A2EP Letter of Support for Jemena's proposal for renewable gas connections

14th February 2025

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About the Australian Alliance for Energy Productivity

The Australian Alliance for Energy Productivity (A2EP) is an independent, member-based, not-for-profit organisation focused on improving the productivity of energy use and decarbonisation in industrial and commercial sectors. Our technology-agnostic approach is supported by our broad range of Members across manufacturing, research, consultants, equipment manufacturers, energy utilities and contractors. Through our A2EP Member network we reach more than 1,000 of Australia's top manufacturers and energy users. Our Members are listed in Appendix A.

Research conducted by A2EP on industrial process heat and renewable alternatives over the last ten years has given us unique insights on how industry intends to decarbonise, the time frames and the required costs. Specific research pieces that inform the recommendations in this submission include:

- Mapping of boiler and burner projects across Australia utilising NGERS and NPI data to identify fossil fuel use for heating and then direct and indirect surveying on intended decarbonisation pathways. Commissioned by Federal Department of Climate Change, Energy, the Environment and Water (DCCEEW).
- More than 50 feasibility studies completed or reviewed on renewable heating options across Australian manufacturing.
- Collaboration on three renewable heat reports:
    - *Harnessing Heat Pumps for Net Zero* with the Energy Efficiency Council
    - *Electrification and Renewables to Displace Fossil Fuel Process Heating* for the RACE for 2030 CRC
    - *Bringing the Heat*: *Hydrogen's role in decarbonising Australian industrial process heat* with the Australian Hydrogen Council
- >100 informal discussions with Australia's top gas users in just the last two years.
- In September 2024 A2EP hosted 200 industry leaders at the inaugural Australian Renewable Heating Conference which showcased more than 60 presentations, largely featuring real-world projects that have reduced or eliminated natural gas usage for process heat.

Criticality of renewable gas for decarbonisation

As presented at A2EP's Australian Renewable Heat Conference in September 2024, on the current trajectory, emissions from stationary energy are projected to be the largest source of emissions by 2030 (see *Figure 1*). Process heat accounts for more than 40% of the energy used in stationary energy which is approximately 22% of Australia's final energy demand, as stated in *Renewable energy options for process heating* by ITP Thermal (2019).

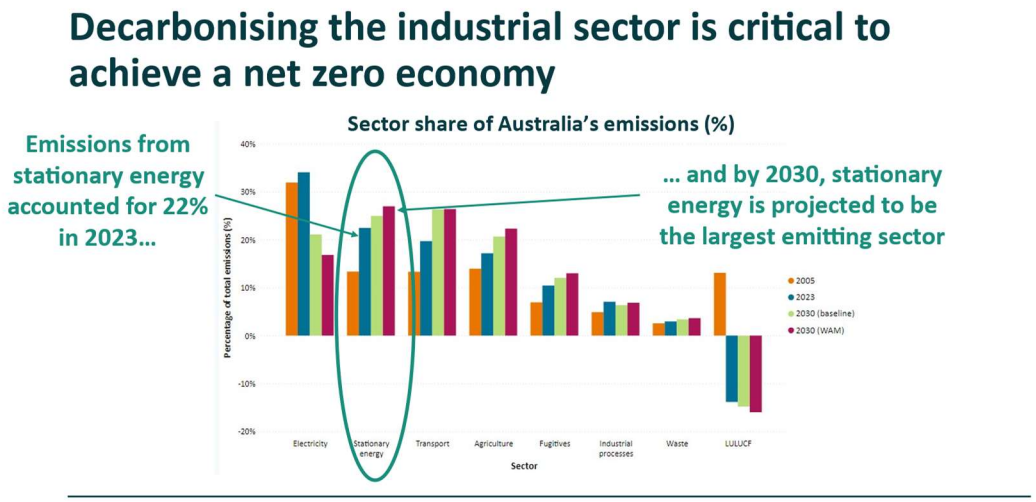


Figure 1: Figures on Australian stationary emission DCCEEW at the 2024 Australian Renewable Heat Conference on 25 September 2024.

A2EP insights on the future fuel mix for industry

Using the previously outlined research insights, we expect the projected future heating mix to be as shown below where biogas or biomethane is show as a major contributor to displacing fossil fuels.

Insight #1: Victoria needs biogas for industry

A range of renewable heat solutions need to be deployed to decarbonise industrial heat, based on the temperature ranges offered by each technology

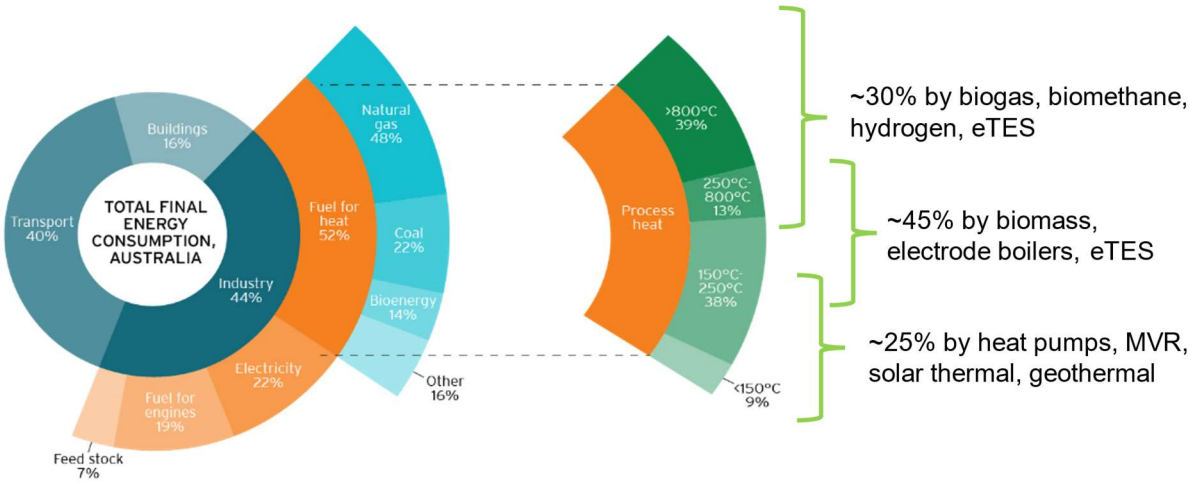


Figure 2: The range of process heat temperatures required by Australian industry and the solutions that can serve them. Source: ITP Thermal et al, Renewable Energy Options for industrial process heat (2019)

Research by A2EP as part of its boiler and burner mapping project for the Federal DCCEEW, indicated many major energy users were not yet sure of their heat decarbonisation pathway, but that those who were, 10% were looking to biogas and only 1% were looking to use a combination of biogas/hydrogen.

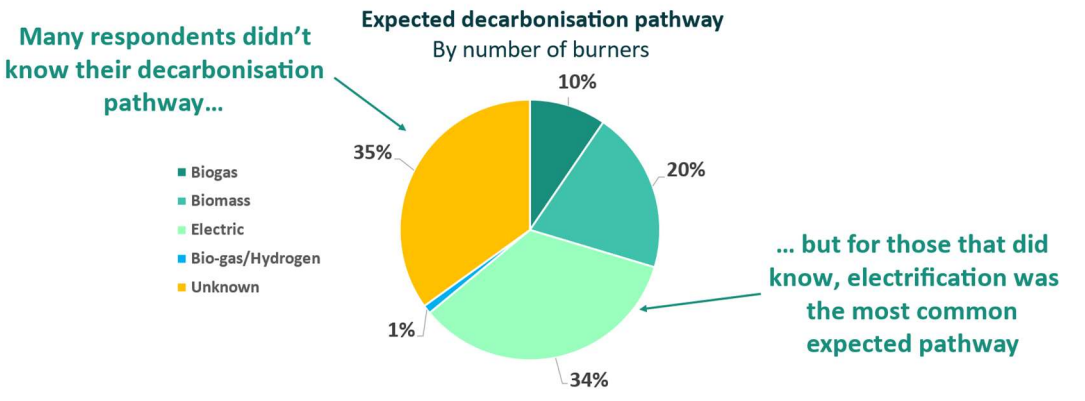


Figure 3: Results of the boiler and burner mapping study, as presented by Jennie Cassidy of the Federal Department of Climate Change, Energy, the Environment and Water at the 2024 Australian Renewable Heat Conference on 25 September 2024.

Insight #2: Biogas – not hydrogen – is the answer

As detailed in its report, *Bringing the Heat,* for the Australian Hydrogen Council, A2EP's research identified a very narrow opportunity for hydrogen to provide decarbonised heat, limited by cost (compared to renewable gas and electric alternatives), technical, location and logistical issues. Our conclusions were shared by industrial energy users consulted for the boiler and burner mapping exercise we conducted. Recent projects by AGIG, such as the Hydrogen Park Murray Valley project, only confirm the costs are a long way from being economic whereas biogas can be economical today (more analysis here). Unlike hydrogen, biomethane is a 'drop-in' renewable solution for existing gas users which can often be integrated with minimal or no equipment changes.

Insight #3: Australia's biogas resources are underestimated and underutilised

A2EP estimates that Australia currently produces around 22 PJ of biogas, the majority of which comes from landfills. Currently it is either used to generate renewable electricity with an efficiency of around 35% (i.e. 65% is wasted) or 100% wasted through flaring. Alternatively only 15% is waste when used for industrial purposes.

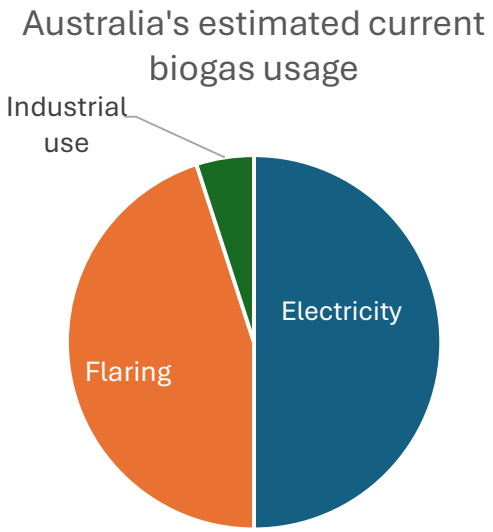


Figure 4: Australia's current estimated biogas usage/wastage.

Two issues are resulting in poor usage of existing biogas resources:

1. The production of biogas from landfills is a function of the landfill properties and cannot be easily controlled. As a result, the burning of landfill gas for renewable electricity cannot be ramped up and down according to the needs of the electricity grid. Consequently, biogas used for electricity generation regularly competes with wind and solar-generated electricity or is flared.

2. Increasing periods of negative electricity prices are resulting in increasing periods of flaring of biogas rather than generating electricity at a loss. Figure 5 shows the increasing frequency of negative electricity events as presented by Glenn Schultz of Origin Zero at the 2024 Australian Renewable Heating Conference, 25 September 2024.

This 22 PJ of readily available biogas has a value of more than $300M of annual energy benefit and more than $50M of annual carbon benefit at today's ACCU prices when displacing fossil fuels. The economic benefit for jobs is much greater. The combination of the inability for landfill's to adjust electricity production to support solar and wind as well as increasing periods of negative electricity pricing results in an increasing portion of the approximate 22 PJ of biogas available being wasted.

Note that reducing LGC prices (see Appendix B1) will likely reduce the economics of using biogas for electricity therefore supporting the need to transition to industrial usage via pipelines.

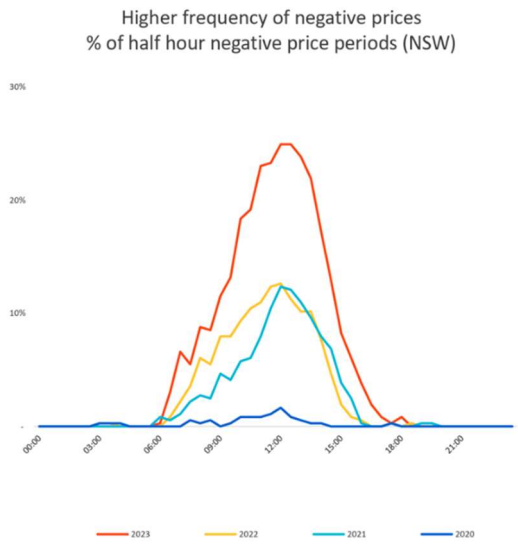


Figure 5: Increasing frequency of negative electricity events in NSW as presented by Glenn Schultz of Origin Zero at the 2024 Australian Renewable Heating Conference, 25 September 2024.

Insight #4: Biogas for heat vs biomethane for network injection

Biogas from landfills or anaerobic digestion processes can often be used directly for heating applications, not just biomethane. Localised utilisation of biogas offers a lower cost pathway to adoption with less processing and distribution costs reducing the required sales price by more than $15 per GJ.

Biogas production that cannot be used locally should be upgraded to biomethane and exported. Such projects will likely need financial support for gas conditioning and pipeline connection infrastructure.

Industry demand for renewable gas

From *ITP Thermal et al, Renewable Energy Options for industrial process heat (2019)* , the following major Australian gas users have high temperature processes which are either unlikely or as yet technically unproven as being able to be served by electrification or hydrogen. However, biomethane is a technically feasible and economic option for these applications.

Table 1: Estimated biogas demand by manufacturing sector. Souce: ITP Thermal et al. (2019)

Industry	No. of sites in Australia	Total gas usage (PJ)
Alumina & other non-ferrous	37	171
Cement & gypsum	>20	45
Iron and steel	12	90
Ammonia and chemicals	90	42

Bricks & ceramics	33	17
Glass	15	7
Other metal working	>50	~4
Other 'hard to electrify' sites	>200	~10
Total biogas demand		>386 PJ

Based on this we can estimate a potential demand for biogas in Australia 386 PJ. Industries not detailed in the ITP Thermal report, such as metal forging, casting, galvanising and asphalt production, also require high temperatures and could likely utilise another 1 PJ to 2 PJ. Many sites will find it very difficult to fully electrify due to network constraints so are likely to require access to renewable gas for decarbonising their heating needs as well.

Timing for the adoption of renewable gas will likely be over the next 10 years given most of the large gas users have obligations to reduce emissions via the Safeguard Mechanism or publicly announced targets. As such, it can be assumed these sites would be receptive to receiving these volumes of renewable gas at an economical price in the near future.

It should be noted that the majority of the biogas production potential, as shown in Appendix B1, is not located near sites with major biomethane demand as shown in the map in Appendix B4. Furthermore, due to the extremely high cost of construction in Australia, relocation of facilities next to biogas production sites is highly unlikely in the near future.

Given the likely strong demand for biomethane and the need for industry to decarbonise, A2EP strongly endorses Jemena's push to support renewable gas connections to enable transport of the biomethane to gas users.

A2EP is available for clarification on any of the information presented above.

Yours sincerely,

Jarrod Leak

Chief Executive Officer

Australian Alliance for Energy Productivity (A2EP)

Appendix A – A2EP Members

INDUSTRY LEADERS

INDUSTRY SUPPORTERS

Appendix B – Key data and references

Appendix B1: LGC price trend

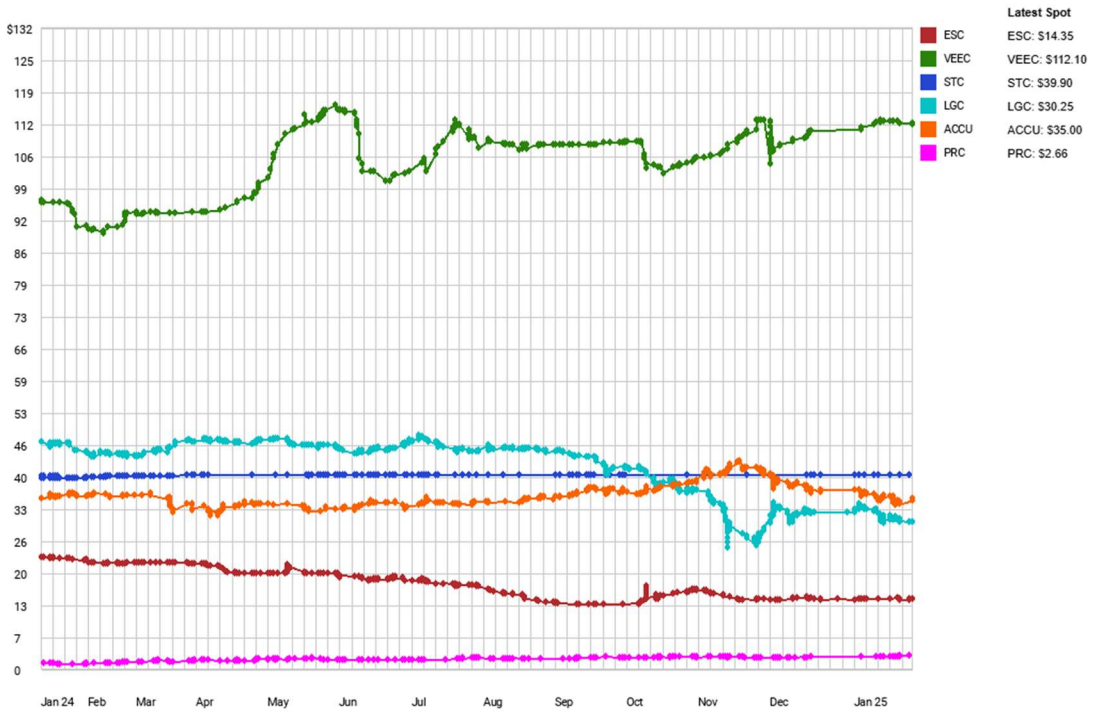


Figure 6:Certificate price trends showing the declining value of LGC's which is underpinning the utilisation of biogas for electricity generation (LGC's shown in turquoise). Source: https://www.demandmanager.com.au/certificate-prices/

Appendix B2: Future Fuels CRC – key data

Extracts from the Future Fuels CRC publication *Where are the most viable locations for bioenergy hubs across Australia.*

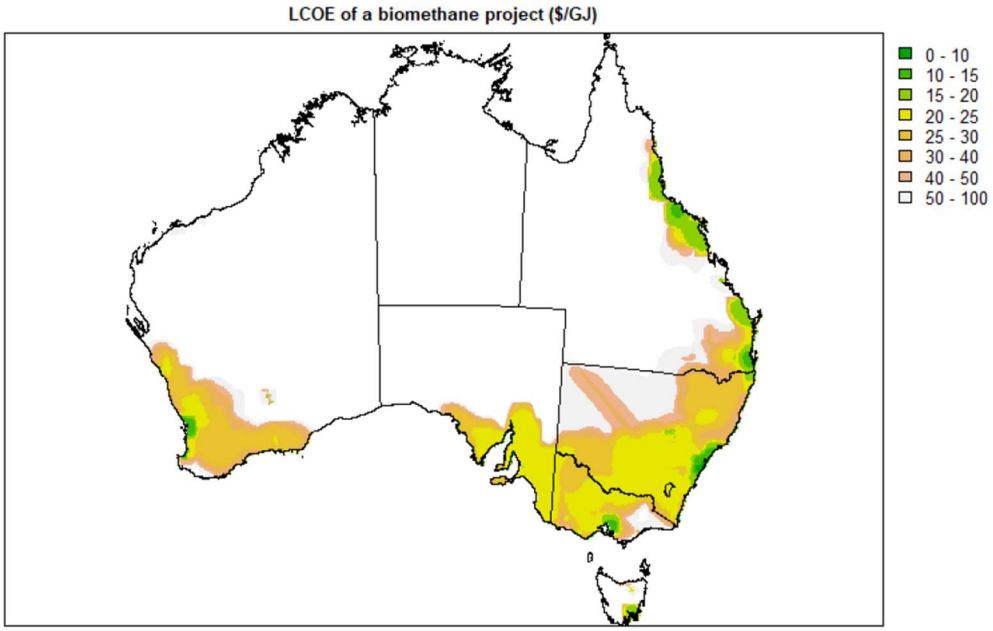
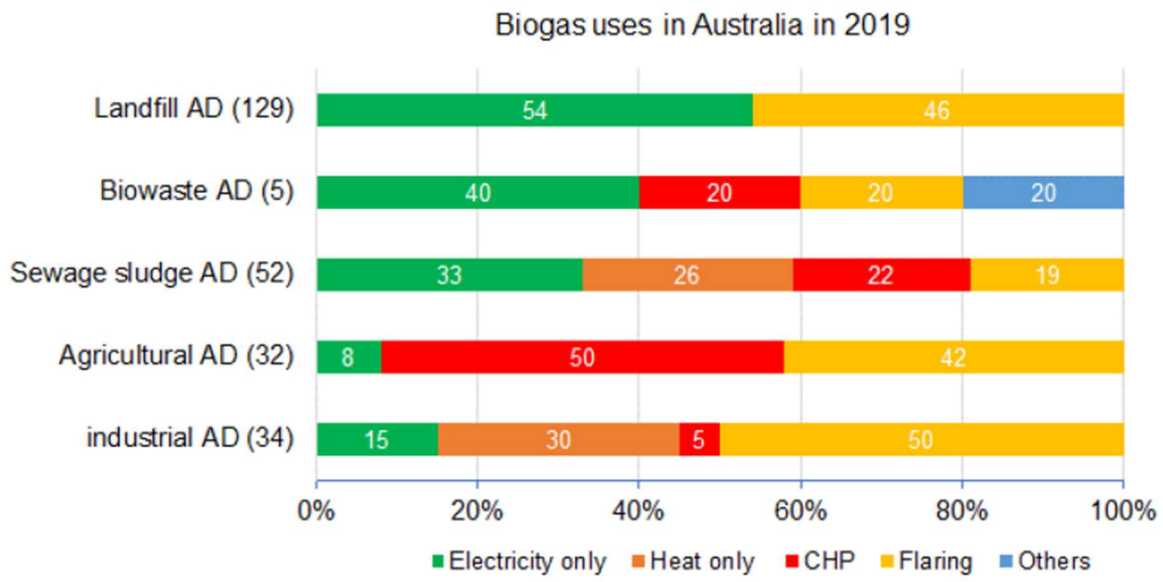


Figure 7: Estimated LCOE of a bio-methane project across Australia, assuming all available feedstock is processed, with a digestate profit of $50/tonne and a gate fee of $40/tonne.

Appendix B3: RACE for 2030 CRC's key data

Extracts from the RACE for 2030 CRC's opportunity assessment on 'Anaerobic Digestion for electricity, transport and gas'



Appendix B4: Location of large energy users

Extract for ITP's 'Renewable Energy Options for Process Heating', 2019.