30 July 2025

# GEA Submission: LCLF Methodologies

Gas Energy Australia (GEA) represents Australia's liquid gas supply chains including Liquefied Petroleum Gas (LPG) and associated gases. Our members span from producers to retailers and everything in between. The LPG industry safely and securely supplies 43PJpa of energy to industrial, commercial and residential consumers nation-wide, including around 30% of regional households where electricity can be unreliable or unavailable[1].

GEA welcomes the opportunity to comment on the Department of Climate Change, Energy and Water (DCCEEW) Guarantee of Origin (GO) Scheme Low Carbon Liquid Fuels Methodology (LCLF) consultation.

LPG plays a vital role supplying energy to Australian industrial, commercial, residential, transport and recreational energy users today. Through the supply of drop-in renewable forms of LPG, energy consumers can continue to receive reliable, affordable energy via LPG while supporting emissions reduction targets[2].

## General Feedback

BioLPG is a drop-in renewable form of LPG produced during HEFA/HVO processing (5 to 10 per cent co-product), fitting within LCLF Methodology. Including BioLPG as a specified Product from the LCLF Methodology:

a) Is “low hanging fruit” requiring minimal development beyond existing LCLF method development requirements.
b) Can support decarbonization of rural Australian energy consumers reliant on LPG where other energy supply can be unreliable or unavailable.
c) Can support the business case for HEFA production through access to investment-grade foundation customers with superior credit ratings.

GEA commits to supporting the LCLF Product GO (PGO) team in developing the BioLPG branch of the HEFA LCLF PGO and looks forward to ongoing engagement.

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[1] DCCEEW, 2024, *Australian Energy Update 2024*, https://www.energy.gov.au/publications/australian-energy-update-2024
Australian Bureau of Statistics, 2014, Environmental Issues: Energy Use and Conservation, https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4602.0.55.001Main+Features1Mar%202014?OpenDocument

[2] Frontier Economics, 2023, *Pathways to Zero Emissions for LPG*, https://www.gasenergyaus.au/get/2016/pathway-zero-emissions-for-lpg-frontier.pdf

## LPG today, renewable forms of LPG tomorrow

Just like electricity and natural gas, LPG also has renewable alternatives. Drop-in BioLPG and Renewable LPG (rLPG) can be used with no changes in LPG infrastructure or appliances. Dimethyl Ether (DME) can be blended into LPG for use with existing appliances and infrastructure or used in its pure form with minor changes to existing LPG or natural gas appliances and infrastructure.

For many energy customers, these options will have much lower upfront and lifecycle decarbonisation cost than electrification. This is especially true in rural Australia where electricity can be unreliable or unavailable, making electrification less practical. Further detail on this can be found in the *The Role of LPG in Australia's Energy Landscape* section below.

## Recommendation

GEA recommends including a BioLPG product in the LCLF Product Go Methodology. This is a low hanging fruit opportunity which would require minimal additional effort to develop. A PGO scheme which recognises renewable forms of LPG such as BioLPG supports least cost decarbonisation for all Australian households and businesses.

GEA notes that a similar decision is being considered by GreenPower and recommends engagement between the PGO and GreenPower teams on the value of BioLPG inclusion.

Thank you for considering our submission. We look forward to continued discussions on this important matter. To discuss any of the above feedback further, please contact me on +61 422 057 856 or via jmccollum@gasenergyaus.au.

Yours sincerely,

JORDAN MCCOLLUM
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## The Role of LPG in Australia's Energy Landscape

Liquefied Petroleum Gas (LPG) plays a vital role in Australia's energy security and net zero transition. As a versatile energy source with drop-in renewable alternatives, LPG provides essential energy services to millions of Australians, particularly in regional and remote areas where it serves approximately 30% of households[3]. The LPG industry safely and securely supplies 43 petajoules of energy annually across industrial, commercial, and residential applications nationwide[4]. A further 120 petajoules of LPG is exported annually, with the LPG sector as a whole contributing over $5bn of GDP and 20,500 FTE to the Australian economy[5].

LPG stands out as a cleaner alternative to many traditional fossil fuels, producing 14% fewer greenhouse gas emissions than diesel[6]. The industry is actively embracing Australia's transition to net zero through the pursuit of renewable forms of LPG[7]. These include bioLPG (a co-product of Sustainable Aviation Fuel) and renewable LPG (rLPG) produced from hydrogen. These alternatives reduce scope 1 emissions by 99% while utilizing existing infrastructure and appliances.

One of LPG's most significant advantages is its superior energy storage capability in cheap, transportable LPG tanks. This is key in regional areas where mains power may be unreliable or unavailable. A standard residential LPG tank installation provides energy storage equivalent to more than 42 Tesla Powerwall 3 home battery systems at around one-tenth the cost[8]. This storage capacity, combined with the portability of LPG tanks, makes it an invaluable resource for energy security and emergency resilience.

The LPG industry is uniquely positioned to support Australia's energy transition without requiring government funding or subsidies. As the nation moves toward net zero emissions, renewable forms of LPG complement renewable electricity, offering a practical decarbonisation pathway for applications where electrification may not be feasible or cost-effective. By recognizing and supporting the development of renewable forms of LPG, Australia can ensure a diverse and resilient energy mix that retains energy security while achieving its climate goals.

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[3] Australian Bureau of Statistics, 2014, *Environmental Issues: Energy Use and Conservation*, https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4602.0.55.001Main+Features1Mar%202014

[4] Australian Federal Department of Climate Change, Energy, the Environment and Water, 2024, *Australian Energy Update 2024*, https://www.energy.gov.au/publications/australian-energy-update-2024

[5] ACIL Allen, 2022, *Economic contribution of the Australian gas economy in 2020-21*, https://www.gasenergyaus.au/get/2123/economic-contribution-of-australian-gas-economy.pdf

[6] Australian Federal Government, *2024, National Greenhouse and Energy Reporting (Measurement) Determination 2008*, https://www.legislation.gov.au/F2008L02309/latest/text

[7] Frontier Economics, 2023, *Pathways to Zero Emissions for LPG*, https://www.gasenergyaus.au/get/2016/pathway-zero-emissions-for-lpg-frontier.pdf

[8] Elgas, 2025, *LPG Gas Bottle Sizes*, https://www.elgas.com.au/elgas-knowledge-hub/residential-lpg/lpg-gas-bottle-sizes-gas-bottle-dimension-measurements/

# Detailed feedback

While many choose to use LPG in metropolitan Australia, LPG comes into its own in the regions, beyond the grid, where energy supply can be unreliable or unavailable. Here, LPG provides energy access and energy security with lower environmental risks compared diesel or solid fuels.

BioLPG represents one of the few practically or economically viable options to decarbonise regional LPG use. Some LPG customers require high temperature, intensity, or speed heat or a clean flame – something only a gas can provide.

A drop-in renewable fuel using existing infrastructure and appliances, it is also expected that the higher cost of BioLPG will represent a lower cost of decarbonisation than the combined costs of electrification and remote electricity firming. Beyond the upfront cost of electric appliances alone, providing the equivalent energy firming as provided by bottled LPG will be expensive when using electricity firming means.

A LCLF PGO for BioLPG can support the formation of an Australian BioLPG Market. And the regional impact of a BioLPG market cannot be understated. Australia can't achieve net zero while leaving regional communities behind. Leaving regional Australians without viable decarbonisation options beyond electrification risks regional social licence for the transition – something we see unfolding already today.

A BioLPG market can help retain regional social licence for the transition – and PGO certification can help ensure that market can be formed.

## Scale of the decarbonisation opportunity

CSIRO projects that up to 5 billion litres of Sustainable Aviation Fuel (SAF) could be produced via the HEFA process.[9] Given that BioLPG typically makes up between 5 to 10 per cent of the total production. This equates to a potential BioLPG yield of approximately 250 to 500 million litres.

For context, Australia's current LPG production is around 43 petajoules, or roughly 1.67 billion litres. If CSIRO's projection comes to fruition, BioLPG co-produced through HEFA could account for approximately 15 to 30 percent of Australia's existing LPG production.

This would offering a significant opportunity to decarbonise LPG use using existing LPG supply and utilisation infrastructure. Energy customers which use LPG today, especially in regional Australia, tend to rely on LPG where energy supplied via other energy infrastructure can be unreliable or unavailable.

[9] CSIRO, 2022, Sustainable Aviation Fuel Roadmap, https://csiro.us/csiro-boeing-roadmap-charts-flight-path-to-sustainable-skies/

### Supporting HEFA process investment

Beyond representing an additional saleable product from the HEFA process, BioLPG can support HEFA process investment by attracting foundation customers with superior credit ratings in comparison to Australia's major airlines.

An investment-ready facility requires investment-grade foundation customers. However, Airlines such as Qantas and Virgin have sub-investment-grade credit ratings. Alternately, GEA's top three LPG retailers, Origin Energy, Elgas and Ampol, credit ratings which classify them as investment-grade.

While large LPG retailers will not be sufficient to support HEFA process investment alone, the introduction of customers with investment-grade credit ratings for even 5 to 10 per cent of production can help support the investment case for these facilities. This in turn can help bring producers closer to enabling BioLPG production from the HEFA process at scale.

## Responses to Consultation Questions

*Q - We welcome feedback on whether there are outputs likely to be generated as part of the production process that may qualify as co-products? (Page 10)*

The HEFA process results in multiple fuel products. Beyond Sustainable Aviation Fuel (SAF) and Renewable Diesel (rDiesel), BioLPG can be produced as a co-product. BioLPG typically makes up around 5 to 10 per cent of the total product mix. According to the consultation paper, emissions from the HEFA pathway are apportioned between diesel, aviation fuel, and hydrocarbon co-products.

As a hydrocarbon co-product, BioLPG would be accounted for generally under the hydrotreating and fuel refining module. However, as detailed in answers to further questions, the specification of BioLPG as a product would support BioLPG market development. This in turn can support decarbonisation of an additional energy supply chain and provide a further decarbonisation option for regional Australian.

*Q - We welcome feedback on whether: The minimum modules and the potential emission sources adequately capture the processes in the HEFA production of diesel and aviation kerosene. (Page 7)*

The two minimum modules proposed in the LCLF are:

- *hydrotreating and fuel refining module, to encompass the various steps undertaken at a refinery related to the fuel production, including any feedstock preparation, excluding the steps related to hydrogen production*
- *hydrogen supply module, which relates to the steps for hydrogen production.*

The minimum required modules include hydrotreating and fuel refining, covering feedstock preparation, hydrogenation, and refining steps. Since BioLPG is produced as part of this process, it is captured within the existing module structure. Emissions intensity would be allocated between SAF/rDiesel and BioLPG using the lower heating value energy content allocation approach, as outlined in the methodology.

Post-production delivery modules such as pipeline transport, vehicle transport, and storage infrastructure would also apply to BioLPG where common infrastructure is used.

The only aspect missing for BioLPG is the specific identification of BioLPG as a product.

*Q - If the PGO product is blended with other fuel products after production, then where would blending occur e.g. at the refinery or at the customer's premise? (Pg 5)*

Once produced, blending of BioLPG with conventional LPG could/would typically occur downstream of production, such as at distribution terminals, refilling facilities, or in some cases, at the refinery. Blending could theoretically occur at customer premises, however this would be less common. Most customers receive LPG supply from a single supplier via a single supply network and suppliers tend to blend supply across their distribution network.

Like other renewable fuels, a BioLPG Market will need to be founded upon blending of BioLPG into existing LPG Distribution Networks. LPG Distribution Networks are analogous to gas distribution networks:

- They service multiple supply and demand customers;
- Are interconnected (by road transport within LPG networks, rather than by pipe); and
- Interconnection forms a 'reasonable physical link' between:
    - BioLPG supplied into any one LPG distribution network;
    - All LPG distribution networks (accessible by road); and
    - Customers supplied BioLPG via any one LPG distribution network.

The BioLPG PGO will require provisions similar to those seen in the Hydrogen PGO which allow for BioLPG blending into distribution networks. This would include allowing for PGO completion by consumers across networks with a reasonable physical link to the network into which BioLPG was supplied – or any LPG distribution network accessible by road.

Recognising the carbon intensity of BioLPG through PGO certification would allow customers to make informed, emissions-conscious LPG purchasing decisions. This in turn creates an 'emissions value' to 'green premium' link through which a market can be created.

Without PGO certificates enabling a BioLPG market, there is a risk that a market may not form. If this were to be the case, there is a risk that this low-carbon HEFA co-product could be redirected into heat or in-plant hydrogen production rather than supporting regional decarbonisation. This is already being seen in a number of the HEFA projects being proposed in Australia today.

*Q - We welcome feedback on whether the common delivery modules provided in the draft methodology are suitable for LCLF? (Page 12)*

Yes, the common delivery modules outlined in the draft methodology, such as truck transport and storage vessels are generally suitable for BioLPG. These align with existing LPG delivery and handling infrastructure, which BioLPG can readily integrate into without modification to existing infrastructure.