

Pathways Call for Evidence Submission

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Bioenergy Australia Submission: NSW Net Zero Commission - Decarbonisation Pathways for NSW

Bioenergy Australia (BA) is the national industry association committed to accelerating Australia's bio economy. Through targeted advocacy, campaigns, education, industry building and allied sector engagement, we're:

- Enabling decarbonisation of Australia's hard to abate sectors
- Enhancing energy security, supply and supporting the transition of Australia's energy system
- Growing Australia's economy and providing jobs and economic development including for regional Australia
- Enabling the development of Australia's circular economy

This submission from Bioenergy Australia is on behalf of the Low Carbon Fuels Alliance of Australia and New Zealand (LCFAANZ) and the Renewable Gas Alliance (RGA). These alliances were founded to accelerate the development and deployment of Low Carbon Liquid Fuels (LCLF) and Renewable Natural Gas (RNG), also known as biomethane, and biogas in Australia. Individual members of the alliances will be providing more detailed submissions specific to their business and expertise. This submission is a collective response and does not represent the views of any specific member.

Australia's Bioenergy Roadmap (ARENA, November 2021) outlines how, by the start of the next decade, Australia's bioenergy sector could contribute to around \$10 billion in extra GDP per annum and 26,200 new jobs (predominately regional), reduce emissions by about 9 per cent, divert an extra 6 per cent of waste from landfill, and enhance fuel security. Now is the time to capitalise on these opportunities by prioritising the development of LCLF and RNG as part of the NSW-specific decarbonisation pathways.

The Commission's acknowledgement that, for NSW to achieve the state's legislated emissions reduction targets, the pace of decarbonisation must further increase highlights the need to accelerate emissions reductions across all sectors of the economy. Achieving this transition will require a diverse portfolio of solutions that recognise the different decarbonisation challenges across the energy, electricity, transport, industry, resources, built environment, agriculture, and waste sectors. RNG and LCLF represent some of NSW's strongest yet underutilised opportunities to reduce emissions across these sectors. These renewable fuels provide immediate, scalable and technology-ready solutions that can be deployed using existing infrastructure while supporting energy security, waste management, regional industries and economic development.

LCLF - such as sustainable aviation fuel (SAF), renewable diesel, biodiesel, ethanol and renewable methanol - along with RNG, also known as biomethane, and biogas, are waste-to-energy solutions that turn Australian waste, agricultural residues, and feedstocks into valuable, sustainable energy. These low emission fuels can be used as drop-in or blended replacement to fossil alternative within existing vehicles, equipment, appliances and infrastructure.

NSW is well positioned to become a national leader in renewable fuels. The introduction of the NSW Renewable Fuel Strategy and the commitment to expand the NSW Renewable Fuel Scheme demonstrate important leadership and have established a strong policy foundation for industry investment.

As the Commission considers pathways to achieve net zero, we strongly recommend that RNG and LCLF are recognised as essential components of NSW's decarbonisation strategy. **These renewable fuels were recognised as key decarbonisation pathways in the Federal Net Zero Plan and across the Sector Emissions Reduction Plans, and we encourage NSW to align with this approach.** With the right policy settings, these industries can deliver substantial emissions reductions while strengthening fuel security, attracting investment, creating regional jobs and supporting the growth of new green industries across NSW.

1. What opportunities or barriers could improve the effectiveness of NSW's transition to net zero?

a. What policies or market mechanisms could accelerate emissions reductions?

The following policy measures and market mechanisms could help accelerate the development and uptake of RNG and LCLF in NSW:

- **Deliver timely implementation of the NSW Renewable Fuel Scheme**, including the expansion to RNG and LCLF (on the basis that the liable entities are those that receive the benefit or have access to the fuel). We have strongly supported the development of this Scheme and welcomed the progress made to date.
- **Implement supply-side support:** Mechanisms could include capital and development grants, production credits or tax incentives, Contracts for Difference and R&D support. These supply-side mechanisms are essential stackable incentives alongside Federal Government support.
- **Coordinate with the Federal Government on demand-side measures.** The Federal Government has committed to the introduction of demand-side measure for LCLFs. We strongly recommend the NSW Government coordinate with the Federal Government in this area as well as any additional demand-side measures for both RNG and LCLF to avoid inconsistent policies.
- **Introduce Government Procurement Programs** through government contracts and purchasing programs. Establishing renewable fuel requirements within government vehicle fleets, transport, flights, freight, energy and government-contracted operations can provide stable early demand and demonstrate market leadership.
- **Streamline planning and regulatory approvals** to reduce project development timeframes, remove unnecessary barriers to investment and accelerate deployment of renewable fuel production facilities.
- **Increase investment in research, development and innovation**, including feedstock productivity, advanced conversion technologies, and supply chain optimisation that improve efficiency and reduce costs.
- **Develop a comprehensive NSW renewable fuel feedstock assessment** to map sustainable feedstock availability across the State and identify regional hotspots, while distinguishing between theoretical feedstock potential and the actual feedstock potential that is practically, economically and environmentally available.

- **Support RNG and LCLF in meeting the growing energy demand from AI and data centres.**
NSW should consider policy mechanisms, such as minimum renewable fuel content requirements for gas and liquid fuels used in data centre backup and firming generation. For example, gas used in electricity generation supplying data centres - including on-site generation and contracted gas-fired power - could be required to incorporate a progressively increasing share of certified RNG (i.e commencing at 5% by 2030 and increasing to 100% by 2050). This would reduce emissions from one of NSW's fastest-growing sources of electricity demand while creating long-term demand signals for domestic renewable fuel production and investment.
- **Support education and knowledge-sharing initiatives** to improve understanding of renewable fuels, their sustainability credentials, infrastructure compatibility and role in achieving NSW's net zero objectives.

These measures could unlock significant opportunities for NSW to accelerate emissions reductions. The emissions reduction opportunity from RNG is significant. NSW's available RNG resource could support production of up to 88 PJ of RNG per annum¹, with the potential to reduce emissions by around 4.5 million tCO₂-e per annum² through avoided natural gas use. This provides a significant opportunity to reduce emissions from natural gas consumption, particularly in hard-to-abate industrial applications where alternative decarbonisation pathways are more limited.

LCLFs also present a significant opportunity for NSW to reduce emissions from hard-to-electrify sectors such as aviation, freight, heavy transport and agriculture. LCLFs such as SAF, renewable diesel, biodiesel, ethanol and methanol can reduce emissions from existing vehicles, aircraft, vessels and machinery while long-lived assets remain in operation. Even with continued electrification, Australia is expected to require around 30 billion litres of liquid fuel in 2050, highlighting the scale of the opportunity for NSW to develop and use LCLFs to deliver emissions reductions across these sectors.

b. How could the NSW Government better stimulate private finance at the scale and pace needed for the net zero transition?

The NSW Government can help unlock private finance by:

- Providing clear, long-term policy settings that recognise RNG and LCLF as critical decarbonisation pathways in NSW.
- Engaging with industry to leverage the NSW Renewable Fuel Scheme to establish RNG production facilities by the NSW Government purchasing RFS certificates under long-term supply agreements. This would provide greater certainty for RNG producers to establish new facilities and attract private investment.
- Supporting early-stage commercial projects through targeted financial mechanisms that address first-of-a-kind risks and improve project bankability.
- Developing enabling infrastructure and market frameworks that reduce barriers to private investment.
- Using government procurement and partnerships to provide early market confidence and demonstrate demand.

¹ [Blunomy, Biomethane Opportunities to Decarbonise Australian Industry \(2025\)](#)

² As per the NGER scheme, the emissions difference between biomethane and natural gas combustion is 51.4 kg CO₂e/GJ.

- Providing funds that match the investments made by project developers, incentivising private sector contributions and shared risk.
- Establishing partnerships between government, research institutions, and private sector entities. Such partnerships can share the financial and technical burdens of these studies and enhance the quality of the research.
- Dedicating funds to support pilot or demonstration projects that test and refine new technologies before full-scale deployment

c. What are the drivers and risks to reaching NSW's interim targets in 2030 and 2035, and net zero by 2050?

Meeting NSW's emissions reduction targets will require the rapid deployment of multiple decarbonisation pathways across the economy. While electrification will play a central role, it will not be sufficient on its own to achieve NSW's emissions reduction objectives. Even with continued electrification, Australia is projected to still require approximately 30b litres of liquid fuel in 2050, highlighting the need for LCLFs to decarbonise sectors, such as aviation, heavy transport, mining, construction and shipping. Similarly, domestic gas use will continue to and beyond 2050³ in hard-to-abate sectors, including gas-powered- generation, steel, aluminium, cement, glass, food processing and chemicals, that rely on gas as a feedstock and/or source of high-temperature process heat that cannot be readily electrified. RNG provides one of the few practical decarbonisation pathways to reduce emissions in these industries while maintaining productivity and competitiveness.

Key drivers of achieving NSW's emissions reduction targets include:

- Recognition that RNG and LCLF are essential decarbonisation pathways across the sectors to meet NSW's emissions reduction targets.
- Long-term policy certainty that supports investment and the commercial deployment of renewable fuel projects in the state.
- Development of domestic renewable fuel production facilities, enabling infrastructure and resilient supply chains.
- Accelerated deployment and adoption of renewable fuels across hard-to-abate sectors, including transport, industry and manufacturing.
- Collaboration between government, industry and end-users to accelerate project development, investment and market uptake.

Key risks to achieving these targets include:

- Over-reliance on electrification without recognising sectors that cannot be readily electrified.
- Delays in implementing supportive policies and funding programs, including the NSW Renewable Fuel Strategy and associated market mechanisms.
- Inability to secure long-term offtake contracts needed to make renewable fuel projects commercially viable under the NSW Renewable Fuel Scheme.
- Lengthy, complex and costly planning and environmental approval processes that delay project development, increase costs and create investment uncertainty.

³ [Australian Government, 2025, 'Electricity and Energy Sector Plan', p.56.](#)

- Barriers to connecting biomethane projects to existing gas networks, including lengthy technical assessments, commercial negotiations and regulatory approvals, which delay project commissioning and limit renewable gas deployment.
- Infrastructure, planning and regulatory barriers that slow project delivery and the development of supporting supply chains.
- Poor understanding of feedstock availability and supply chain opportunities, limiting strategic planning and investment.
- Increasing international competition for investment, with projects and capital shifting to jurisdictions with stronger policy support and investment incentives.

d. What are the opportunities or barriers for collaboration across sectors to support the transition?

RNG and LCLF are inherently cross-sectoral industries that rely on collaboration across the entire value chain. Unlike many decarbonisation technologies that operate within a single sector, renewable fuel industries require coordinated action across agriculture, waste management, manufacturing, transport, energy, aviation, ports, fuel suppliers and government to establish commercially viable supply chains.

A key barrier to collaboration is the fragmented policy responsibility across government portfolios. Renewable fuels sit at the intersection of energy, transport, waste, agriculture, environment, industry and regional development policy, meaning decisions made within one portfolio can significantly influence project development, investment outcomes and market development in another. The NSW Government has an important role in improving coordination between agencies and ensuring renewable fuel development is considered as a whole-of-government approach.

Key opportunities for collaboration include:

- Better aligning policy across government portfolios to recognise the broader benefits of renewable fuels, including emissions reduction, waste management, regional economic development and energy security.
- Establishing clear cross-government coordination and communication mechanisms, to ensure renewable fuel opportunities, challenges and project requirements are understood and addressed consistently across government.
- Supporting coordinated supply chain and infrastructure development, including collaboration between feedstock suppliers, producers, infrastructure providers and end users to improve feedstock availability, optimise logistics, develop enabling infrastructure and connect renewable fuel supply with market demand.
- Leveraging partnerships between government, industry and research organisations to accelerate commercialisation, improve technology deployment, address technical challenges and support the development of domestic renewable fuel capability.

2. What are the opportunities and barriers to technology development, deployment for each sector?

a. What technologies are available or emerging in your sector, and what is their current state of readiness?

RNG and LCLF technologies span a range of technology readiness levels, from commercially mature and widely deployed solutions through to emerging and next-generation technologies progressing towards commercialisation. For example, RNG technologies are operating at scale internationally, with Australia now progressing domestic commercial deployment through projects such as the Malabar Biomethane Injection Plant. However, there remains significant opportunity to advance novel and emerging low carbon fuel and feedstock technologies, which require continued innovation, investment and market development to achieve commercial scale.

Achieving the full potential of the sector will require a portfolio approach that supports the deployment of commercially mature solutions alongside the continued development and commercialisation of emerging technologies. This will be critical to reducing costs, improving performance, expanding supply chains and achieving scale.

b. What constraints exist around technology uptake and deployment?

RNG and LCLF technologies have a significant deployment advantage as they can be largely used as drop-in or blended fuels within existing vehicles, industrial equipment, fuel systems and gas infrastructure. This compatibility reduces the need for widespread technology replacement, allowing emissions reductions without requiring complete replacement of existing assets. However, the technologies required to produce RNG and LCLF at commercial scale remain a key deployment challenge in Australia. While many technologies have been demonstrated internationally, domestic deployment remains limited. Projects must navigate adapting international equipment for domestic standards, securing equipment, meeting Australian compliance requirements, and managing the risks associated with scaling emerging technologies.

Key barriers include:

- **Limited Australian deployment experience:** Limited commercial-scale deployment of RNG and LCLF production technologies increases technical, operational and investment risks for early projects.
- **Access to technology and equipment:** Reliance on overseas technology providers and specialised equipment can create challenges around availability, cost, delivery timeframes and ongoing technical support.
- **Adapting technologies for Australia:** Many RNG and LCLF technologies are commercially deployed internationally; however, differences between overseas and Australian standards, certification requirements and approval processes can require additional engineering, redesign, testing and validation before deployment. These requirements can increase costs, extend project timelines and create a barrier to bringing proven international technologies to Australia.
- **Capital and investment barriers:** High upfront costs and first-of-a-kind risks make it difficult for projects to secure finance and progress from demonstration to commercial scale.

c. What does the evidence say about current and future costs?

- RNG and LCLF currently face higher costs than fossil alternatives due to limited commercial-scale deployment, higher financing risks, the early stage of domestic industry development and a lack of sufficient subsidies and government support to bridge the cost gap.
- Australia faces additional cost pressures due to high construction and project development costs, limited domestic manufacturing capability and reliance on imported technologies and equipment.
- Feedstock availability, quality and transport logistics are key determinants of production costs for both RNG and LCLF, reinforcing the importance of strategic feedstock planning and investment in supporting infrastructure.
- The cost competitiveness of RNG and LCLF is expected to improve over time as industries scale, technologies mature, supply chains develop, carbon pricing strengthens and the environmental costs of fossil fuels are increasingly reflected in markets.

d. What role could the NSW Government play in strengthening technology development and deployment?

- Streamline planning, environmental and regulatory approvals for RNG and LCLF production facilities to reduce development timelines, costs and investment barriers.
- Support long-term offtake agreements through government procurement for renewable fuels.
- Develop supportive regulations and approval processes for digestate use and application in NSW to help establish end markets.
- Support pilot, demonstration and commercial projects through grants, concessional finance and risk-sharing mechanisms to accelerate technology deployment.
- Invest in enabling infrastructure that supports the development, demonstration and commercial deployment of RNG and LCLF technologies, including shared infrastructure, industrial precincts and project hubs.
- Support R&D for emerging and novel RNG and LCLF technologies, feedstocks and feedstock technologies.

3. What are the opportunities to foster demand reduction and behaviour change?

Demand reduction and behaviour change alone will not eliminate emissions from sectors where the use of liquid fuels and gas remains essential, including heavy transport, aviation, industrial processes, agriculture and firming energy generation. For these sectors, RNG and LCLF provide a critical decarbonisation pathway that is compatible with existing vehicles, infrastructure, appliances and equipment. As drop-in and blended solutions, RNG and LCLF can replace fossil fuels without requiring significant changes in behaviour, operational practices or widespread asset replacement, allowing businesses and consumers to continue meeting their energy needs while reducing emissions. Improving awareness of this compatibility among fuel and gas users, industry and the broader community will be important to build confidence and acceptance of renewable fuels and enable informed adoption decisions.

4. What are the likely economic effects on NSW of different emissions pathways to net zero, relative to NSW's current level of ambition?

The development of RNG and LCLF presents a significant economic opportunity for NSW, supporting regional investment, new manufacturing capability, improved energy security and the creation of skilled jobs across emerging supply chains. The NSW Government has already recognised the critical

economic opportunity presented by RNG and LCLF through the NSW Renewable Fuel Strategy. The development of NSW decarbonisation pathways should align with this recognition.

The economic potential of these industries is significant. The Race for 2030 identified that adoption of biogas technologies could create more than 18,000 full-time jobs by 2050, predominantly in regional areas, and contribute approximately \$50 billion to Australia's GDP. The CEFC also identified that a domestic LCLF sector could contribute a \$36 billion market opportunity by 2050. In NSW, modelling commissioned by NSW Regional Economic Development estimated that biogenic SAF alone, could represent a \$4.8 billion market opportunity.

5. What are the opportunities and barriers to addressing socio-economic priorities for a just transition, including equitable outcomes for First Nations peoples and rural, regional and remote communities?

RNG and LCLF can support a just transition by creating regional investment, employment opportunities and economic diversification, particularly in rural and regional communities with strong agricultural, waste, manufacturing and industrial capability. The development of these industries can create new value streams from locally available resources, including agricultural residues, waste and other sustainable feedstocks, while supporting regional supply chains, local businesses and domestic energy security. This can create opportunities for rural and regional businesses involved in project engineering, manufacturing, construction and ongoing operations, while also bringing fuel production closer to agricultural and other regional users, reducing the need to transport large volumes of fuel over long distances to these rural areas.

In addition to creating new opportunities for the agricultural sector by generating additional value from agricultural residues and other feedstocks, RNG and LCLF can be used as drop-in renewable fuels that support the decarbonisation of agricultural operations. This can help strengthen regional economies while supporting the transition to lower-carbon production across the agricultural sector.

Importantly, RNG and LCLF provide a practical pathway for consumers and businesses to participate in the net zero transition where electrification or major asset replacement may not be technically feasible, economically viable or accessible in the near term. This is particularly important for households, businesses and industries that may face financial or practical barriers to significant upfront investment in new technologies. Maintaining a range of decarbonisation pathways, including renewable fuels, will help ensure the transition remains inclusive and that communities across NSW can continue to access reliable energy services while contributing to emissions reduction goals.

6. What evidence can you provide to inform pathway inputs and assumptions? For example, cost curves, deployment rates, or sector -specific data, include commercially sensitive data where relevant

Bioenergy Australia's responses to Federal Government net zero and sector plans:

- [Electricity and Energy Sector Plan](#) – with a specific focus on renewable gas
- [Electricity and Energy Sector Plan](#) – with a specific focus on low carbon liquid fuels
- [Agriculture and Land Sector Plan](#)
- [Transport and Infrastructure Net Zero Roadmap and Action Plan](#)

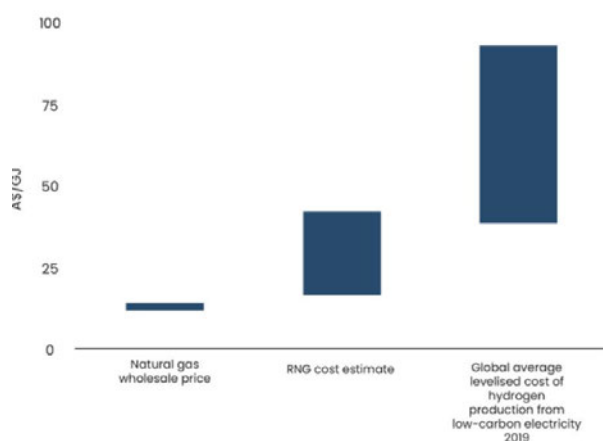
Bioenergy Australia's response to the Climate Change Authority consultation on decarbonisation pathways:

- Response to the [2024 Issues Paper: Targets, Pathways and Progress](#), outlining the role of LCLF across the Electricity and Energy, Transport, Industry, Resources, Built Environment, Land, Agriculture and Waste sectors.
- Response to the [2024 Issues Paper: Targets, Pathways and Progress](#), outlining the role of renewable gas across the Electricity and Energy, Transport, Industry, Resources, Built Environment, Land, Agriculture and Waste sectors.

Bioenergy Australia reports:

- [Unlocking Renewable Natural Gas to Enhance Energy Security and Maintain Australia's Manufacturing Sector \(July 2025\)](#): Feedstock access and quality are key cost drivers for RNG. The feedstocks for RNG are organic materials from a range of human activities, including landfills, wastewater facilities, agricultural residues, and manures from livestock. Large landfills are likely to produce the lowest cost RNG in the short term because the organic residues are already aggregated in large quantities, and the ability to utilise landfill morphology as an anaerobic digester. Wastewater facilities also benefit from large, aggregated volumes of organic residues. The cost of scaling up RNG production using agricultural residues will vary depending on the condition of the feedstock and will benefit from logistics that minimise the cost of aggregating the resource. Targeted policy could drive RNG costs down. Costs to develop RNG projects are challenging without a level of long-term project revenue certainty (see Figure 4).

Figure 4: Estimated cost of RNG compared to natural gas wholesale price and levelised cost of gen production^{5, 6}



Notes: (a) RNG cost estimates are approximate and based on ACIL Allen (2025) Progressive Change scenario. (b) Estimate for the range provided for RNG includes landfill gas, wastes, and crop residues.

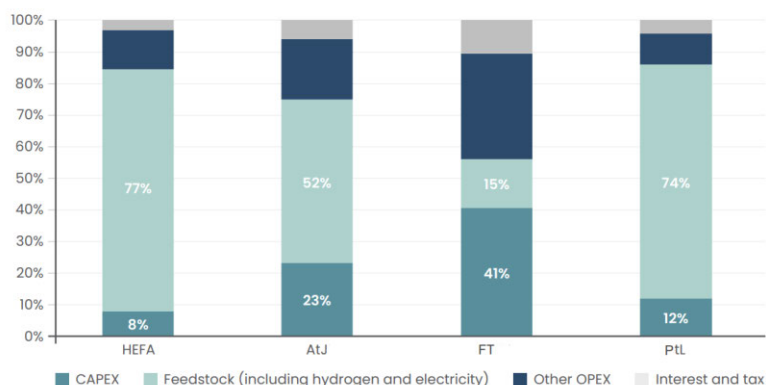
Current fossil gas prices are around \$11/GJ (30-day rolling average price on 3 August listed as \$10.82/GJ, with the highest recent price within the 30-day rolling average price of \$10.94 on 24 July 2026⁴). The NSW RFS can help bridge some of this gap, but further support is required

⁴ Australian Energy Market Operator (AEMO), 2026, GHS data dashboard', 4 August 2026
<https://www.aemo.com.au/energy-systems/gas/gas-supply-hub-gsh/data-gsh/data-dashboard>

to enable the offtake agreements that would support commercially viable RNG projects to establish at scale.

- [Securing our Fuel Future: Resilience Through Low Carbon Liquid Fuels \(March 2025\)](#): Feedstock costs are a significant cost driver for LCLF and could account for up to 77% of production costs, depending on how it is made (see Figure 8).

Figure 8: Cost breakdown of 2030 fuel costs by production pathway¹



Technology and infrastructure is also a large cost component, especially around efficiency of feedstock collection and transport ecosystems, and the efficiency of processing technologies. These costs could account for up to 41% of production cost, depending on pathway.

- [Department of Primary Industries and Regional Development, NSW Sustainable aviation fuel: Prospectus \(2024\)](#): NSW has a biogenic SAF production potential of up to 5,200ML/year by 2050. Modelling commissioned by the NSW Office of Regional Economic Development expects biogenic SAF to account for approximately 52% of all aviation fuel in Australia by 2050, with market value amounting to A\$11.9 billion in Australia and A\$4.8 billion in NSW.
- [CEFC & Deloitte, 'Refined Ambitions: Exploring Australia's low carbon liquid fuel potential' \(2025\)](#): Australia's fuel security challenges have been worsening over time, with 80 per cent of liquid fuels imported, costing approximately \$50.7 billion in 2023. At the same time, fuel users in priority sectors are willing to purchase LCLFs on an abatement cost basis but face a material cost gap relative to traditional liquid fuels. This gap is more pronounced in sectors where conventional liquid fuels are cheaper, such as mining where fuel tax credits apply. LCLFs also face a significant cost gap compared with other abatement options, such as offsets trading below \$40/tCO₂-e. However, achieving net zero across Australia's economy by 2050 will require greater investment in direct abatement by these industries.
- **Speed to value consideration**: Given current geopolitical and fuel supply uncertainty, speed to value should also be an important consideration alongside price. Supporting the deployment of near-term, drop-in renewable fuels that can be deployed quickly could help address near-term fuel and energy supply risks while also supporting decarbonisation. To leverage this opportunity, the NSW Government could establish a targeted program to co-fund and support the deployment of near-term LCLF and RNG technologies, generating real-world evidence on capital and operating costs, feedstock supply and logistics, and commercial

returns, while also supporting additional near-term fuel and energy supply. This would help reduce investment barriers, support wider deployment and fast-track the development of LCLF and RNG projects in NSW.

- **Supply continuity and access:** Supply continuity should also be considered alongside price, particularly for the agricultural sector. A lack of fuel and access to energy could disrupt planting, maintenance and harvesting, while higher energy costs would increase production costs and ultimately flow through to consumers. As Australia's major agricultural export markets face similar challenges, developing domestic RNG and LCLF supply could support Australia's ongoing competitiveness while providing lower-carbon fuel options for agricultural operations.

7. Beyond emissions reduction, what outcomes should be considered? For example, impacts on business, jobs, land -use, water and biodiversity.

- **Fuel security and resilience:** Australia imports approximately 80% of its liquid fuel, leaving NSW exposed to global fuel price volatility and international supply disruptions. Developing domestic LCLF and RNG production can strengthen NSW's fuel and energy resilience, reduce reliance on imported fuels and provide additional locally produced energy options.
- **Fuel diversity and flexibility:** Expanding RNG and LCLF production can diversify NSW's energy mix by providing additional supply options alongside conventional fuels and electrification pathways. This improves flexibility and resilience, particularly for sectors requiring energy-dense fuels or reliable gas supply.
- **Economic opportunities and regional development:** Establishing RNG and LCLF industries can attract new investment, create new economic activity, contribute to GDP growth and support the development of new industries across the renewable fuel value chain. Projects can generate employment and economic opportunities across multiple sectors and particularly in regional communities.
- **Leveraging NSW feedstocks and resources:** NSW has significant agricultural, waste and organic resource streams that can support RNG and LCLF production. Developing markets for these resources can create additional revenue opportunities for farmers, regional producers and waste management operators while increasing the value of existing materials.
- **Waste diversion and circular economy outcomes:** RNG and LCLF pathways can utilise waste-derived feedstocks, diverting materials from disposal and supporting NSW's transition towards a more circular economy. RNG can also support nutrient recovery through digestate production, which can be returned to agricultural land as a renewable fertiliser.
- **Maximising existing infrastructure and enabling uptake:** RNG and many LCLFs can utilise existing infrastructure, including gas networks, fuel distribution networks, storage systems, vehicles and equipment. This reduces barriers to adoption, lowers transition costs and enables faster deployment compared with solutions requiring entirely new infrastructure.

8. Do you have any other comments or information you would like to provide?

NSW Sectors	Renewable Gas	Low Carbon Fuels
Electricity & Energy	RNG is a renewable alternative to natural gas, supporting decarbonisation of gas-reliant energy demand. RNG can provide a firm, storable renewable energy source that enhances energy security, reduces exposure to natural gas price volatility and supports energy reliability during periods of low renewable electricity generation.	LCLF provide a pathway to decarbonise liquid fuel demand that cannot be readily electrified due to energy density, storage and mobility requirements. Domestic production can also improve energy security by reducing reliance on imported fossil fuels.
Transport	RNG supports transport decarbonisation where electrification is constrained by range, payload, charging requirements and operational cycles. Bio-CNG is suited to depot-based fleets such as buses, waste vehicles and urban freight, while Bio-LNG provides a higher energy density option for long-haul heavy freight.	LCLF are essential for transport decarbonisation where liquid fuels remain necessary, including aviation, shipping, heavy freight and off-road vehicles. SAF, renewable diesel, biodiesel, bio-methanol and ethanol provide lower-emission alternatives while utilising existing aircraft, vehicles and fuel infrastructure.
Industry	RNG can replace natural gas in industrial processes, where electrification may not be technically or commercially feasible due to high-temperature requirements, process constraints or electricity infrastructure limitations.	LCLF support industrial applications requiring high-energy-density fuels, including heavy equipment, and remote operations.
Resources	RNG can support regional and resource-sector energy needs by providing renewable gaseous energy where grid expansion or electrification may be constrained by location, reliability requirements or cost.	LCLF provide a pathway to reduce diesel emissions from mining and resource operations, particularly heavy mobile equipment, haulage and remote operations where alternatives face may not be technology and geographically feasible.
Built Environment	RNG provides an emissions reduction pathway for existing gas-connected buildings where electrification is not technically or economically feasible.	LCLF can reduce emissions from construction, heavy equipment, freight and logistics activities where electrification is not technically or operationally feasible due to high energy requirements,

		mobility needs, range limitations or equipment constraints.
Land & Agriculture	RNG supports agricultural decarbonisation by converting agricultural wastes and residues into renewable energy, reducing methane emissions while providing energy for farm operations, agricultural processing and regional energy systems.	LCLF can support decarbonisation of agricultural machinery and off-road equipment, including tractors, harvesters and heavy vehicles, while creating new markets for agricultural residues and sustainable feedstocks used in renewable fuel production.
Waste	RNG is a key waste decarbonisation pathway as it captures methane from landfill, wastewater and organic waste streams that would otherwise be released, converting it into renewable energy while supporting circular economy outcomes.	LCLF support circular economy outcomes by utilising waste-derived feedstocks to produce renewable fuels, reducing waste disposal and displacing fossil fuel consumption.

Thank you for taking the time to consider our submission. Any questions or request for further assistance are welcome and can be directed to [REDACTED]

Sincerely,



Shahana McKenzie
CEO Bioenergy Australia