Sugarcane Bioenergy Inquiry 2025

Submission No:	41
Submitted by:	Jemena
Publication:	Making the submission and your name public
Attachments:	No attachment
Submitter Comments:	

27 October 2025

Jemena Limited
ABN 95 052 167 405
Level 16, 567 Collins Street
Melbourne, VIC 3000
PO Box 16182
Melbourne, VIC 3000
T +61 3 9173 7000
F +61 3 9173 7516
www.jemena.com.au

Mr Stephen Bennett MP
Chair
Primary Industries and Resources Committee
Queensland Parliament
pirc@parliament.qld.gov.au

Submitted via: pirc@parliament.qld.gov.au

Re: Inquiry into sugarcane bioenergy opportunities in Queensland

Dear Mr. Bennett and Committee,

Jemena appreciates the opportunity to respond to the inquiry into sugarcane bioenergy opportunities in Queensland.

Jemena owns and manages a diverse portfolio of energy assets across the northern and eastern regions of Australia. With over $12 billion invested in major gas and electricity infrastructure, we supply energy daily to millions of households, institutions, and industries. Our assets encompass the Jemena Gas Network in New South Wales, the Jemena Electricity Network in northwest Melbourne, and significant gas transmission pipelines including the Eastern Gas Pipeline, Queensland Gas Pipeline, and Northern Gas Pipeline.

Our group also holds partnerships in the ActewAGL gas and electricity networks within the Australian Capital Territory and maintains a 34 per cent stake in the United Energy electricity network serving southeast Melbourne and the Mornington Peninsula. Additionally, our group includes Zinfra, an energy services company that delivers project management, construction, operations, and maintenance services for both electricity and gas sectors. Combined with Zinfra, Jemena employs approximately 4,100 staff members.

We remain committed to reducing greenhouse gas emissions throughout our networks, with targets to achieve a 30 per cent reduction in Scope 1 and 2 emissions by 2030 (based on a 2021-22 baseline), and an ambition of achieving net-zero emissions by 2050.

Given our experience and involvement in both planning and operating comprehensive energy systems, we possess valuable insights into how the electricity and gas sectors can advance objectives of delivering reliable, low-carbon, and resource-efficient energy services at minimal societal cost. We support further examination of alternative decarbonisation strategies that foster efficient and timely investment, and we welcome continued engagement in this consultation process.

Accordingly, we present the following submission to the Government, outlining key messages and recommendations to support the decarbonisation of Australian energy use, particularly for hard-to-abate industrial gas users.

Key messages

- Cogeneration of sugarcane biomass into electricity is less efficient, and results in lower decarbonisation benefits, than utilising the resource to produce biomethane to support hard-to-abate industries (including gas used for firming electricity)
- Sugarcane biomass resources should be utilised to decarbonise Australian industry, to support export of low-carbon embodied goods, instead of exporting the bioenergy resource to overseas markets, this will stimulate jobs and boost regional economies

- Government policy and funding support in the form of seed funding, feed-in tariffs, tax-offsets or a renewable gas target, is required to grow the biomethane industry and derisk capital investment

For more information regarding Jemena's submission or to arrange a discussion please contact Joeb Northey, Manager of Policy and Government Relations (joeb.northey@jemena.com.au).

Yours sincerely,

Suzie Jakobovits

Suzie Jakobovits
General Manager Renewable Gas, Jemena

1. The role and benefits of sugar cogeneration in Queensland's electricity generation mix, including existing capacity and potential for expansion.

Sugarcane is a highly versatile feedstock that can be utilised through various energy pathways to support increased bioenergy production in Australia (**Error! Reference source not found.**). Whilst Sugarcane waste streams can be used for cogeneration of electricity, a more efficient use of the feedstock is in the production of low carbon liquid fuels (LCLF) and biomethane via anaerobic digestion (electricity generation at ~30 percent energy conversion efficiency[1] versus biomethane production at over 90 percent conversion efficiency[2]).

Whilst renewable electricity generation is required in Queensland, there are alternative, lower emission, electricity generation sources such as wind and solar. There is another application of the bioresource that is arguably a more important end use that doesn't have an alternative decarbonisation option. Many hard-to-abate industrial processes cannot be electrified. Bioenergy (biomethane and LCLF) can provide a cost-effective decarbonisation pathway for these businesses.

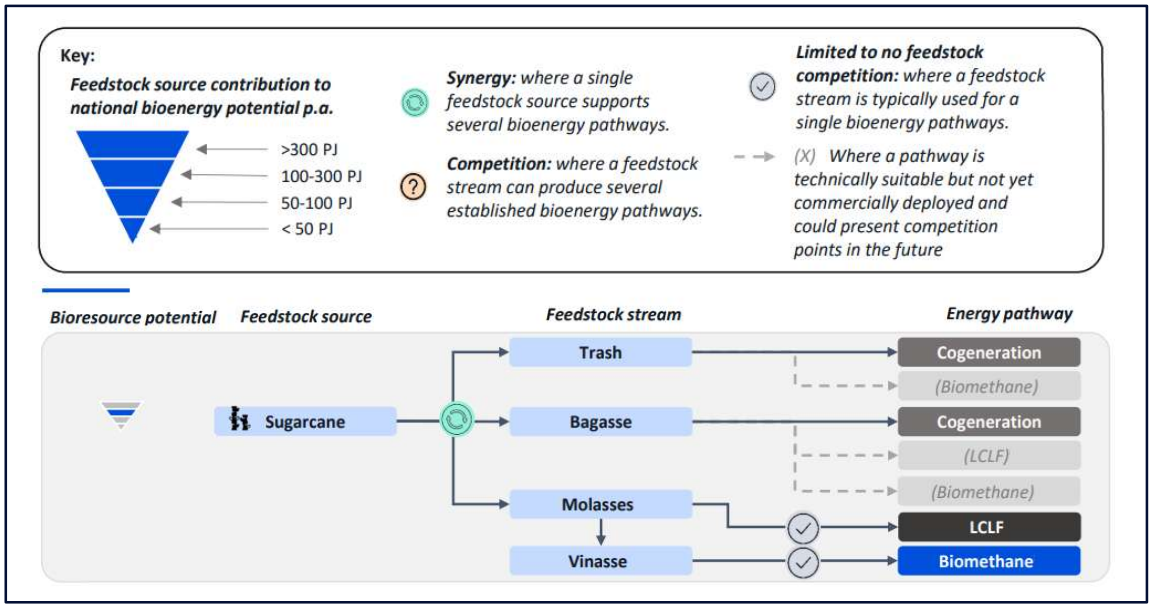

Figure 1 - Bioenergy pathways from sugarcane (source: Blunomy)

Conversion of sugarcane into biomethane and LCLF will not only play a role in decarbonising Australian industry but will also help to sure up fuel security and therefore decreasing sovereign risk[3].

Biomethane and LCLF are uniquely placed to assist in Australia's net zero ambitions;

- Biomethane has been identified as a key enabler of natural gas decarbonisation as part of the Electricity and Energy Net Zero Plan[4]

[1] LMOP Landfill Gas Energy Cost Model (LFGcost-Web) User's Manual, Version 3.6. Fuel use rate for a CHP Reciprocating Engine-Generator Set = 11,250 BTU/kWh. 1 BTU/kWh = 0.001055 GJ/MWh, therefore 11,250 BTU/kWh = 11.87 GJ/kWh. 3.6 GJ / MWh, therefore electrical efficiency = 3.6 / 11.87 = 30.3%

[2] BiogasWorld. (2023, May 29). Biogas upgrading to biomethane: Discover BiogasWorld's clients and their technology. BiogasWorld. Retrieved July 3, 2025 from https://biogasworld.com/news/biogas-upgrading-to-biomethane-discovers-biogasworlds-clients-and-their-technology/ https://biogasworld.com/news/biogas-upgrading-to-biomethane-discovers-biogasworlds-clients-and-their-technology/

[3] Deloitte. (2025). *Unlocking Renewable Natural Gas to Enhance Energy Security and Maintain Australia's Manufacturing Sector.* Prepared for Bioenergy Australia. Retrieved from *https://cdn.revolutionise.com.au/cups/bioenergy/files/0utdgum1meyoizrw.pdf* *https://cdn.revolutionise.com.au/cups/bioenergy/files/0utdgum1meyoizrw.pdf*

[4] DCCEEW 2025, Electricity and Energy Sector Plan, Department of Climate Change, Energy, the Environment and Water, retrieved from https://www.dcceew.gov.au/sites/default/files/documents/electricity-energy-sector-plan-2025.pdf DCCEEW 2025, Electricity and

- LCLFs have been identified as a key enabler of decarbonisation within the transport sector as part of the Transport and Infrastructure Sector Plan[5]
- Biomethane is a "drop-in" fuel for natural gas. This will enable many large industrial businesses to decarbonise without investing in capital infrastructure or technology required for electrification.
- Biomethane can be used as a "building block" for Low Carbon Liquid Fuels. Biomethane technology is well established with over 1,650 network-connected facilities in Europe alone. Biomethane can be used to create low-carbon liquid fuels via steam methane reforming, meaning in the short term, biomethane production can be started and then once LCLF technology is established, biomethane can be directed to support LCLFs
- Biomethane can support the development of LCLFs, by lowering the cost of developing liquid fuels. Rather than transport biomass long distances to biorefineries located at the point of use (e.g. ports or airports), the biomass can be transported as biomethane utilising existing gas infrastructure. Biomethane can then act as a feedstock to the production of LCLFs via steam methane reforming. This can alleviate the need for expensive feedstock supply chains.

Biomethane for Domestic Decarbonisation and Exporting Low-Carbon Goods

Given the scale and urgency of Australia's emissions reduction challenge, including meeting 2030 and recently set 2035 targets, we believe there is compelling justification to maintain the valuable decarbonisation asset of bioenergy on Australian shores – allowing Australian manufacturing to generate low-carbon embodied goods that can then be exported.

Bioenergy faces a significant export risk to international markets because of the high willingness-to-pay of international markets, assisted by strong demand side policies that are yet to exist in Australia, and are outstripping the ability of Australian heavy industry and manufacturing to pay. We recommend the Queensland Government consider measures to ensure sugarcane as a feedstock is recognised as a valuable commodity for domestic energy use.

2. Market, regulatory, and infrastructure barriers to increased bioenergy production from sugar.

Infrastructure barriers:

Significant electricity transmission infrastructure is required to support the increased renewable electricity generation.

As biomethane is a drop-in fuel it can be injected directly into existing gas infrastructure without major retrofits or expansions. As QLD and the entire East Cost of Australia has a large footprint of existing gas transmission and distribution networks, these can be utilised to transport decarbonised gas, similar to electricity networks.

Therefore, the major transmission build-out that is required to support renewable electricity is not required for gas, if the biomethane facilities are co-located with existing gas infrastructure. This is a major benefit, with minimal retrofitting being required, and therefore minimum infrastructure required to facilitate the industry.

Energy Sector Plan, Department of Climate Change, Energy, the Environment and Water, retrieved from https://www.dcceew.gov.au/sites/default/files/documents/electricity-energy-sector-plan-2025.pdf

[5] Australian Government (Sept 2025), *Transport and Infrastructure Net Zero Roadmap and Action Plan*: *Transport Sector Plan*, retrieved from https://www.infrastructure.gov.au/sites/default/files/documents/transport-and-infrastructure-net-zero-roadmap-and-action-plan.pdf

Australian Government (Sept 2025), *Transport and Infrastructure Net Zero Roadmap and Action Plan*: *Transport Sector Plan*, retrieved from https://www.infrastructure.gov.au/sites/default/files/documents/transport-and-infrastructure-net-zero-roadmap-and-action-plan.pdf

Regulatory barriers:

A challenge for biomethane project developers is navigating the planning and approvals process. Progressing from the initial concept to FID can involve administrative requirements, costs, and uncertainty. Jemena's experience with various project partners indicates that delays and administrative obligations are common, especially for first-movers, which may affect development timelines.

For example, a recent project partner reported that, to reach the commissioning stage for a new biomethane facility, they were required to prepare and submit twenty-nine distinct studies in accordance with the NSW Department of Planning and Environment Secretary's Environmental Assessment Requirements. The associated administrative fees for these documents alone exceeded $500,000, resulting in a considerable financial commitment prior to the commencement of construction or revenue generation. This extent of regulatory compliance presents notable challenges for innovative projects within emerging sectors and will differ between different state jurisdictions.

Planning complexities can influence project viability. Developers may need to allocate significant resources to address regulatory requirements, which can reduce their focus on areas such as innovation, technological development, or stakeholder engagement. For smaller operators or those with limited support, the time and financial commitments required may lead to delays or the discontinuation of initiatives before reaching FID.

The digestate catch-22

An additional complicating factor is the management of digestate, a co-product generated through anaerobic digestion. While digestate offers potential value as a low carbon substitute for fossil-based fertilisers, its legal application requires a regulatory exemption that is often difficult to secure.

A project partner noted a regulatory "catch-22" in the sector: Biomethane projects must present a digestate use plan to secure investment, but the Department requires digestate samples to grant an exemption. However, obtaining these samples is only possible after commissioning the facility, which itself depends on having the exemption.

This regulatory circularity forces developers to either take on major financial risk by proceeding without the exemption or delay the project indefinitely, risking both investment and emissions reduction.

3. Opportunities to align sugar biofuel production with national security and Defence liquid fuel needs.

Utilising government entities to procure biomethane from the first production facilities can help to accelerate the market by ensuring that there is a buyer who has a long-term market demand for the product. This will derisk capital investment into projects as, similar to renewable electricity projects, they need long term offtake agreement to underpin the returns.

As there is natural gas shortfalls predicted on the East Coast of Australia from 2028 onwards, biomethane can also support national fuel security by reducing the need for Australia to import natural gas from international markets, and exposure to international gas pricing excursions.

4. Policy and funding mechanisms to de-risk investment in cogeneration and biofuels by manufacturers and growers, including examples of successful policy implementation from overseas and other industries.

To support Queensland's domestic bioenergy sector, the Government can take several targeted actions.

Seed Funding

The Queensland Government can offer financial incentives, grants, or loan guarantees to encourage private sector participation and reduce the perceived risks associated with bioenergy projects. Seed funding in the form of low-interest loans or grants would assist biomethane developers to move a project forward from concept to development. Seed funding typically carries a higher risk and given the emerging nature of biomethane in Australia, seed capital from government funds can help attract further investment from private capital, validate feasibility and cover early engineering design costs.

Contracts for Difference

The Australian government currently supports renewable electricity generation through revenue underwriting agreements for renewable electricity via the Capacity Investment Scheme (CIS) and the proposed Electricity Services Entry Mechanism (ESEM) from the NEM Review, which will provide revenue support for years 8 to 15 of a project's operation.

The biomethane industry faces similar challenges whereby there is a mismatch between the long-term timeframes required for new project producers in the market, against the short-term contracts sought by consumers. This mismatch leads to uncertainty for investors and projects struggle to attract private capital due to the perceived high risk and uncertain returns in an evolving energy transition market. Applying a similar model to biomethane projects would improve investment certainty for long-term projects – reducing perceived risks and thereby unlocking private capital for biomethane projects.

Guarantees

Government guarantees also play a role in supporting biomethane investment by reducing the perceived financial risks associated with new and emerging projects. By providing a safety net for lenders and investors, guarantees can significantly lower the barriers to accessing private capital. Government-backed guarantees can improve project bankability, attract more favourable financing terms, and help drive innovation and scale within the biomethane industry.

Renewable Gas Target

Setting a clear Renewable Gas (RG) target or ambition provides certainty for investors and signals long-term government commitment, encouraging further development and uptake of bioenergy solutions.

Banning crop stubble burning

A ban on stubble burning can assist in the diversion of crop residues to anaerobic digestion and in turn, reduce on-site emissions associated with the practice.

5. Benefits for growers in diversification opportunities.

Empowering Queensland's Farmers: Job Creation and New Income Opportunities through Sugarcane Bioenergy

The Bioenergy Australia 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%[6]. This highlights the significant potential for a thriving biomethane sector in Australia. Research undertaken by Blunomy

6 ARENA. (2021). Australia's Bioenergy Roadmap – Report. Retrieved from https://arena.gov.au/assets/2021/11/australia-bioenergy-roadmap-report.pdf

(2025)[7] (**Error! Reference source not found.**) estimated that across Queensland there is a recoverable potential of 84 PJ of biomethane that could technically be produced annually, 88% of

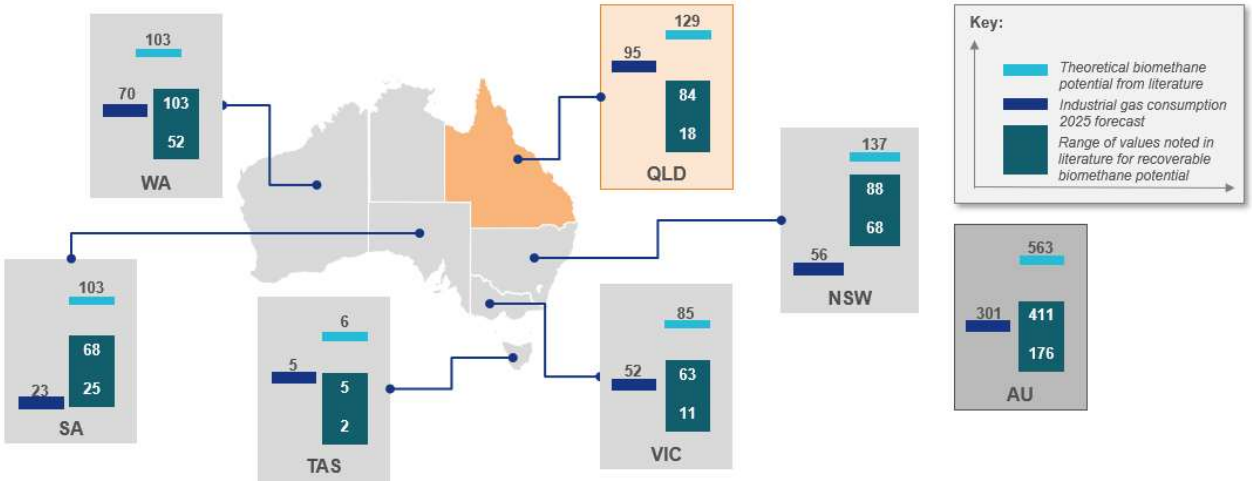

Figure 2 – Australia has a Recoverable Biomethane potential of 411 PJ, with up to 84PJ in Queensland (Source - Blunomy)

current industrial gas demand (95 PJ). This shows Queensland's potential to support industrial decarbonisation on the back of the well-established sugar industry.

Regional Jobs

Developing biomethane facilities in regional areas, close to feedstock, has the advantage of creating local job opportunities. As mentioned above, the Bioenergy Australia Roadmap identified that by 2050 bioenergy could create 35,300 additional jobs, many of these in regional areas.

Digestate

Digestate is created in the production of biogas via anaerobic digestion, which produces a rich, low-carbon organic fertiliser that can be used across Australia's agriculture sector. Using digestate on agricultural soils presents a regenerative approach to agricultural productivity that has multiple benefits. 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, of which 80 per cent is imported yearly into Australia. Leveraging biogenic digestate from biomethane production would further decrease the country's reliance on imports.[8] Furthermore, organic digestate use can support emissions reduction efforts, as studies in Europe have estimated that "producing a tonne of synthetic mineral fertiliser emits an average of 9.7 tonnes of CO2 equivalent".[9]

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

7 Blunomy. (2025, July). Biomethane Opportunities to Decarbonise Australian Industry: Converting waste into grid-injectable biomethane. Report for Energy Networks Australia. Retrieved from https://www.energynetworks.com.au/assets/uploads/Blunomy-%E2%80%93-2025-%E2%80%93-Biomethane-Opportunities-to-Decarbonise-Australian-Industry.pdf https://www.energynetworks.com.au/assets/uploads/Blunomy-%E2%80%93-2025-%E2%80%93-Biomethane-Opportunities-to-Decarbonise-Australian-Industry.pdf

8 Fertilizer Australia. (n.d.). Australian Fertiliser Market. Retrieved June 18 2025 from https://fertilizer.org.au/about-fertiliser/the-fertiliser-industry/australian-fertilizer-market

9 GHD for Bioenergy Australia. (2022). Fertile Ground The role of digestate in Australia's circular economy. Bioenergy Australia. Retrieved from https://cdn.revolutionise.com.au/cups/bioenergy/files/6ukmpvvrwewhfyw5.pdf

nutrient poor in the world.[10] Digestate use is scientifically proven to regenerate soils, locking in nutrients that can enhance the long-term productivity.

Race for 2030's report '*Opportunity Assessment: Anaerobic digestion for electricity, transport and gas*'[11] 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 that European suppliers are 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.

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'[10].

Biogenic CO_2

Biogenic carbon dioxide (CO_2) is a by-product 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 by-product 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.

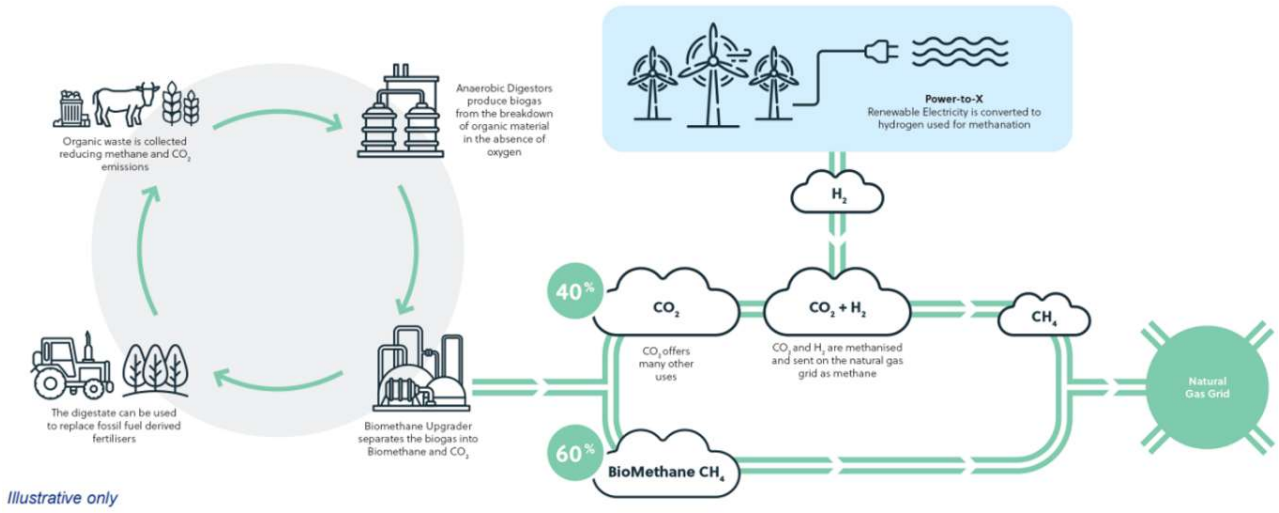

Figure 3 - The circular economy of biomethane (Source: Jemena)

Today, high quality CO_2 is required for a broad range of Australian businesses who use carbon dioxide for beverage carbonation, water treatment, desalination, cooling and freezing of food, sterilisation, welding and many other uses. The existing carbon dioxide market in Australia relies on dwindling fossil fuels sources – such as natural gas wells or byproducts of manufacturing processes.

10 Department of Agriculture, Water and the Environment (DAWE). (2021). National Soil Strategy. Australian Government. Retrieved from https://www.agriculture.gov.au/sites/default/files/documents/national-soil-strategy.pdf
11 Kaparaju, P., Conde, E., Nghiem, L., Trianni, A., Cantley–Smith, R., Leak, J., Katic, M., Nguyen, L., Jacobs, B., Cunningham, R.(2023). Anaerobic digestion for electricity, transport and gas. Final report of Opportunity Assessment for research theme B5. Prepared for RACE for 2030 CRC. Retrieved from https://www.racefor2030.com.au/content/uploads/21.B5-OA_-Final.pdf

There is currently no regulatory definition, or sustainable certification, to differentiate fossil fuel-derived CO_2 from biogenic CO_2, however there is still strong demand for 'greener alternatives' displace the need for fossil-based CO_2 and strengthen sovereign sources, alleviating the need for liquid CO_2 imports into Australia. Air Liquide recently announced a partnership with Manildra Group to build a biogenic CO_2 plant off the fermentation of wheat that Shoalhaven Starches[12] demonstrating a strong interest in biogenic CO_2.

6. Consideration of food verses fuel.

When evaluating bioenergy pathways, the balance between food and fuel is an important factor. Many bioenergy pathways, particularly biomethane, utilise waste streams are not in direct competition with food. Biomethane can be generated from any organic material to varying degrees of yield which makes it particularly advantageous for exclusively utilising waste sources in bioenergy production. Nevertheless, the ongoing debate concerning food versus fuel will continue in the absence of a defined feedstock strategy, as well as sustained community education and engagement.

[12] Air Liquide. (2025, May 21). Press Release: *Largest biogenic CO_2 plant in Australia*. Retrieved 23rd October 2025 from: https://au.airliquide.com/sites/al_au/files/2025-05/press-release-largest-biogenic-co2-plant-in-australia-21-may-2025.pdf