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Productivity Commission
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Re: Opportunities in the circular economy – Interim Report

Dear Commissioners,

Jemena welcomes the opportunity to respond to the Productivity Commission's Interim Report: *Australia's circular economy: Unlocking the opportunities* released in March and we refer also to our response provided to the Commission in its initial consultation in November 2024.

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 are encouraged by the Commission's Interim Report and strongly endorse its recommendations that the Australian Government could consider:

- Updating the National Greenhouse and Energy Reporting (NGER) Scheme for 'biogas' delivered through shared infrastructure;
- Improve regulatory settings, such as waste classifications for organic digestate; and
- Harmonising zoning and planning changes for anaerobic digestion projects.

We note that at the most recent Energy and Climate Change Ministerial Council (ECMC) meeting in March, Ministers discussed options for developing a renewable gas industry in Australia, recognising 'renewable gases as one of the most viable pathways to decarbonise parts of industry where electrification is not a viable option'. We are encouraged by this and hope that the Productivity Commission's advice will be sought by Ministers as they look to develop a nationally consistent policy approach to renewable gas.

We strongly believe that biomethane represents an important opportunity to lower our domestic emissions and enhance Australia's productivity. It can provide lowest-cost abatement for hard-to-electrify Australian industries, regional investment, secure clean energy, and regenerate our nation's ecosystem.

However, due to the lack of consistent policy and regulatory recognition of biomethane and its by-products; biogenic carbon dioxide and digestate, the industry is yet to activate. The capacity to reduce domestic emissions by displacing natural gas, fossil carbon dioxide and fertilisers is currently undervalued or not recognised at all influencing the slow commercialisation of the renewable gas market in Australia. Jemena strongly encourages policy makers to support this nascent market to drive our emissions down, support economic growth, boost regional jobs and secure our clean energy grid. We continue to believe that a thriving renewable gas market can be realised by addressing the following areas:

- Utilise government's procurement power to help establish a renewable gas market in Australia to support the decarbonisation of traditional natural gas usage.
- Utilise existing infrastructure, such as gas networks to complement the renewable electricity buildout, to ensure the lowest whole of system cost for the energy transition.
- Acknowledge, through certification and recognition, the role of biomethane delivered through shared infrastructure in enabling the domestic manufacturing of low-emission products and buildings
- Support the development of ancillary 'green' markets, such as certification and recognition 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 for domestic users.
- Streamline the approval for the lawful use of digestate as a fertiliser to increase the benefits of a circular economy, and support the project economics of biomethane producers by providing an additional revenue stream.
- Support education of key stakeholders in the supply chain of biomethane production, to accelerate the circular economy benefit.
- Support seed funding to improve investor confidence.
- Leverage renewable gas certification registries to track progress of the industry and circular economy benefits.

Jemena welcomes further consultation with the Productivity Commission on how a successful sovereign biomethane industry can support an Australian circular economy. To arrange a discussion please contact Emma Browning, Senior Policy and Government Relations Adviser

Yours sincerely,

Suzie Jakobovits
General Manager
Renewable Gas

Information request 4.2
Coordination mechanisms to enhance the benefits of sustainable procurement policies

Renewable gases play an important role in the decarbonisation of traditional natural gas usage, and biomethane in particular has strong circular economy benefits. Jemena believes that utilising governments' combined procurement power could help to establish a renewable gas market in Australia.

A lack of long term, committed demand volume, is one area that is currently slowing down renewable gas uptake in Australia. Governments at both state and federal level have substantial purchasing power that could be used to kickstart the nascent renewable gas market, by providing long term demand and price certainty for new biomethane producers. Renewable gas project producers are currently looking for long term offtake contracts to underwrite their biomethane and green hydrogen projects. As a large purchaser of natural gas, buying through combined procurement hubs such as Health Share, government entities including hospitals and schools could set renewable gas targets or mandates to provide demand and price certainty for renewable gas offtake.

Information request 4.4
Other circular economy opportunities in the built environment

Jemena supports the PC's objective of efficient infrastructure spend and believe this can be achieved by leveraging Australia's existing gas infrastructure. Australia's gas infrastructure network is extensive with more than 100,000 kilometres of gas lines and over 42,000 kilometres of transmission pipelines that interconnect. These pipelines are crucial for delivering natural gas to residential, commercial, and industrial customers across the country. There are over 5.5 million connections to Australian homes, businesses and industry[1].

Leveraging existing gas infrastructure to transport renewable gases to complement the renewable electricity buildout, supports a lower cost and more resilient integrated energy system. Gas infrastructure, transporting natural and increasingly renewable gases, will contribute to the least-cost, fastest, and most stable transition to net zero emissions. Gas Vision 2050's Frontier Economics modelling demonstrates that achieving net zero (by 2050) by retaining gas infrastructure and developing renewable gas would be half the cost of full electrification and save consumers upwards of $12 billion per annum from 2050. Many existing gas users will require renewable gas to decarbonise industrial and manufacturing processes. For other customers the economics of electrification is not technically or commercially feasible for their end use. In addition, replacing existing appliances before the end of life is uneconomic and wasteful. Therefore utilising existing infrastructure and end use appliances optimises infrastructure investment and increases energy system reliability, , which in turn maintains customer choice and minimises energy costs and waste for end users[2]. Jemena recommends the PC advocate for the utilisation of existing energy infrastructure and appliances through the energy transition.

Information request 5.2

Recognising the benefits of biogas in carbon reporting

Jemena thanks the PC for including this information request in their interim report. We believe that this call out has assisted the Department to progress this request, with the consultation for the NGERs Market Based Mechanism closing at the start of April with the intent for this to be included in the NGER Scheme 2025 updates to commence from 1 July. We believe that the inclusion of biomethane and hydrogen transported through existing gas infrastructure, rather than requiring co-locating with the user, will open up the market to many more end users seeking abatement solutions

As is well documented, the feedstock and consequently biomethane production, is not co-located alongside biomethane demand customers. As such, without an update to the NGER Scheme, any biomethane produced

[1] 0131-ENA-Renewable-Gas-for-a-Future-Made-in-Australia.pdf
[2] The role of gas infrastructure in the energy transition

and injected into the network can only be used on a voluntary basis, meaning the green premium is not valued thus undermining the economics of renewable gas business cases. In short, the absence of NGERS recognition means there is no current monetary value to the green product over traditional natural gas.

Further carbon reporting inclusions:

Whilst we believe that the recognition of renewable gas under the NGERs legislation is imperative for the market to commence, there are still further recognition platforms that would be beneficial. These include the recognition of GreenPower renewable gas certificates or Guarantee of Origin PGOs into frameworks such as:

- Climate Active (CA)
- Corporate Emissions Reduction Transparency Report (CERTR)
- Building and Sustainability Index (BASIX)
- National Australian Built Environment Rating Systems (NABERS)
- GreenBuilding Council of Australia Green Star Rating (GBCA)

Recognition of renewable gas certificates into these frameworks would open up the offtake opportunities for project developers by increasing consumer willingness-to-pay. Currently, as renewable gases are not recognised under voluntary and mandatory reporting schemes and certification systems, end users who want to decarbonise can only use renewable electricity. The consequence of this is that current end user choice in energy is not maintained forcing sub-optimal energy transition pathways for many gas users.

Jemena once again thanks the PC for its recognition of the importance of including renewable gas in shared infrastructure under NGER's legislation and asks for support for renewable gases under wider energy reporting schemes.

Nationally recognised certification:

Currently renewable gases can only be certified under GreenPower producing Renewable Gas Guarantee of Origin (RGGO) certificates for both biomethane and green hydrogen. This was designed to be a pilot program to run for two years until a federal scheme was implemented. In 2024 however, GreenPower announced that the RGGO scheme would move from a pilot to a permanent program. These certificates can only be recognised in the Australian market.

The Federal Government is currently developing the Guarantee of Origin certification scheme. The first product to be certified under this scheme is green hydrogen from electrolysis. The basis of the Product Guarantee of Origin (PGO) scheme is alignment with international green reporting schemes to allow the export of products into international markets. This is useful for green hydrogen, or low carbon manufactured products to allow Australia to become a "green energy export super power". Currently the scheme is looking to expand to biomethane and other low carbon liquid fuels (LCLF), which will encourage and support these developing sectors. However, as the PGO scheme is designed to facilitate the export market, there is a risk that these LCFC and biomethane certificates are sold overseas to meet the high demand from neighbouring countries with limited feedstock resources. With international governments implementing demand side incentives, this creates a higher willingness-to-pay in international markets, that could lead to this precious renewable resource being diverted away from Australian consumers.

Biomethane and other low carbon liquid fuels should be prioritised to decarbonise Australian industries.

Certification of by-product markets:

Further to the acceptance of the renewable gas certification, Jemena believes that the certification and recognition of both biogenic CO_2 and digestate as carbon abatement products would also greatly benefit the development of the industry and increase the circular economy benefits biomethane projects can bring. Biogenic CO_2 can displace the need for fossil based CO_2 and also help to alleviate the need for liquid CO_2 imports into Australia. Biogenic CO_2 forms part of the circular economy benefits generated by biomethane projects and has the potential to help these projects reach commerciality by adding a secondary revenue stream. Certification of these by-products will stimulate the industry and be key to its sustained growth.

Information request 5.3

Reforming regulations to support the recovery of value from organic waste

Information request 10.1

Governance arrangements to harmonise regulations that pose barriers to circularity

One of the largest regulatory barriers for biomethane projects is the inconsistent and prohibitive regulation surrounding digestate as a saleable product. Raw digestate is a direct output from anaerobic digestion that contains a mixture of solid and liquid organic matter with readily available nutrients. Although it can be directly applied to soils, it can be further processed to separate the solid-liquid fractions and optimise the nutrient composition to make it more suitable for soil amendments and biofertilisers or alternatively, turned into biochar.

The commercial use of biomethane by-products in Australia is impeded by unsupportive regulatory policy. Across most states, there is a lack of clarity and consistency surrounding the use, transport, and sale of these by-products. Victoria and Queensland are currently the only states in Australia to have implemented digestate-specific regulations.

Queensland recently introduced an End of Waste Code for digestate, which sets out the criteria for digestate to be reclassified as a 'resource' rather than a 'waste'. This allows digestate to be used as a soil amendment, rather than requiring that it be disposed of as waste. To be classified as a resource in Queensland, digestate must result from only the following feedstocks: paunch, organic material from agriculture (including livestock production), liquid digestate, green waste from municipal kerbside collection, food and food processing waste (including pet food and beverages), and cardboard and paper waste. The digestate must also be pasteurised, and must fall below the maximum allowable concentrations of listed chemicals and materials. These requirements are unreasonably strict, and the limit for PFAS contamination (not detected at a limit of detection of 0.002µg/L) would not be met by the general environment therefore making these changes effectively worthless.

Victoria introduced a streamlined regulatory pathway for use of low-risk digestate. Prior to the introduction of these changes, digestate from waste-to-energy was classified as a reportable priority waste, with the waste code N205: "Residues from industrial waste treatment and disposal operations, including digestate, bottom ash and char". This meant that digestate fell within the same regulatory framework as incinerator ash, and had to follow the same waste management protocols. The new pathway applies to digestates which fall within specified contaminant ranges, which have been either pasteurised or composted, and which do not use any biosolids as feedstocks. Digestates which meet these conditions are no longer classified as "reportable priority waste", meaning that permissions are not required for the supply and transport of digestate. However, it remains classified as "industrial waste" and "priority waste". Nonetheless, this change allows the use of digestate as a fertiliser without requiring permissions, a move towards recognition of digestate as a resource rather than a waste residue.

In other states, digestate falls within regulations covering waste, compost, or both. Biochar, the product of pyrolysis or thermal gasification, is in the same position, with no specific regulatory pathways in any states or territories. Where there are regulations in place, these are not harmonised between states. In addition, these regulations are prohibitively and unnecessarily strict. For example the limit of PFAS allowed in digestate under Queensland's End of Waste Code was less than that found in the general environment. In addition to these regulatory obstacles, a report by Bioenergy Australia identified a number of other barriers. Legitimacy barriers exist in the form of farmers' perspectives on the safety and efficacy of digestate, while market structure and financial investment barriers are raised by competition from an incumbent mineral fertiliser industry.

International examples:

United States:

Digestate use in the United States is regulated at local, state and federal levels. In general, digestate from farm-based anaerobic digestors is much less regulated than industrial or waste treatment plants. However most states do require a nutrient and soil management plan to ensure that land application is appropriately carried out.

To facilitate regulatory approval and improve communication with users and regulators, the American Biogas Council has established the Digestate Standard Testing and Certification Program. The industry-led program

exists to measure and certify the physical and chemical qualities of digestate, providing producers with a reliable standard for demonstrating quality and safety.

Canada:

The quality and safety requirements of digestate is regulated at the provincial level through environmental legislation and quality standards.[3] In many provinces, biogas plants co-located with farm operations are treated as part of the farm operation. These typically have more permissive regulatory frameworks in place for digestate, allowing its application to the owner's farm and nearby farms. By contrast, other biogas plants are regulated as waste treatment facilities. It is possible for biogas operators to register and certify digestate as a fertiliser through the Canadian Food Inspection Agency under the federal *Fertilizers Act and Regulations*. In some jurisdictions, digestate registered as a fertiliser product can be sold and used similar to other commercially available fertiliser and soil amendment products. However, to be registered as a fertiliser it is subject to nutrient management regulations and must meet strict safety standards for contaminants and provide clear labelling, including precautionary statements where necessary to protect human, animal, and environmental health[4]. Depending on local market opportunities, some biogas operators further treat digestate to produce other products (e.g. aerobic composting to produce compost products).

Denmark:

Denmark has a simple and efficient digestate management system where farmers deliver manure to biogas processors, and in return collect digestate to use as a fertiliser. This simultaneously facilitates cost-effective transport of feedstock and efficient removal of digestate, with biogas plants paying for the cost of transporting the feedstock and digestate[5]. Digestate use is primarily regulated by Order No. 1060 of 26/07/2023 on the use of fertilisers in agriculture. It mandates biogas plants to measure and report on the nutrient content of digestate to farmers, who use this information to develop fertilisation plans. Regulations specify that nutrients in manure and slurry must be either used as fertiliser on crop land or incinerated. The co-digestion of manure and waste is regulated by Order No. 1001 of 27/06/2018 on the use of waste for agricultural purposes. If livestock manure makes up more than 75% of the feedstock, digestate can be applied in accordance with the Danish "Executive Order on commercial animal husbandry, livestock manure, silage, etc." This means it is not considered a waste and is allowed to be spread on farms as fertiliser without needing to apply for a permit or licence.[6] Denmark has also implemented policies restricting the application of nitrogen and phosphorous per hectare of agricultural land. These regulations have incentivised farmers to remove surplus livestock manure, with anaerobic digestion providing an avenue for said manure. Livestock manure can be applied to agricultural land untreated, or in the form of digestate following anaerobic digestion but may only be applied during the growing season[7] under approved application methods to prevent excessive nitrogen loss to the atmosphere during application.

United Kingdom (UK):

Digestate that reaches the **British Standard Institution's Publicly Available Specification 110** and **Quality Protocol** standards does not need a permit to be spread. If PAS 110 standards are not reached, a permit is required unless an exemption applies (spreading under 50 tonnes/hectare from pre-defined feedstock, with a storage limit of 200 tonnes). The United Kingdom's system of digestate regulation is a particularly desirable model – allowing digestate to be spread without a permit (provided quality standards are met) greatly

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[3] Canadian Biogas Association. Canadian Digestate Management Guide [Internet]. 2023 Mar. Available from: https://biogasassociation.ca/resources/page/canadian_digestate_management_guide/

[4] Fertilizers Regulations [Internet]. C.R.C., c. 666. Available from: https://laws-lois.justice.gc.ca/eng/regulations/c.r.c.,_c._666/index.html

[5] Seadi TA. Utilisation of digestate as fertiliser - a common practice in Denmark [Internet]. 2010 Nov. Available from: https://task37.ieabioenergy.com/wp-content/uploads/sites/32/2022/03/Teodorita_Al_Seadi_Digestate_in_Denmark.pdf

[6] Ministeriet for Fødevarer, Landbrug og Fiskeri. Bekendtgørelse om erhvervsmæssigt dyrehold, husdyrgødning, ensilage m.v. [Internet]. Mar 1, 1992. Available from: https://www.retsinformation.dk/eli/lta/1992/11

[7] Støckler M, Harder B, Berman D, Jensen TYHW. Biogas production: Insights and experiences from the Danish Biogas Sector [Internet]. Tjele, Denmark: Food and Bio Cluster Denmark; 2020 Jun. Available from: https://www.foodbiocluster.dk/rapporter-og-analyser/biogas-production-insights-and-experiences-from-the-danish-biogas-secto

enhances the ability of biomethane producers to use this resource commercially, and its value as a product of anaerobic digestion.

In the United Kingdom, anaerobic digestors are regulated through a three-tier permitting system. The first level is a regulatory exemption, meaning that no permit is required (although the project must still be registered with the Environmental Agency). This is available for on-farm anaerobic digestion producing digestate for use as a fertiliser, for biogas burned for energy, and for the anaerobic digestion of biodegradable waste to produce fertiliser[8]. The second level of regulation is standard permitting, where projects fit within pre-defined specifications. Standard permitting "enables anaerobic digester operators (processing no more than 100 tonnes per day) to carry out anaerobic digestion of wastes and also combustion of the resultant biogas in gas engines. The rules also allow use of gas turbines, boilers, fuel cells and treatment and/or upgrading the biogas to biomethane. Permitted wastes include those controlled by the Animal-By-Products Regulations but do not include hazardous wastes."[9] Finally, bespoke permitting is available for projects that do not fall within an exception or the standard permitting specifications.[10]

Summary:

As discussed, digestate can be an important by-product of biomethane production, adding to the commerciality of biomethane production. Regulations relating to the storage, transport, and use of digestate may influence the commercial viability of selling digestate as a product, and consequently the commercial viability of biomethane plants. In Demark and the United Kingdom, waste forms an important part of the biomethane business case. In Australia, however, various regulations and permitting requirements make it difficult to use digestate as a product. Australia's federal legal system creates additional challenges for harmonising digestate laws between states and territories. Nonetheless, providing clarity about the circumstances under which digestate may be lawfully used, and streamlining this process as much as possible, would increase the ability of biomethane producers to use digestate as an additional revenue source.

The United Kingdom has reduced barriers to the use of digestate by allowing digestate to be spread without a licence, provided that it meets quality standards. In Demark, digestate use is linked to feedstock provisioning, with farmers dropping off manure at biogas processors and picking up digestate. In both countries, regulations do not act as a barrier to digestate use.

Information request 10.2

Supporting coordination, facilitation or brokering services

Currently we believe that there is a lack of education across the renewable gas supply chain around the benefits of the industry and the potential it can bring to regional communities. Australia's Bioenergy Roadmap identified that by 2050 bioenergy could have a $14 billion impact on annual GDP, create 35,300 additional jobs and reduce emissions by 12%[11]. With the government's help and coordination to facilitate stakeholders, we believe an educational campaign could act as a conduit to potential feedstock owners, landowners, local councils, and offtakers (including retailers), to better understand the potential and the role they must play in the industry. The key to the circular economy is communities working together, and in many regional areas there are many benefits to be gained.

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8 Environment Agency. UK Government. 2014. T24 waste exemption: anaerobic digestion at premises used for agriculture and burning resulting biogas. Available from: https://www.gov.uk/guidance/waste-exemption-t24-anaerobic-digestion-at-premises-used-for-agriculture-and-burning-resulting-biogas

9 Anaerobic Digestion. The Official Information Portal on Anaerobic Digestion. 2024. Regulation. Available from: https://www.biogas-info.co.uk/about/regulation/

10 Environment Agency. UK Government. 2024. New bespoke environmental permit: application forms (England). Available from: https://www.gov.uk/government/collections/environmental-permit-application-forms-for-a-new-bespoke-permit

11 australia-bioenergy-roadmap-report.pdf

Research conducted with our own customer base shows that once they understand what renewable gas is, and the role it can play in the energy transition, people become very interested and want to learn more around how they can participate. We believe that the government acting as an educator and a facilitator for the industry participants could accelerate the circular economy benefits.

Information request 10.4

Improving investor confidence in the circular economy

We believe that the Sustainable Finance Taxonomy will assist biomethane producers to better attract investors for their projects, however we do not believe this alone forms enough to derisk the industry. Projects are struggling to attract seed funding investment, as with only one biomethane facility in Australia the industry is still considered high-risk. We believe that further demonstration facilities, helped by funding allocations from entities such as ARENA and other government capital funding rounds, will assist these projects to source investment and lower the risk profile of the industry over time.

Continued acknowledgement around the need for renewable gases and policy support in the way of supply and demand side incentives, at both state and federal levels of government will help to unlock investment and provide investors with the confidence that the market has longevity in an Australian context.

Information request 10.6

Expanding the set of circular economy indicators

There are multiple indicators that could be used to track the progress of the biomethane industry as part of the circular economy. Firstly, understanding the feedstock potential and updating the ABBA data which currently forms the basis of all biomethane and low carbon liquid fuel (LCLF) supply volumes would be beneficial. Looking at the potential supply from the lens of what *could* be achieved through marginal land cropping, seasonal cropping and innovative crops such as seaweed and other high energy crops would also be beneficial in assessing the potential of the industry, as opposed to only the current state.

Once the industry is underway, using the biomethane certificate registries would be a good indicator to track the progress of the industry. These are government owned and accredited so the information would be accurate. This information could be used to assess compliance with renewable gas targets, even achievement of aspirational targets if targets are not mandated by government. This would provide accurate carbon abatement data and then the proportional amount of the organic waste streams utilised by the industry could also be tracked as a percentage of the total available supply potential.