



IEA Bioenergy Task 37

# Country report Australia

**Bernadette McCabe**

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## **Current biogas status**

The majority AD plants are associated with municipal waste water treatment plants (WWTP) with most sites employing CHP

Numbers for industry and agricultural plants are difficult to obtain

Survey developed to extract information



## Survey

To register please complete the form below (We may contact you for further information).

Plant Name

Plant Name

Please provide your e-mail address

E-mail

Type of Technology and Technology Supplier

Type of Technology and Technology Supplier

Installed Capacity (kW electricity)

Installed Capacity

Commissioning date (month and year)

dd/mm/yyyy

Please provide your full address and postcode

Address

Please provide a contact telephone number

Telephone Number

Please provide a description of the feedstock(s) being used

Feedstock

Biogas production/yr and/or Biomethane production/yr (specify units)

Biogas Production

Please add additional information - such as press release - here

Brief Description

Please select one category that best describes your digester feedstock

- Sewage sludge - mono or co-digestion
- Biowaste - co-digestion or mono-digestion of food waste and other types of biowaste
- Agriculture - digestion at farms (mainly manure)
- Industrial - digestion of waste stream from various industries (e.g food and meat processing)
- Landfill - landfill with collection of the landfill gas

Utilisation of Biogas (tick all applicable)

- Electricity
- Heat
- Combined heat and power (CHP)
- Flare
- Other

If other please specify

Description of biogas utilisation

Digestate Handling (tick all applicable)

- N/A
- Fertiliser
- Other

If other please specify

Description of digestate handling

Submit

# Biogas Plant Inventory

Substrate/Plant type	Estimated Number of plants	Number of plants from survey	Potential Production (GWh/year)*
Sewage sludge (WWTP)	52	22	221
Biowaste	5	3	15
Agriculture	22	9	27
Industrial	34	12	39
Landfill	129**	-	1,140**
<b>Total</b>	<b>242</b>	<b>46</b>	<b>1,442</b>

\* Calculated from the estimated electricity production and an assumed efficiency of 35% with 70% methane content in biogas.

\*\* From 2006 Sustainable Power Plant Register, Australian Business Council for Sustainable Energy

No biogas up-grading plants

# Geographic location of biogas plants in Australia

Source <https://batchgeo.com/map/2fb1cc9f27a39cb7b37562b95c32bcf4>



And Survey [Map](#)

# Biogas Trends

Renewable energy provided 14.6% of Australian electricity generation during 2015.

Bioenergy currently makes up 9.1% of total clean energy, or about 1.34% of Australia's total energy.

The majority of bioenergy comes from the combustion of sugarcane bagasse.

However, electricity generation from AD installations has shown most growth over the past six years.

Goals of 2,413 and 55,815 GWh for bioelectricity were set for 2020 and 2050 respectively, to which on-farm AD and AD using biowaste and industrial organics are key contributors<sup>1</sup>

<sup>1</sup> Clean Energy Council, "Australian Bioenergy Roadmap (2008)"

# Biogas Utilisation

Table 2.2: Utilisation of biogas in Australia\* (data from survey at end of 2016 – 46 respondents)

Plant type	Electricity (%)	Heat (%)	CHP (%)	Flare (%)
Biowaste	40.0	20.0	20.0	20.0
Sewage sludge	33.3	26.2	21.5	19.0
Industrial	17.6	29.4	-	53.0
Agricultural	80			20

\*No data for landfill

# Digestate handling

Plant Type	Usage as fertiliser	Usage other
Biowaste	100%	-
Sewage Sludge	63.2%	31.6%
Industrial	20%	30%
Agricultural	100%	-

## Digestate trends and existing regulations

Biosolids regulated on a state by state basis

Promote the reuse of nutrient rich biosolids to land in a manner that protects environment and human health

Need for national consistent guidelines across states

Odour considered a threat to continued land application

Vector reduction guidelines need further improvement

# Financial Support Systems for Biogas

- **Large-scale Generation Certificates (LGCs)** only financial incentive nationally (\$87MWh) (Dec 2016)
- One Feed-in-tariff in Victoria for small plants <100kW capacity ( $\approx$  \$0.06/kW)
- Loan support
  - Clean Energy Finance Corporation (CEFEC) loans and financing instruments (
- Investment grants
  - ARENA grants
  - Smaller state R&D grants

# National Strategies

- Renewable Energy Target – Previous political uncertainty about the RET has subsided recently – the price has recovered quite significantly.
  - scaled back 41,000 GWh target to 33,000GWh early 2015
- Clean Energy Act 2011 – repealed – large amounts of ARENA funding removed or deferred replaced by Emission Reduction Fund (ERF) - \$(AUD) 1.5 billion over 3 years
  - The Emissions Reduction Fund may be an important source of revenue for biogas projects.
- Bioenergy Roadmap **(2008)** most significant specific guiding strategy
- Carbon farming initiative methodology (Carbon Credits)
  - Credits available when replace lagoons with AD reactors or CAL technology

# Performance and Economic Data

Performance Data (if available):

Not available

Economic Data (if available):

- Not available

# Obstacles for the Biogas Development

- Grid connections (electricity, heat and gas pipeline)
  - Typically requires energy partner (wholesaler contract between buyer and seller)
  - Gas connection to pipeline??? Unknown if even possible?
  - No centralised heat network
- The technology supply chain and biogas project 'ecosystem' is underdeveloped in Australia
  - there have been very few projects, so there is little experience with importing equipment, installation and operation.
- AD plant permitting
  - can be difficult/costly to navigate state by state and case by case basis

# Obstacles for the Biogas Development

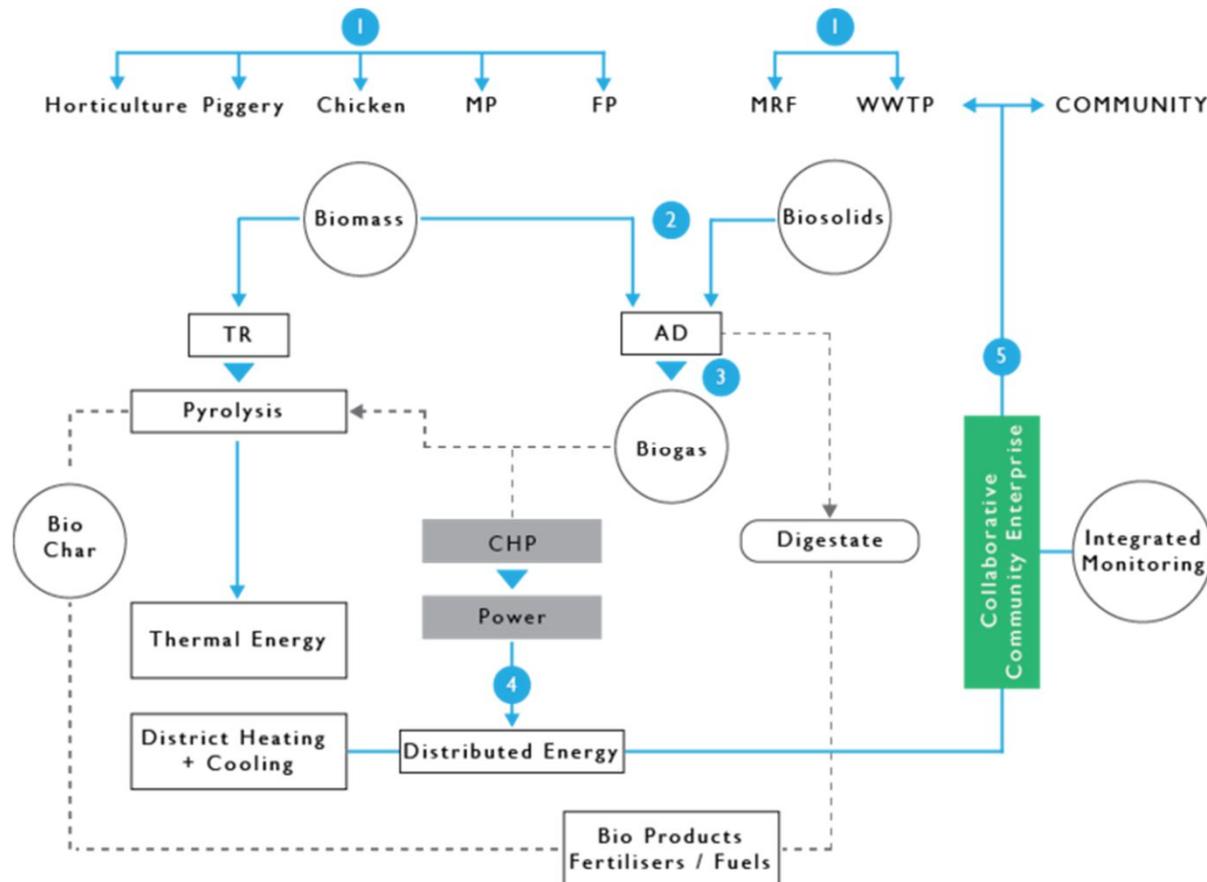
- Environmental licenses (air, water, land)
- Digestate utilisation
  - In Victoria digestate classified as industry waste until proven otherwise
  - In NSW and QLD considered under compost guidelines
  - Small market for digestate
- Poor valorisation of bioenergy
- Financing
  - Hosts would often like to outsource the whole project and just buy electricity but typically the projects are sub-scale for project finance.

# Trends into the future

- Land fill bans and gate fees increasing in some states eg Victoria, South Australia, New South Wales
- In absence of federal initiatives, state and local governments and communities are developing projects to foster a circular economy that use organic waste.
- Co-digestion using multiple waste streams in regional centres
  - Eg: CLEAN Cowra Project

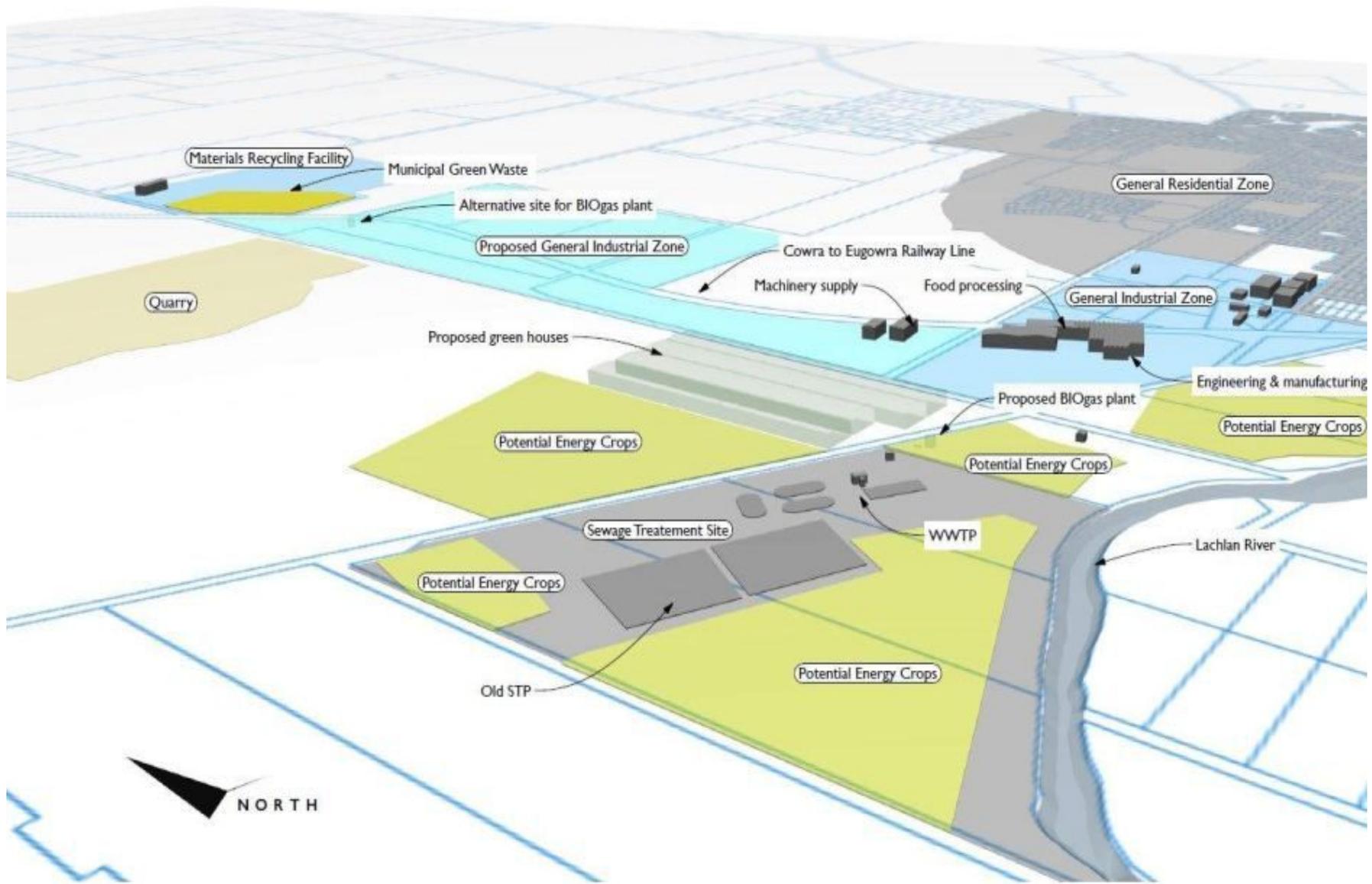
# CLEAN Cowra Project

- At full capacity the Cowra biomass project will produce an estimated 60% of Cowra's energy needs. It would involve construction of a biomass plant and an initial 2MW version is estimated to cost around \$8 million.



CLEAN Cowra: Creating a circular economy through aggregation of organic waste streams. MP= Meat processing; FP= Food processing; MRF= Materials recovery facility; WWTP= Waste water treatment plant; TR= Thermal recovery; AD= Anaerobic digestion; CHP= Combined heat and power

# Map of proposed project



# Biogas Projects

## Biogas Project 1:

Yarra Valley Water  
Waste to Energy Facility,  
Victoria



- Recently constructed plant commissioned late 2016; fully operational April 2017
- Located next to an existing sewage treatment plant in Aurora and is expected to generate enough biogas to run both sites with surplus energy exported to the electricity grid
- Expected that facility will divert 33,000 tonnes of commercial food waste from landfill each year.
- Waste delivered by trucks from commercial waste producers, such as markets and food manufacturing.

## Biogas Project 2:

Oakey Beef Exports, Queensland – Producing biogas from slaughterhouse waste water

- Covered, high-rate anaerobic lagoon system (COHRAL™) technology
- Replace up to 50,000 gigajoules natural gas a year to fire boilers to heat water for sterilising and rendering
- Commissioned in 2015
- Has a sub-surface membrane to prevent methane leaks and a unique waste water distribution and settling system.
- A flexible storage system – one of the world's largest of its type - reserves biogas for peak operating demand



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NCEA

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