1 November 2024

Productivity Commission
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Re: Opportunities in the circular economy

Dear Commissioners,

Jemena welcomes the opportunity to respond to the Productivity Commission's inquiry into the circular economy.

Jemena owns and operates a diverse portfolio of energy assets throughout the northern and east coast Australia. With more than $12 billion of major gas and electricity infrastructure, we deliver energy to millions of households, institutions, and industries every day. Our assets include the Jemena Gas Network in New South Wales, the Jemena Electricity Network in northwest Melbourne and gas transmission lines such as the Eastern Gas Pipeline, Queensland Gas Pipeline and Northern Gas Pipeline.

As an integrated energy infrastructure and services company, which owns, operates, designs, constructs and maintains both gas and electricity assets, we recognise our responsibility to make changes to how we operate to help Australia meet its net zero emissions targets, while retaining system reliability. We are seeking to address our own emissions to achieve our 2050 net-zero ambition, as well as using existing technologies and supporting the development of new technologies to deliver choice in renewable energy sources.

At Jemena, we see gas as a fuel in transition, not just a transition fuel. Today, Australians – and our trading partners – rely on Australia's natural gas resources. Tomorrow, this demand for Australian energy is increasingly likely to come in the form of clean energy embodied goods, derived from feedstocks such as biomethane and renewable hydrogen. By displacing increasing amounts of natural gas with these carbon neutral alternatives, we believe that existing gas infrastructure can play a critical role in a more secure and cost effective transition to 2050.

We strongly support this consultation and are encouraged by the decision to view the circular economy through the lens of enhancing Australia's productivity and lowering emissions. Biomethane represents an important opportunity to achieve these benefits and more. It can provide lowest-cost abatement for hard-to-electrify industries, regional investment, secure clean energy, and regenerate our nation's ecosystem.

However, due to inconsistent government policy and regulations, and market failures, the industry has been slow to activate. Jemena strongly encourages policy makers to support this nascent market to drive emissions down, support economic growth, boost regional jobs and secure our clean energy grid. This can be realised by addressing the following areas:

- Acknowledge through regulations, certification, and accounting standards the role of low-emission products (e.g. biomethane through shared infrastructure).
- Support the development of ancillary 'green' markets for waste products derived from the production of biomethane (e.g. biogenic CO_2 and organic digestate).
- Provide government funding support to the supply side, helping drive down production costs. Work with users to determine appropriate demand side measures to encourage supply, and support offtake.
- Work with industry and other scientific agencies to develop a comprehensive understanding of the immense opportunities available in the biomethane, and bioenergy space. Helping link the disparate value streams that cross multiple sectors of Australia's economy.

Jemena welcomes further consultation with the Productivity Commission on how a successful sovereign biomethane industry can support an Australian circular economy. For more information this submission or to arrange a discussion please contact Joeb Northey, Manager Policy and Government Relations

Yours sincerely,

Suzie Jakobovits
General Manager
Renewable Gas

What progress is being made in Australia?

Malabar Biomethane Demonstration Project

Jemena's Malabar Biomethane Project (Malabar) is the first demonstration project in Australia to produce biomethane and inject it into a gas network; providing on demand renewable energy to network consumers.

At the Malabar facility, Jemena has partnered with Sydney Water to upgrade biogas produced from organic waste at the Malabar Water Resource Recovery Facility to a quality that meets the required specifications for injection into the natural gas network, as illustrated in Figure 1.

The facility is located in the Malabar Headland National Park, and is one of Sydney Water's multiple anaerobic digestion (AD) plants in NSW which produce biogas from organic waste in waste water. Before the development of the biomethane injection facility, the bulk of the AD biogas output was used for electrical power generation and water heating on site. The balance of biogas that could not be used via site processes was subsequently flared through waste gas burners.

Jemena has sought to demonstrate technologies that allow for a transition to renewable gases in order to reduce the emissions of its network customers including those that cannot electrify. In this context, biomethane has the benefit of leveraging waste products, to deliver a competitive and sustainable natural gas substitute.

Since inception in July 2023, Malabar has injected ~87 terajoules (TJ) of biomethane into the NSW gas network, with a target of reaching 95/TJ per annum going forward. This has reduced emissions by ~4.4 thousand tonnes of carbon dioxide equivalent (CO2-e) in just over twelve months, roughly the same as taking 1,000 internal combustion engine vehicles off the roads.

Research undertaken by GHD confirms there is between 30-34 petajoules of biomethane supply available proximate to Jemena's NSW gas network. This would be sufficient to supply approximately 65 per cent of industrial load and 90 per cent of hard-to-abate load connected to the network.

Jemena has also recently signed a series of memorandum-of-understandings with project proponents who have determined a further 20PJ *not* in immediate proximate to our network, but could be viably used. This additional supply would be enough to cover the entirety of Jemena's industrial customers. The levelised-cost of biomethane across all feedstocks is estimated to be in the range of $6.3 - $17.6/GJ, making it relatively cost competitive with unabated gas, despite the early stages of the market.

However, a fully realised circular economy approach to biomethane production can have further diffuse economic, social and environmental benefits (e.g. for the decarbonisation of agriculture, power, industry, and waste). These additional benefits can be attained through unlocking new revenue streams, and supporting the regulatory environment for biomethane.

Further opportunities include:

- Establishing a national organic digestate market with streamlined regulations and knowledge sharing support. Whilst Sydney Water has deep expertise in managing and trading digestate, other biomethane proponents face steep learning curves, and upfront costs. Successfully lowering the barriers to entry and helping link the value streams of these processes enable emerging project developers to effectively and efficiently engage in a market that offers an important additional revenue stream for project economics.
- Jemena currently vents ~2,920 tonnes of biogenic CO2 per annum at Malabar due to the market and regulatory challenges of commercialising this commodity. Establishing a national biogenic CO2 market would provide an alternative carbon-neutral feedstock for industry, and financially value an important waste product. Doing so will accelerate low-emission heavy industries, and provide an additional revenue stream for biomethane projects.

Realising these critical opportunities will provide the foundations for a successful biomethane sector and accelerate emissions reductions, increase economic activity in the regions, while further bolstering Australia's fuel security. Jemena believes that the market is primed, and the technologies exist to scale up and achieve these benefits. Further information on these benefits can be found in the Appendix.

Nonetheless, **additional policy and regulatory** changes are required due to the nascent stage of this important sector, and the challenges it faces in connecting all the vital value streams available within its circular economy process.

- The Commonwealth Government must progress the Climate Change Authority's recommendation to reform the National Greenhouse and Energy Reporting (NGER) methodology to recognise (reduced) emissions from biomethane use through shared infrastructure. Without this, hard-to-electrify gas users ,including existing Safeguard Mechanism facilities, have no incentive to procure biomethane; imposing greater costs of marginal abatement on them as they decarbonise.
- Harmonisation is required for state, territory and commonwealth laws and policies around digestate. (e.g some state regulators have classified digestate as reportable priority waste residue, making cost-effective beneficial use very difficult). This inconsistency is an impediment to investment and cross-border trade.
- Greater regulatory clarity is necessary around digestate and biogenic CO2 as important commodities for a net-zero circular economy, coupled with supportive policies to increase uptake.
- Funding support for education and resources is needed to explore circular economy approaches, opportunities and bioenergy supplies across Australia for biomethane producers. This will support multi-sector collaboration, innovation and scale-up projects with farmers and other important supply chain partners.
- There is currently no regulatory definition, or sustainable certification, to differentiate fossil fuel-derived CO2 from biogenic CO2. This hinders circular economy outcomes and acts as an inhibitor to a successful biomethane industry. The Commonwealth Government should look to define this 'green' commodity, to enable its full market potential.

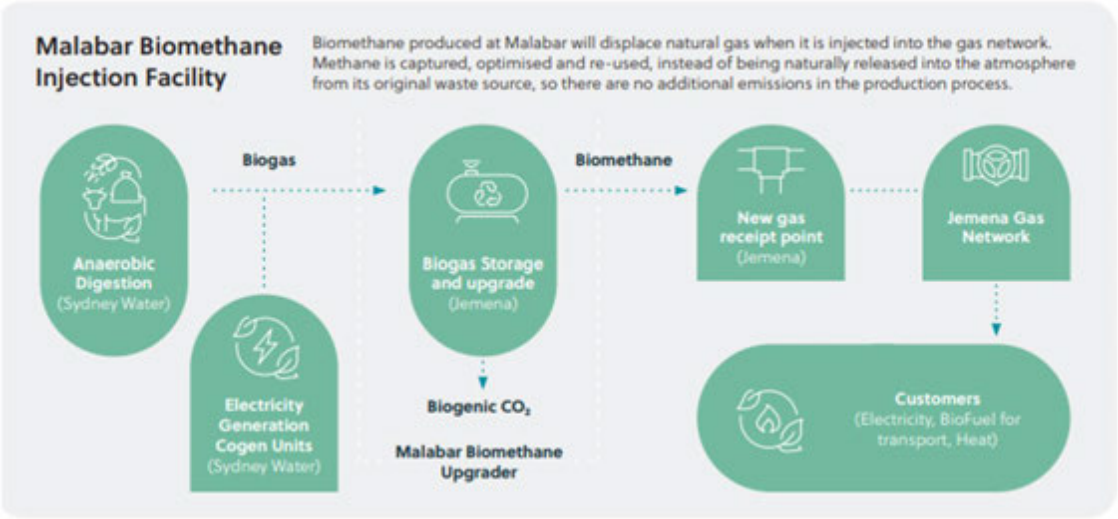

Figure 1 - Malabar biomethane injection process (source: Jemena)

What are the priority opportunities for Australia?

A thriving sovereign biomethane sector has multiple circular economy benefits. It narrows the loop for fossil-derived products, acting as a carbon neutral substitute for natural gas. It slows the loop by repurposing existing pipeline infrastructure to deliver carbon neutral energy; and closes the biogenic waste loop by recycling organic material, regenerating our natural ecosystems.

Importantly for maintaining Australia's competitiveness throughout the energy transition, biomethane also provides a cost-efficient, emission reduction pathway for industrials; many of whom fall under the Safeguard Mechanism and have no electrification pathway.

In its 2023 *'inquiry into managing the climate transition*', the Productivity Commission (PC) recommended expanding the Safeguard Mechanism to make it Australia's centrepiece abatement policy. Jemena agrees with the PC that this framework can help move Australia towards a lower-cost approach to achieving its 2030 and 2050 climate targets, while ensuring productivity growth. In particular, Jemena sees biomethane as *the* enabling option for Safeguard Mechanism entities where they are currently reliant on natural gas.

Right now however, the opportunity for a biomethane sector to support Australian industry, and the country's broader climate targets, is being stymied due to an absence of market signals, and inconsistent regulations. To achieve a robust biomethane industry operating in Australia for our hard-to-abate energy users, policy makers must act across several areas. These include:

- Committing to and finalising the recognition of biomethane's emission reduction qualities through existing shared pipeline infrastructure (i.e NGER emissions reporting reform).
- Supporting the development of new, circular economy and net zero-compatible markets that provide further revenue stream opportunities and cross cutting emissions reduction opportunities (e.g biogenic CO_2 and digestate).
- Harmonising regulations and laws across the country to enable a consistent and transparent investment environment.
- Working with industry to investigate Australia's immense potential in bioenergy, and understand critical information, knowledge, and skills gaps.

Addressing these areas will establish confidence, transparency, and predictability across the biomethane value chain. This will provide the signals for private investors to confidently invest and innovate in this clean technology sector, while minimising the costs of the transition. This will lead to positive spillovers and create a more circular economy across waste, industry, agriculture, and the power sector.

A 2023 study commissioned by the European Biogas Association found numerous additional benefits of biomethane when viewed through a circular economy lens. The report, titled *Monetising biomethane's whole-system benefits*, found an additional benefit of €23 – 78/GJ of biomethane produced was unquantified by the market (depending on production pathway).

This higher externality value was the result from a larger (positive) greenhouse impact due to reducing fugitive emissions in agriculture, and the benefits of biogenic digestate application and organic waste processing. The authors then considered these new value streams in the economics of biomethane which resulted in lower overall costs to produce a marginal unit of the renewable gas. This lead to lower total system costs and higher energy security benefits, resulting in (EU 27) economy-wide benefits by 2030 of €38-78 billion per annum, rising to €133-283 billion by 2050[1].

Between 2022 and 2050, The Race for 2030 CRC found a thriving Australian biomethane market could create 18,000 full-time jobs (mostly in regional areas) and contribute $50 billion to Australia's gross domestic product (GDP)[2]. This was supported by a KPMG report titled '*Renewable Gas: Policy options to support Australia's decarbonisation journey',* which found considerable economic benefits to implementing a circular economy for Australia's food and organic waste. In particular, it found $8.8 billion worth of additional value could be attained by converting organic waste to renewable energy, and $1.6 billion in converting nutrients in organic waste into fertiliser.

Biomethane represents a no-regrets circular economy opportunity that can reduce emissions, improve sovereign fuel security, create regional jobs, and provide on-demand renewable energy. In order to crystalise these, policy makers need to look at the enabling environment where several sub-opportunities exist to support this important renewable gas. Jemena encourages the PC to further investigate how biomethane can play an immediate role in decarbonising Australian industry. *For further information on quantitative and qualitative analysis see Appendix A.*

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[1] 20230213_Guidehouse_EBA_Report.pdf (europeanbiogas.eu)

[2] Race for 2030, 'B5: Opportunity Assessment - Anaerobic digestion for electricity, transport and gas' (2023), p.122.

What is needed to enable further progress?

In comparison to other major developed economies, Australia has not widely adopted anaerobic digestion, or subsequently, biomethane production. This is due to unsupportive regulations, lack of information, poor public understanding, costs, reliance by the agricultural sector on fossil-derived fertilisers, and a lack of appreciation for its emissions and clean energy benefits.

Jemena believes however, the single biggest inhibiting factor to activating a biomethane market is the lack of NGER recognition. Right now, the Commonwealth's NGER framework has no methodology that allows for users to reduce their emissions, should they consumer certified biomethane through shared infrastructure.

Market-based method for renewable gases: the key regulatory reform to unlocking the market.

In 2023, the CCA reviewed the NGER framework and made several recommendations to improve the scheme and enable further economy-wide emissions reductions. Recommendation 7 stated the government should "introduce optional market-based reporting of renewable liquid and gaseous fuels once a framework for approving certifications for renewable fuels is operational".

This would allow NGER reporters to make claims on the lower emissions intensity attributable to biomethane purchases, even if the fuel they purchased is distributed through common infrastructure and across multiple entities. As the CCA states "this is particularly important for entities that need to demonstrate that they have reduced their emissions to meet their obligations under the Safeguard Mechanism".

GreenPower, the NSW-government back certification agency, has recently finalised its renewable gas certification scheme; providing a pathway for large industrial users to purchase renewable gas certificates in the same way they do for large-scale generation certificates (LGCs) in the electricity market. In 2024, Jemena was proud to announce that its Malabar project was the first certified renewable gas project in Australia under this scheme.

However, despite being able to purchase these certificates on the open market. Large industrials cannot claim the emissions reduction benefits until the national reporting framework is updated. This effectively makes biomethane indistinguishable from unabated gas, reducing the incentive for consumers to sign up to offtakes and pay a 'green' premium. This has held back investment, and is stymieing the environmental, social and economic benefits a robust biomethane industry can provide.

Today, the Commonwealth government has committed 'in-principle' to the CCA's recommendation. It is important that the amendments to the NGER methodology are progressed within the next annual update to bring forward latent investment, and drive near-term industrial decarbonisation. Jemena encourages the PC to acknowledge the importance of this regulatory reform to unlock demand for biomethane, in order to activate the market.

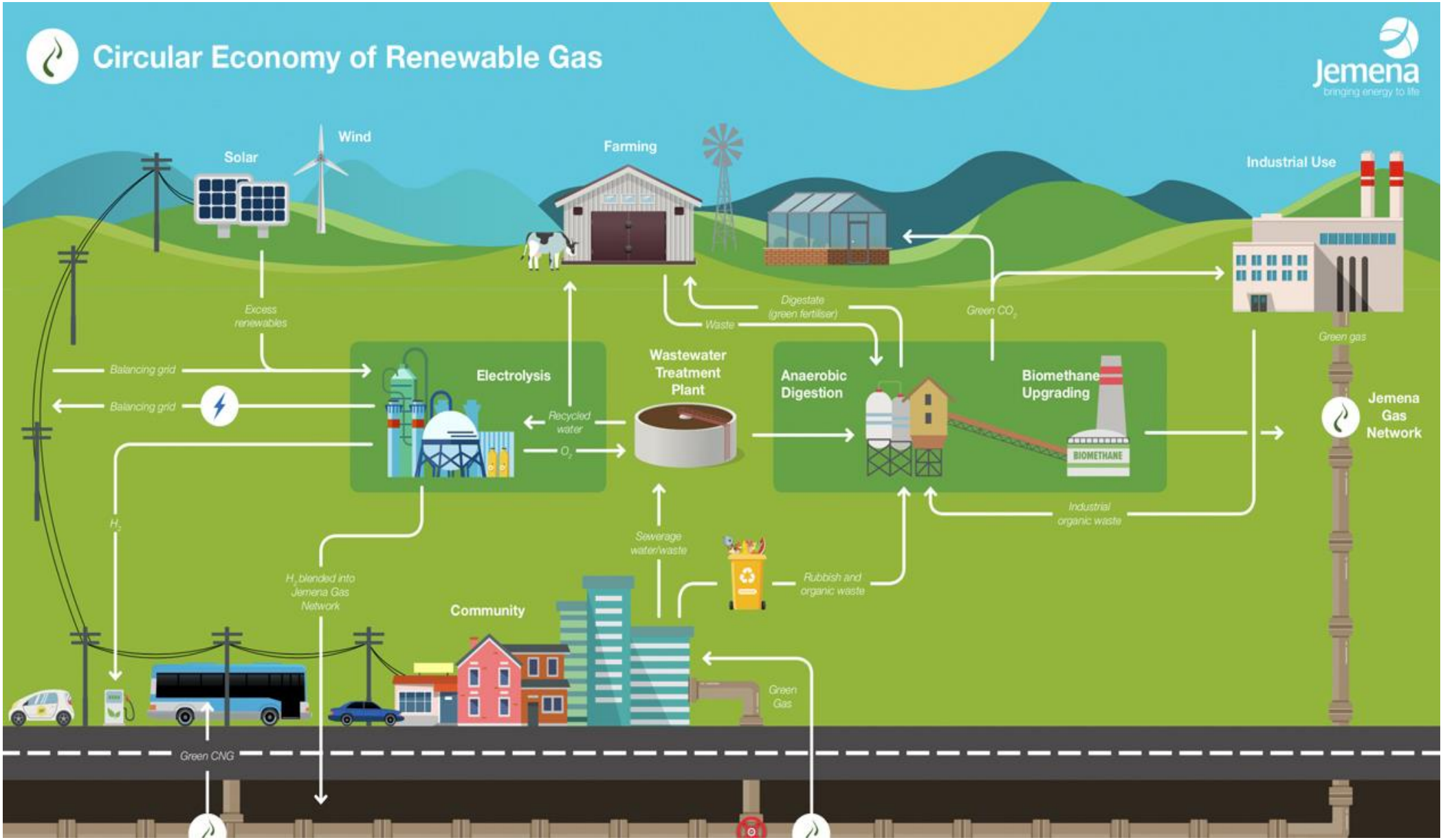
Doing so will have positive environmental, social and economic spillover effects into the agriculture, waste, and power sectors. It will also provide an efficient, cost-effective pathway to decarbonisation for current, and future, gas users seeking a low cost decarbonisation pathway.

Activating new markets, and valuing positive circular economy externalities.

To date, Australian governments have not seriously considered biomethane or developed any comprehensive plan to connect its disparate value streams with decarbonisation and secure clean energy outcomes. This has resulted in a fragmented sector that requires clear government leadership in parallel with industry engagement. To achieve the many circular economy outcomes on offer, Jemena recommends policy makers consider a comprehensive approach to biomethane that includes: regulations, supply side incentives, demand side requirements, and research and development support. Examples of these include:

- Demand side mechanisms such as industry wide and government contract specific renewable gas purchasing targets, to help reduce the project offtake risk.
- Support industry initiatives to revise AS4564: Specification for General Purpose Natural Gas, to align with international standards. Removing a barrier to biomethane and hydrogen blends, whilst maintaining a safe and reliable gaseous fuel market.
- Government support for feasibility and FEED funding for renewable gas projects to support first-movers until the market develops.
- Governments should consider removing barriers to aggregating feedstocks and creating biomethane 'hubs'. This would leverage existing gas distribution networks, achieve economies of scale and allow for the transportation of biomethane at lowest cost to market.
- Governments should develop policy to maximise the availability of organic waste feedstocks and ensure that the most efficient use of the bioenergy resource is mandated.

- Governments and science agencies should work together with industry and the agricultural sector to better understand the immense opportunities available in the bioenergy space. This could include national or state roadmaps, quantification of supply sources, and/or infrastructure assessments.


Circular Economy of Renewable Gas
Jemena
bringing energy to life
Solar
Wind
Farming
Industrial Use
Excess renewables
Digestate (green fertiliser)
Waste
Green CO_2
Green gas
Balancing grid
Balancing grid
Electrolysis
Wastewater Treatment Plant
Anaerobic Digestion
Biomethane Upgrading
BIOMETHANE
Jemena Gas Network
Recycled water
O_2
H_2
H_2 blended into Jemena Gas Network
Sewerage water/waste
Rubbish and organic waste
Industrial organic waste
Community
Green Gas
Green CNG

Appendix A – Further information

Benefits

Emissions reduction

According to the CCA's 2024 Industry and Waste Sectoral Pathway report, widespread adoption of a circular economy approach and fuel switching to biofuels will be required for the two sectors to decarbonise. Biomethane can play a crucial role in these emissions reduction efforts, and others, with the right regulatory reform and policy support from government. This will bring forward emissions reductions across agriculture, waste, and industry, whilst fast-tracking innovation and technology cost reductions that are needed for a self-sustaining and prosperous sector. Estimates by ARENA, place emissions reductions of 9 per cent by 2030, and 12 per cent by 2050 in thriving Australian biomethane sector[3].

Biomethane is produced via the refinement of biogas produced from biomass, such as organic matter derived from forestry material, agriculture waste, manure, sewage or waste streams available on a renewable basis[4]. As a fuel, its use is interchangeable with natural gas. Current gas usage adds emissions from outside the biological cycle, while biomethane reuses that which is already present[5]. This offers a carbon-neutral technology to support important hard-to-abate industries, gas-powered generation to firm renewables, and heavy transportation options. Crucially, as a 'drop-in and on-demand fuel' fully compatible with existing infrastructure, it avoids the need for new transportation and storage investment reducing the overall cost of the energy transition.

Consideration of the entire emissions reduction avenues available from biomethane production illustrates the cross cutting and compounding benefits of this nascent sector:

- It uses unabated waste from other sectors (e.g. manure in agriculture, or landfill gas), helping lower the emissions of those respective sectors.
- Replacing natural gas consumption with biomethane also reduces the amount of new additional emissions large industrial users emit. This is important, as the government looks to further enhance the Safeguard Mechanism in the coming years.
- By using biogenic CO_2, it reduces the amount of 'new' CO_2 created from fossil-derived energy sources and released into the atmosphere today.
- By reducing the usage of synthetic fertiliser, derived from natural gas, organic digestate reduces additional emissions.

When considered together, these multiple emissions reduction opportunities quickly scale up, and highlight the overall circular economy benefits of a successful and thriving local biomethane sector.

Energy security

Energy security benefits can be achieved by scaling up domestic biomethane production, which helps offset tight east-coast gas supplies, and lowers the emissions intensity of gas consumption. Using locally produced biomethane can also support greater fuel security and provide a buffer for local consumers from international gas prices; protecting the economic competitiveness of Australian industry.

The energy security benefits have been recognised by other nations across the globe in the wake of Russia's invasion of Ukraine, which has led to supportive biomethane policies by national governments. In Europe, biomethane is already used widely in many countries, particularly in Europe, where it is seen as "the cheapest and most rapidly scalable renewable gas available today". The EU now has a target of 35 billion cubic metres (bcm) per year by 2030 of biogas/biomethane. It has linked its REPowerEU plan with its Waste Framework Directive to improve organic waste collection to increase feedstock availability, and created the Biomethane Industrial Partnership (BIP) to achieve this goal[6][7].

Furthermore, the production of biomethane creates two biproducts with both commercial and environmental value, namely, biogenic carbon dioxide and a nutrient rich fertiliser known as digestate.

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[3] ARENA, Australia's Bioenergy Roadmap, p.16 (https://arena.gov.au/assets/2021/11/australia-bioenergy-roadmap-report.pdf)

[4] ARENA, Australia's Bioenergy Roadmap, p.4(https://arena.gov.au/assets/2021/11/australia-bioenergy-roadmap-report.pdf)

[5] ENA, Renewable gas for a future made in Australia, p.6

[6] https://energy.ec.europa.eu/topics/renewable-energy/bioenergy/biomethane_en

[7] https://bip-europe.eu/about-the-partnership/

Biogenic carbon dioxide

Biogenic carbon dioxide is a crucial, yet nascent, waste product stream from the upgrading of biogas to biomethane. It has wide applicability to support low-emission products and fuels in a net zero and circular economy. This waste stream can be used as a feedstock in multiple industrial applications, largely displacing fossil CO_2 sources, or in emerging applications such as renewable fuels, and chemicals (e.g 'green' methanol for maritime transport). Alternatively, the CO_2 can be permanently stored in concrete or through land use, providing a carbon negative production approach.

The International Energy Agency (IEA) assessed the climate benefits of five key sources of demand for CO_2 over the medium term: fuels, chemicals, building materials, concrete and crop yield boosting. According the IEA's assessment, fuels have shown the greatest potential for CO_2 used by volume, while building materials have the greatest potential for climate benefits per tonne of CO_2 used[8].

As part of the biogas upgrading process at Malabar, biogenic carbon dioxide is removed and vented into the atmosphere. This is due to the lack of necessary technology, skills and understanding needed to commercially clean, liquify and truck the valuable product to end users by Jemena and the broader biomethane sector. Some final consumers have also signalled reservations from using a feedstock derived from human waste.

Today, food and beverage and the oil and gas sector are the two largest consumers of carbon dioxide. In the future however, there exists an opportunity for biomethane producers to on-sell this commodity to producers of low-emission fuels. Combining the CO_2 waste-stream with other chemicals (e.g. hydrogen) can produce carbon neutral fuels for sectors like aviation, and maritime transportation, known as 'power-to-X' (see Figure 2).

There is currently no regulatory definition, or sustainable certification, to differentiate fossil fuel-derived CO_2 from biogenic CO_2. This hinders circular economy outcomes, and acts as an inhibitor to a successful biomethane industry. 'Greener alternatives' for this waste product are unable to compete on an equal footing against those derived from fossil-fuels, which can rely on well-established supply chains, low costs from decades of efficiency improvements and its environmental externality not efficiently priced in the market.

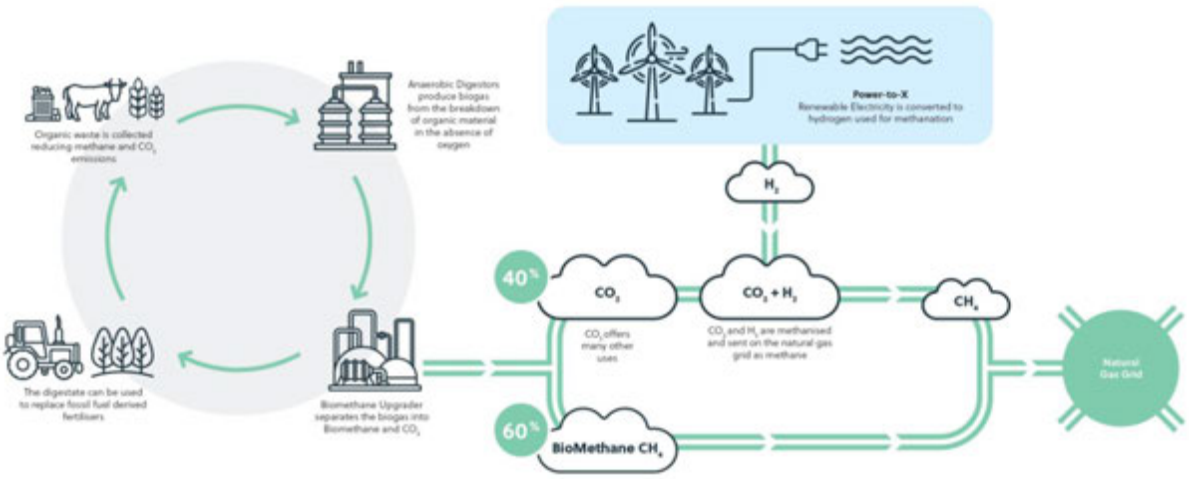

Figure 2 - Use of different biogas products (source: Jemena)

Jemena currently vents ~2,920 tonnes of biogenic CO_2 per annum at Malabar due to the market and regulatory challenges of commercialising this commodity. Using the Australian Energy Market Commission's shadow price of \$70/tCO_2-e, Jemena is forgoing ~\$200k of revenue through this process. Jemena has been in contact with several industrial customers who are interested in the product due to the significantly higher costs existing liquid CO_2 sells for in the market (~\$1,200/t). However, the high upfront costs, technical learnings required, prohibitive economics for first movers and lack of mature supply chains inhibit the Malabar project from closing the loop on this waste product and providing a more sustainable product to the market.

Jemena recommends policy makers identify and enable early market opportunities for CO_2 use that are scalable, commercially-feasible and can deliver emissions reductions. Unlocking a deep and liquid biogenic CO_2 sector

[8] Putting CO2 to Use – Analysis - IEA

can have spillover effects across other areas, and will help support biomethane projects which in turn will deliver multiple cross-cutting economic, social and environmental benefits.

Organic digestate

Digestate is created in the production of biogas via anaerobic digestion, which produces a rich organic fertiliser that can be used across Australia's agriculture sector. Using this additional product on agricultural soils presents a regenerative approach to agricultural productivity that has multiple benefits. In particular, it can improve soil health indicators and sequesters organic carbon in the soil. These organic-rich attributes can in-turn help support the recovery of degraded Australian soils, while reducing the need for fossil fuel-derived synthetic fertilisers. Close to 80 per cent of these fertilisers are imported yearly into Australia. Leveraging biogenic digestate from biomethane production would further decrease the country's reliance on imports[9]. Furthermore, organic digestate use can support emissions reduction efforts, as in Europe, "producing a tonne of mineral fertiliser emits an average of 9.7 tonnes of CO_2 equivalent"[10].

Due to the importance of the agriculture sector, healthy Australian soils are crucial to our country's economic activity, food security, and biodiversity. According to the Commonwealth Government's 2021 National Soil Strategy, Australia's soil provides ~$930 billion per year to the economy. However, the Strategy highlights our soil, although rich in biodiversity, is among the oldest and most nutrient poor in the world[11]. Digestate use is scientifically proven to regenerate soils, locking in nutrients that can enhance the long term productivity.

Sydney Water uses the organic digestate produced from the AD process at Malabar (and other facilities), to supply over 40 farms across the central west and south west of NSW to help improve soil. These large farms grow canola, wheat, oats, barley and pastures for domestic and international consumption. Around 73 per cent of the 'biosolids' produced from its water resource recovery facilities are directly applied to these agricultural soils. The remaining 'biosolids' are sent for further processing where they are mixed with other materials such as green waste and further composted to be used in horticulture, mine rehabilitation, and gardens and parklands within Sydney.

This is an illustration of the unique circular economy sectoral-cross over benefits involved in biogas/biomethane production. However, it also highlights the important role Sydney Water has played in harnessing the digestate based off its deep understanding of the AD process and how to monetise this product across different end-users. This market expertise and technological understanding is not widespread amongst prospective biomethane producers within Australia, which is proving to be a limiting factor on monetising a crucial revenue stream for them, and emission reduction pathway for agriculture.

Race for 2030's report '*Opportunity Assessment: Anaerobic digestion for electricity, transport and gas'* highlights these issues, with contributors claiming technologies required to upgrade digestate and the lack of understanding of the land applications of the product were key challenges. It also noted that most of the technology providers that could enable value creation from digestate were from Europe. The report raises the spectre of these European suppliers not participating in the Australian market due to unfamiliarity with Australia's differing biomethane regulations. This presents an opportunity for Australian technology providers to fill gaps in technology required for treatment of digestate, supported by government policy and regulations[12].

It is also worth noting that according to DCCEEW's Agriculture and Land Sector Plan, nitrogen fertilisers alone make up over 16 per cent of emissions from this sector (or ~2% of total emissions), which digestate would contribute to mitigating[13].

For further information on the benefits of organic digestate and its circular economic benefits, please read Bioenergy Australia and GHD's '*Fertile Ground – The role of digestate in Australia's circular economy'*[14].

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[9] https://fertilizer.org.au/about-fertiliser/the-fertiliser-industry/australian-fertilizer-market

[10] Bioenergy Australia, *Fertile Ground*, p.8 (https://cdn.revolutionise.com.au/cups/bioenergy/files/6ukmpvvrwewhfyw5.pdf)

[11] https://www.agriculture.gov.au/sites/default/files/documents/national-soil-strategy.pdf

[12] Race for 2030 - B5: Opportunity Assessment Anaerobic digestion for electricity, transport and gas Final Report – (source: 21.B5-OA_-Final.pdf (racefor2030.com.au))

[13] https://storage.googleapis.com/files-au-ag/agriculture-au/p/prj2f191574ff8314929f695/page/Agriculture_land_and_emissions_discussion_paper.pdf

[14] Bioenergy Australia, *Fertile Ground* (6ukmpvvrwewhfyw5.pdf (revolutionise.com.au)