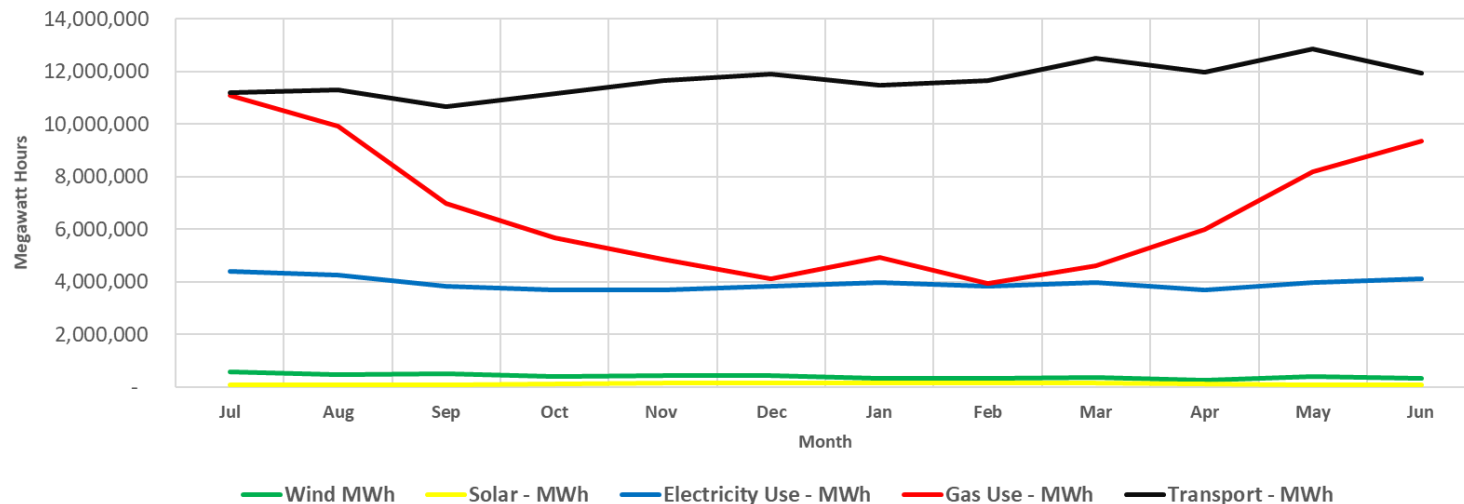
- 14.4 million t in 2016/17
- 69% recovery rate
- 1,406,773 t organics to LF
- 20 million tpa by 2043

## Energy Market

- Hazelwood's shutdown
- Shift to renewables
- Victoria currently faces gas shortage  
(cost increases of 200% to 300% for industrial clients)



# Our energy demand



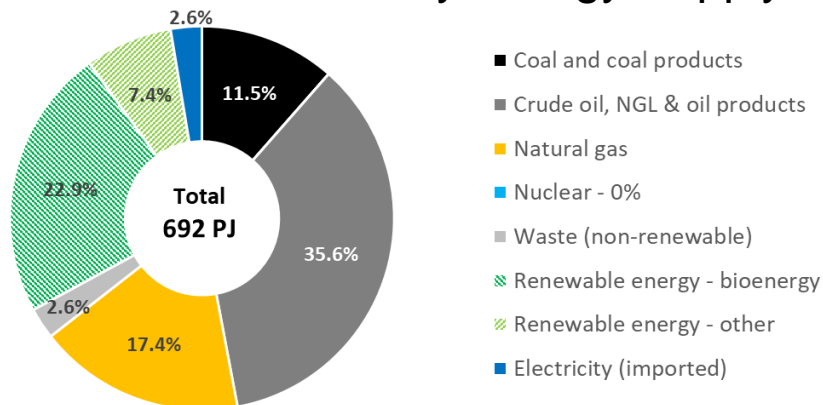
Month	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Wind - MWh	574,200	480,000	494,400	403,800	436,800	436,800	321,600	328,200	367,200	258,600	419,400	329,400	4,850,400
Solar - MWh	68,009	83,778	102,205	130,835	143,728	148,137	157,697	138,978	142,465	105,067	76,461	70,378	1,367,738
Electricity Use - MWh	4,403,820	4,261,762	3,835,586	3,693,527	3,693,527	3,835,586	3,977,644	3,835,586	3,977,644	3,693,527	3,977,644	4,119,703	47,305,556
Gas Use - MWh	11,108,544	9,922,801	6,989,646	5,679,087	4,867,789	4,118,898	4,930,197	3,931,676	4,618,159	5,991,125	8,175,389	9,361,133	79,694,444
Transport - MWh	11,205,383	11,291,258	10,654,085	11,160,164	11,650,481	11,912,052	11,468,960	11,652,202	12,510,047	11,970,314	12,852,175	11,936,719	101,972,223

Notes: Victorian electricity and gas consumption figures from ABS 2016/17 data. Transport fuel figures from: <https://www.energy.gov.au/publications/australian-petroleum-statistics-2018> Solar PV output figures are for 2017/18 from Australian PV Institute: <http://pv-map.apvi.org.au/historical/#4/-26.67/134.12> Total installed PV capacity of 1,614 MW with an average capacity factor of 9.7% Wind output figures are for 2017/18 from Anerod Energy: <http://anero.id/energy/wind-energy/> Total installed capacity of 1,740 MW with an average capacity factor of 31%

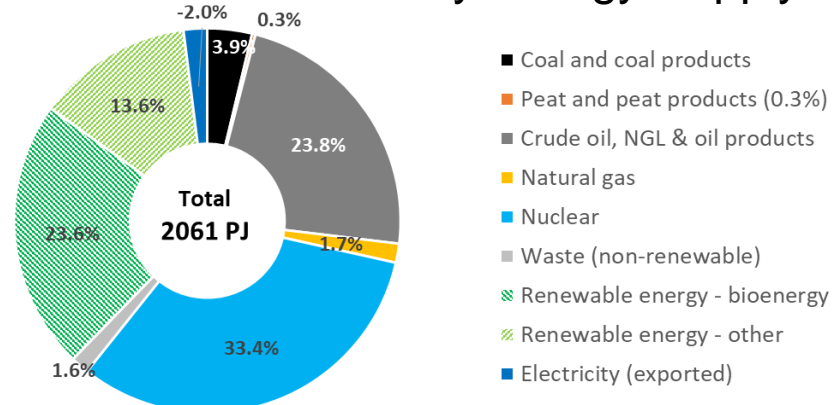


# Bioenergy internationally

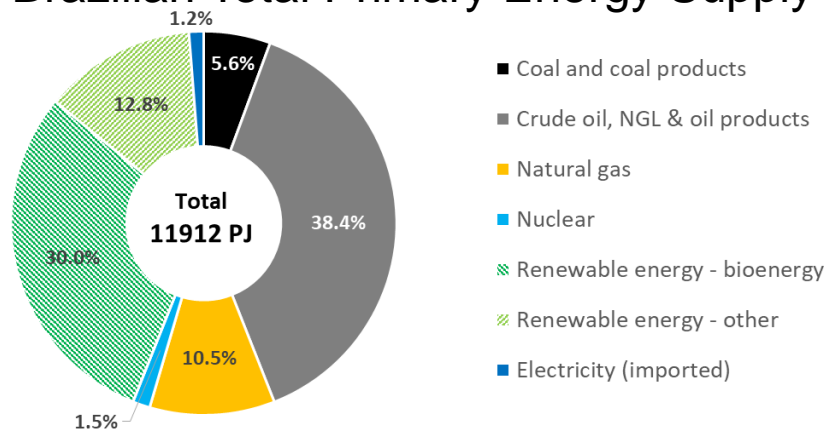
## Danish Total Primary Energy Supply



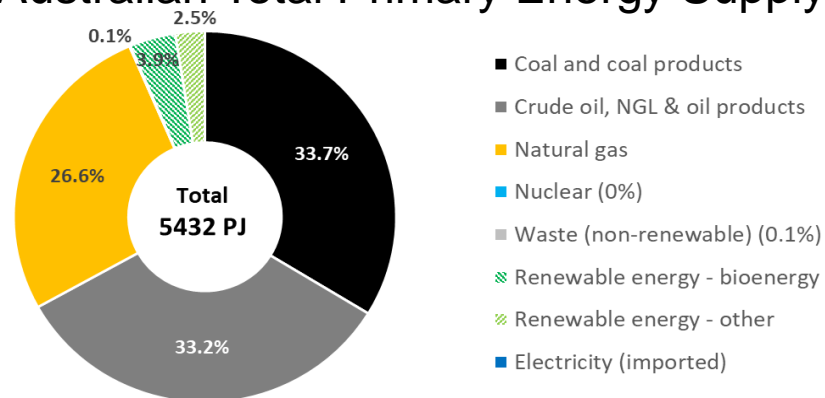
## Swedish Total Primary Energy Supply



## Brazilian Total Primary Energy Supply

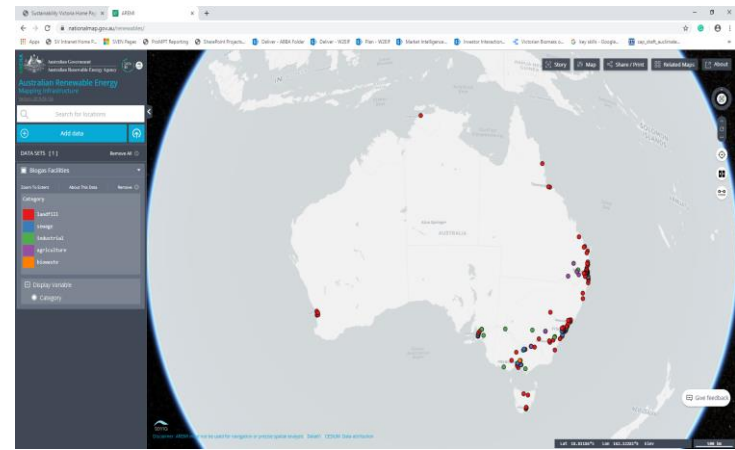


## Australian Total Primary Energy Supply



## Purpose:

- Catalyse investment in the renewable energy sector through the provision of detailed information about biomass resources
- Facilitate project development and decision making for new bioenergy projects; and
- Provide linkages between biomass supply, through the supply chain, to the end user.



# Biomass resources of the Loddon Mallee

Loddon Mallee Modelled Biomass Estimates		Commercial & Industrial		Construction & Demolition		Municipal		Total	
		Recovered Amount	Landfilled Amount	Recovered Amount	Landfilled Amount	Recovered Amount	Landfilled Amount	Recovered Amount	Landfilled Amount
Loddon Mallee WRRG	Food Organics	1,865	4,651	26	46	1,078	33,204	2,969	<b>37,901</b>
	Garden Organics	7,233	1,172	267	332	10,749	5,196	18,248	<b>6,700</b>
	Other organics	14,364	-	35	-	4,768	-	19,167	-
	Timber	5,812	4,517	1,804	1,811	706	1,222	8,322	<b>7,550</b>

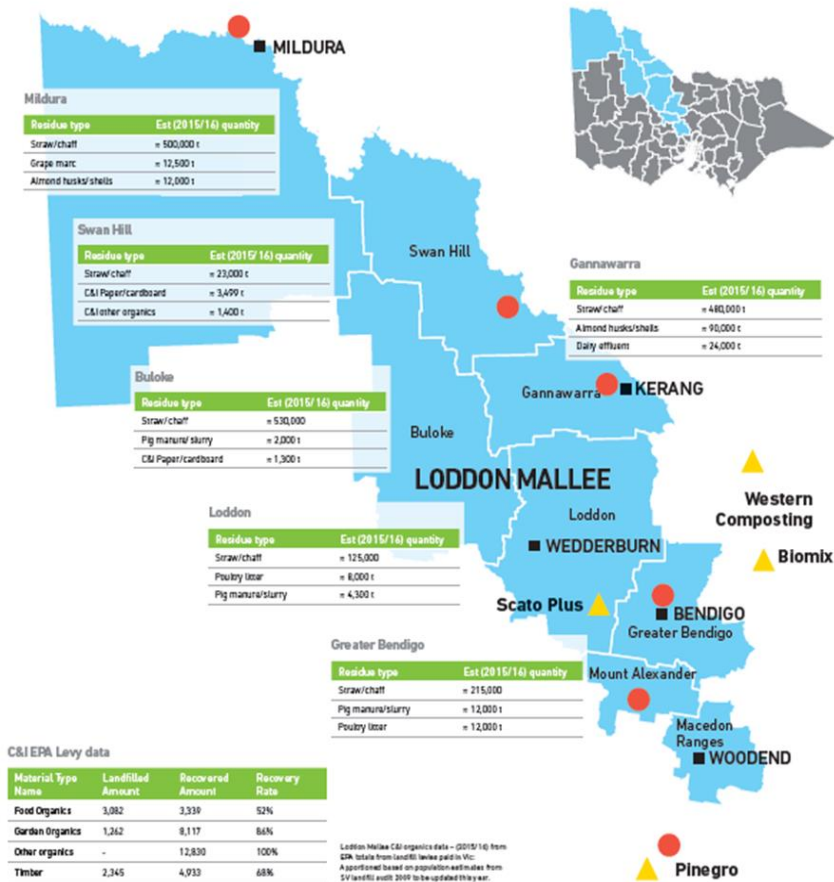
Australian Biomass for Bioenergy Estimates (15/16)		Straw/Chaff	Almond Hulls & Shells	Poultry Litter	Dairy manure/effluent
Loddon Mallee WRRG		<b>1,953,000 tonnes</b>	<b>104,000</b>	<b>37,000</b>	<b>31,500</b>

# Biomass availability

Bendigo and Swan Hill workshops to ground-truth biomass availability

- Some key findings included:
  - Over 6 million chicken broilers, 135,000 laying hens and 8,000 beef cattle are produced each year.
  - Grape marc and residues used for thermal energy facility at Colignan.
  - 'Availability' of straw varies from region to region.
- Continuity Plan would need to look at managing variability.

## Loddon Mallee C&I Organics



# Projects operating in the Loddon Mallee

Plant name	Location	Industry	Status	Type	Application	Brand/Installer	Feedstock	Capacity
Australian Tartaric Products Co-generation Plant	Colignan	Beverage manufacturer	Operational	Cogeneration	Heat source in the manufacturing of tartaric acid	Bono Systems	50,000 tpa/grape marc 25,000 tpa/lees 14,000 tpa/sludges	8 MW-th 450 kW-e
Kia-Ora Piggery	Yarrowalla - Loddon Mallee	Piggery	Operational	AD			pig effluent	
Select Harvest	Robinvale	Almond producer	Operational	Biomass electricity	Electricity to processing and pumps	Vyncke boiler/ Siemens Turbine	Almond Hulls and Husks	16MW-th producing 2.8MW-e

LMWRRIP – Resource recovery and consolidation infrastructure schedule:

## Reprocessor organics, garden

Epsom Sand and Soil	Epsom Sand and Soil	452 Epsom-Barnadown Road Wellsford	Greater Bendigo (C)	Timber
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## Reprocessor organics, other

Rivcow	Rivcow	224 Yeungroon Woosang Road Yeungroon East	Buloke (S)	Feedlot waste
Scatoplus (Bridgewater Compost)	Bridgewater Compost	1477 Yorkshire Road Newbridge	Loddon (S)	Hay
Central Recycling	Central Recycling	1 Furphy Court (off Redesdale Road) Kyneton	Macedon Ranges (S)	Organics

# Our current programs

- Targeted infrastructure investment
  - Recently closed \$750,000 Bioenergy Infrastructure Fund
  - Previously funded anaerobic digestion, timber gasification and production of process engineered fuels
- Investment Facilitation Service
  - Reducing the barriers to investment
  - 70% enquiries relating to WtE projects
- Information and advice
  - Published technology guide to support decision makers
  - Digitised data portal providing full access to data





- SV is uniquely placed to:
  - Ensure we have a robust roadmap for resource recovery infrastructure that supports a range of solutions, including bioenergy
  - Provide data and information that supports industry and local government decision making
  - Facilitate investment in new infrastructure and improve linkages throughout government
  - Support early movers through financial incentives

# Where to next?

- Implementation of State Infrastructure Plan
- Guidance and support materials
- Enabling the circular economy



# Thank you

Kelly Wickham  
Programs Advisor | Recycling Industry Support  
03 8626 8812 | [kelly.wickham@sustainability.vic.gov.au](mailto:kelly.wickham@sustainability.vic.gov.au)  
Sustainability Victoria



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