



Biogas opportunities for Australia

8th International Renewable Energy Conference

24 October 2019

Prepared by ENEA Consulting

Presented by Professor Bernadette McCabe (IEA Task 37)





Foreword

Presentation prepared by ENEA Consulting based on ENEA's *Biogas Opportunities* report

Mendo Kundevski

Principal

mendo.kundevski@enea-consulting.com

M +61 419 750 417

360 Elizabeth Street, Melbourne, VIC 3000

Presented by IEA Task 37 Biogas Taskforce

Professor Bernadette McCabe

Leader - Energy and Bioresource Recycling Research Program Team

bernadette.mccabe@usq.edu.au

T +61 7 4631 1623

Centre for Agricultural Engineering

University of Southern Queensland | Toowoomba | Queensland | 4350 | Australia



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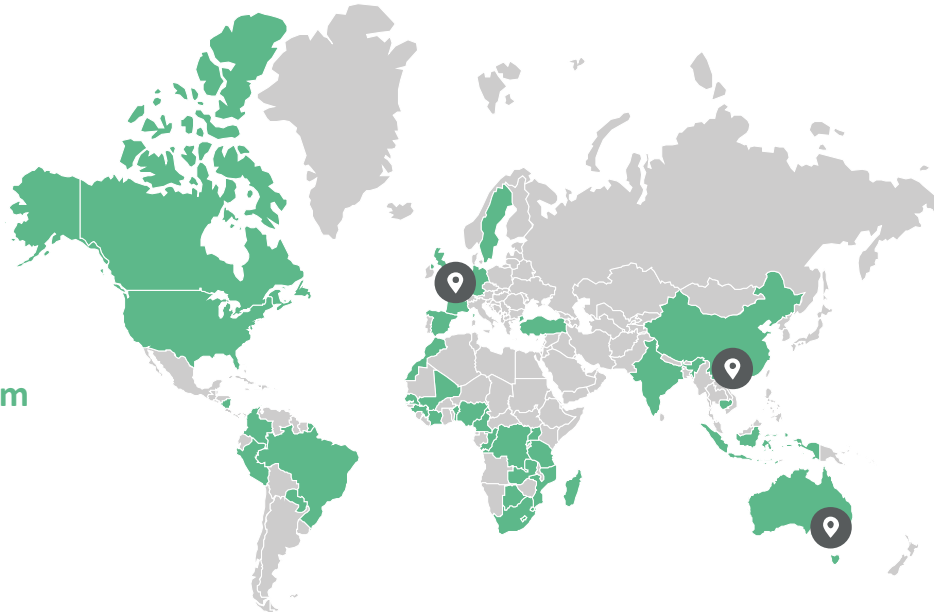
Various customers

Energy companies
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A unique capital of know-how

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Energy access



International coverage

25+ countries
200+ clients
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ENEA Consulting is also committed to improving energy access through its unique ENEA Access programme, supporting social entrepreneurs in Africa and Asia-Pacific

The report delivers solutions via collaboration and harnessing insights

Lead organisation



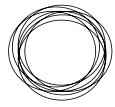
Funding partners



Extensive stakeholder collaboration

Peak bodies	Government	Academia
Technology providers	Project developers	Utilities





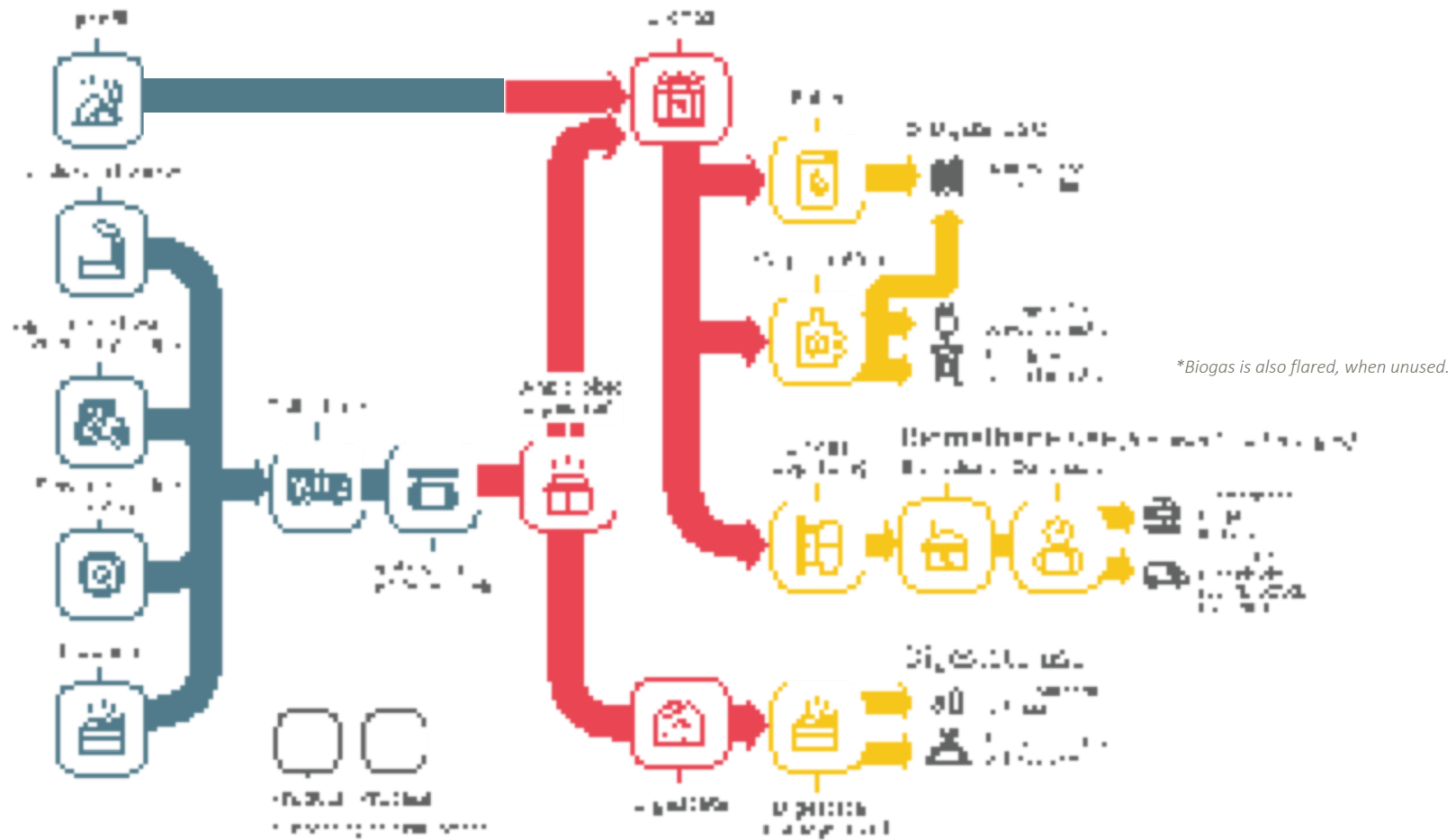
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1. Biogas introduction

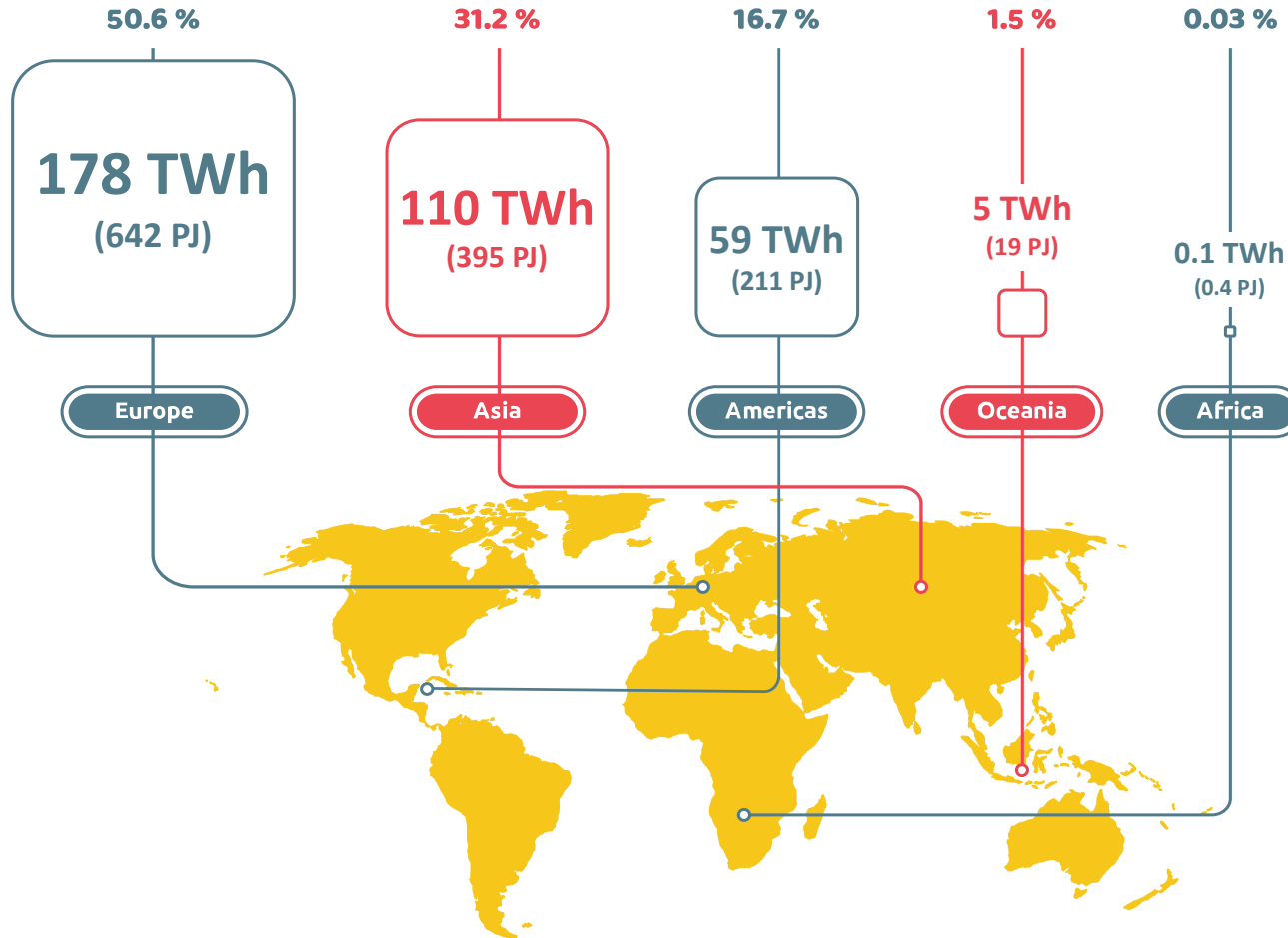
A renewable gas offering multiple uses





2. Global biogas industry

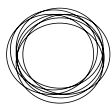
The industry is progressing at different stages across regions



Source: World Bioenergy Association | IEA Key World Energy Statistics.
Biogas production data in 2014.



Global production is 1,270 PJ (~1.5% of global renewable energy supply)



2. Global biogas industry

Overseas learnings about aims, targets and actions can inform Australia

Aims

Reduce GHG emissions



Increase renewable energy



Manage landfill impacts



Support agricultural sector



Targets

Renewable electricity – Germany: 100% by 2050 (non-binding)



Renewable gas – France: 10% by 2028, 1000 on-farm units by 2020



Methane emission reduction – California: 40% by 2030



Fossil independent transport sector – Sweden by 2045 (non-binding)



Actions

Feed-in tariffs, contract-for-difference, renewable energy certificates



Pilot project funding



Landfill taxes

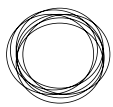


Tax exemption for biomethane vehicle fuels



Countries investigated:

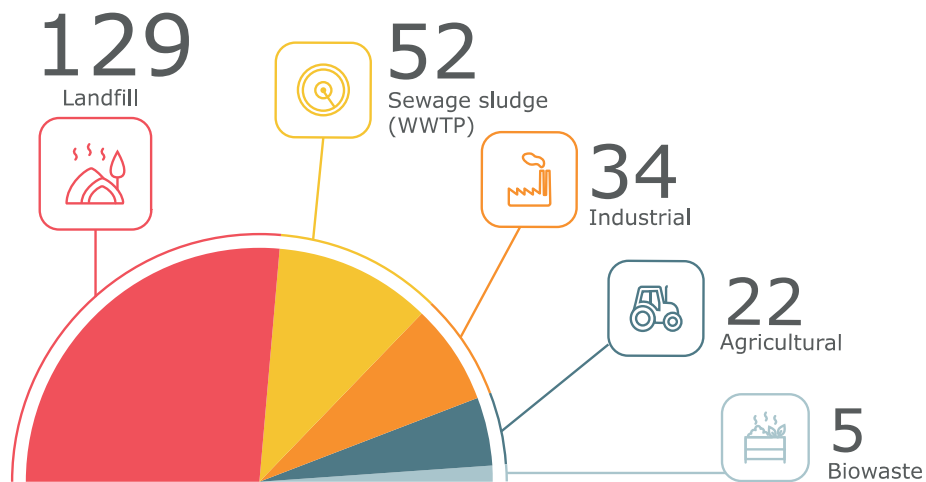
Germany, France, UK, Sweden, California (US), South Korea



3. Australian biogas industry

The industry is emerging with 242 sites, half are landfills

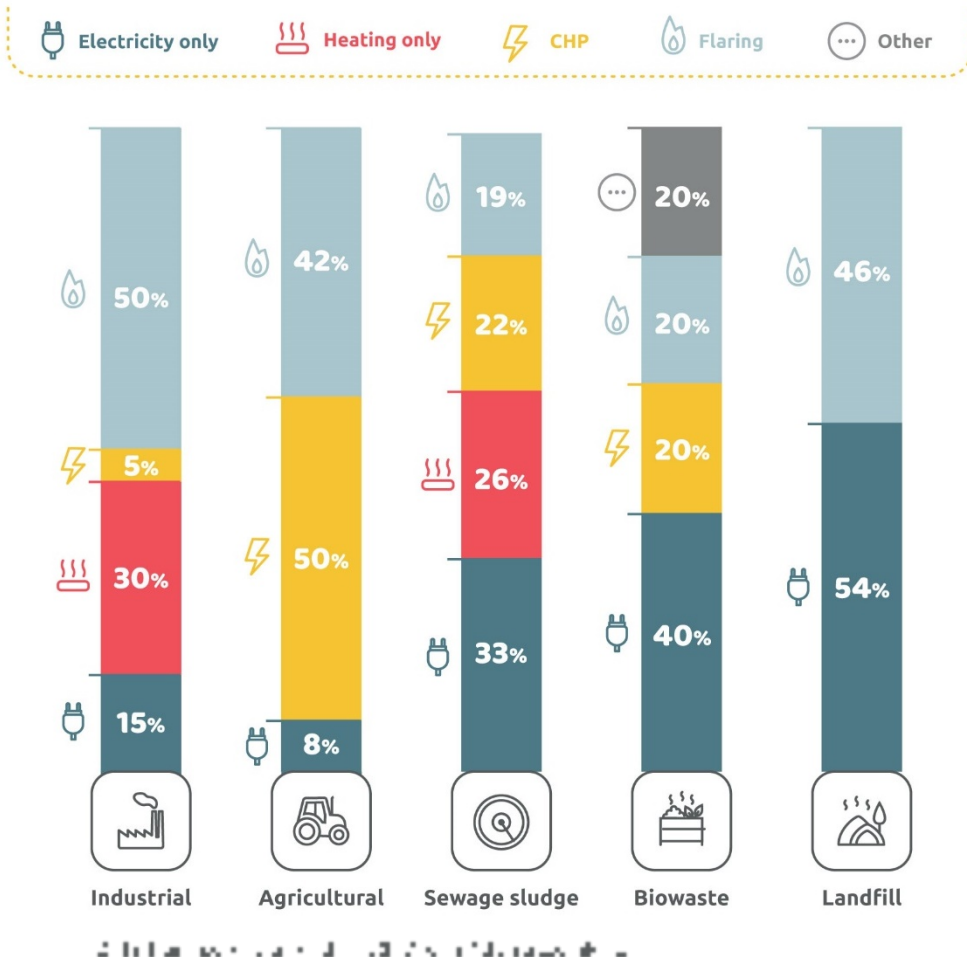
Biogas plants by feedstock type in 2017

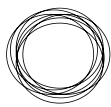


No biogas to biomethane upgrading plant in Australia

- ▶ Germany: 10,431 plants in 2016
- ▶ UK: 987 plants in 2016
- ▶ US: 2,200 plants in 2017

Biogas utilisation





3. Australian biogas industry

The Australian industry has significant untapped potential

Electricity generation from biogas
in 2016-2017



~1,200 GWh (4,320 TJ)

Source: Depart of the Environment and Energy

~0.5% of national electricity generation

Annual estimated biogas
resource potential



103 TWh (371 PJ)

Source: Deloitte

*~9% of final energy consumption and
~30% of natural gas consumption in 2016-2017
Comparable to Germany's current biogas production*

Bioenergy investment potential



\$A3.5 to 5 billion

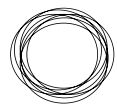
*For new bioenergy and energy from waste projects
Source: CEFC*

CO₂ emission savings potential



**9 million tonnes
per year**

~12% of Australia's carbon abatement task



4. Australian biogas opportunities

Biogas offers environmental, social and economic benefits

1



Renewable, continuous energy

- ▶ Supports grid via reliable, dispatchable energy
 - Especially as intermittent renewables increase

2



Emission reductions

- ▶ Replaces fossil fuels
 - Some biogases ~90% less emission intensive
- ▶ Captures methane emissions
 - Mainly landfills and animal waste

3



Waste treatment option

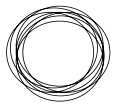
- ▶ E.g. recovers energy from landfill waste
 - 50% organic waste is composted
 - 10% landfill gas is recovered for energy
 - 40% landfill gas is flared

4



Economic

- ▶ Creates investment opportunities and jobs
 - Germany: 45,000; US: 7,000 jobs
- ▶ Supports local economies
 - E.g. new income sources for farmers



4. Australian biogas opportunities

Biomethane unlocks two additional benefits

1



New, sustainable mobility

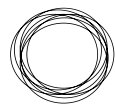
- ▶ Offers sustainable vehicle fuels
 - Especially heavy vehicles
- ▶ Helps decarbonise the transport sector
 - Sweden: 47 of 62 plants supply biomethane fuel

2



Gas sector decarbonisation

- ▶ Biogas is critical (*Gas Vision 2050*)
- ▶ Biomethane injection: no infrastructure upgrades
- ▶ Gas grid offers energy storage



5. Australian biogas challenges

Several barriers hinder project development

1



Financial viability

- ▶ High upfront investment
 - ▶ Complexity in securing revenue sources
- (Note: Small projects with secured feedstocks can stack up)*

2



Policy challenges and gaps

- ▶ No renewable gas targets
- ▶ Financial uncertainties with grid export
- ▶ No taxation exemption for renewable gaseous fuel
- ▶ Unharmonised landfill waste levies

3



Project development

- ▶ Approval process complexity
- ▶ Finding private finance
- ▶ Social license considerations
- ▶ Long distances



6. Recommendations

Advancing Australia’s biogas industry



Commonwealth & State Govt

National target(s) for renewable gas

- ▶ Similar to Australia’s Renewable Energy Target
- ▶ Non-binding targets can encourage sector development



Commonwealth & State Govt

Policy design via industry consultation

- ▶ More consistent national / state policies
- ▶ Adapt existing / develop new policies





6. Recommendations

Advancing Australia's biogas industry



State Govts & Industry

Waste strategies for feedstock quantity and quality



Harmonised levies



Organic source separation



Long-term feedstock supply contracts



Commonwealth Government

Sustainable mobility opportunities



Promote biomethane use as a low carbon fuel alternative



Revise excise duty on biomethane vehicle fuels



Governments & Industry

Simplifying approval processes

- ▶ Review current processes, develop guidelines, information packs



Paris

89 rue Réaumur
75002 Paris,
France

+33 1 82 83 83 83
contact.paris@enea-consulting.com



Hong-Kong

Suite D, 6th floor,
Ho Lee commercial building
38-44 d'Aguilar Street, Central,
Hong Kong

contact.hongkong@enea-consulting.com



Melbourne

Level 12, 360 Elizabeth Street
Melbourne VIC 3000,
Australia

contact.melbourne@enea-consulting.com