

Submission

MERNAP Issues Paper 2: Energy Sources and Technologies

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Introduction

Gas Energy Australia (GEA) welcomes the opportunity to provide a submission on the MERNAP Issues Paper 2: Energy Sources and Technologies.

There is global momentum towards gas-fuelled ships. In fact, a decade ago there were just 10 gas-fuelled cargo vessels worldwide. Today there are 936, with another 876 on order (Clarkson's Research).

Australia has been a slow adopter of the inherent immediate and longer-term advantages gas – and, in particular, LPG – provides. That said, three of the most recent acquisitions to Australia's coastal shipping fleet are powered by LPG. And for good reason.

The benefits of running shipping on LPG include:

1. LPG yields an immediate 20% reduction in emissions compared to marine diesel. But, as renewable gases are developed over the next few years, those emissions will plummet to net zero using bioLPG and, ultimately, actual zero using synthetic renewable LPG (rLPG).
2. Adopting LPG now avoids future costs. Ships are acquired with a view to many decades service. BioLPG and rLPG are one-for-one replacements for conventional LPG. This means no changes are required to ship engines or components in order to swap-in bioLPG or rLPG.
3. Adopting LPG prevents the prevailing dangers posed by marine diesel ships. If a diesel ship were to run aground, collide with another vessel or sink in Australian waters it would be an ecological disaster without parallel for our pristine beaches, waters and the sea life they support.

Such an incident would have far-reaching and long-term ramifications for local businesses, fisheries, tourism operators, hospitality venues and a host of associated impacts. This scenario is entirely avoidable. LPG-fuelled vessels are clean and, in the event of an incident at sea, the gas can be released, dissipating without environmental impact as it neither slicks nor sediments.

4. Energy security is emerging as a key issue globally. Using LPG as a fuel choice would solve our national reliance on imported diesel-oil, replaced by domestically produced gases (LPG, bioLPG and rLPG) that Australia can produce in abundance. This would deliver genuine fuel security and self-sufficiency, which underpins the point of having a sovereign fleet.

As detailed in this submission, net zero bioLPG will be available in Australia from as soon as 2025-26. As a by-product of biodiesel and sustainable aviation fuel production using the hydrotreated vegetable oil process, the first three plants slated for operation in 2025-26 have the capacity to initially displace 11% of conventional LPG demand almost immediately, seeing up to 160,000 tonnes of CO₂-e abated per year.

The exponential growth of this sector has the potential to replace all conventional LPG. Indeed, as the CSIRO's Sustainable Aviation Fuel Roadmap (released August 2023) makes clear, from 2025 Australia will have sufficient feedstock to produce 5 billion litres of SAF every year from approximately 15 biorefineries with LPG as a by-product. This would abate up to 1.5 million tonnes of CO₂-e each year.

However, the advent of renewable synthetic LPG (rLPG), derived from green Hydrogen and CO₂ from the atmosphere, is an actual zero emitting gas. The only CO₂ expelled when it is burned is what was captured when it was made – meaning it has a zero impact on the environment and, as such, requires no offsets. It is expected rLPG will be available in Australia from the mid-2030s.

Based on current domestic demand, replacing all conventional LPG with synthetic actual zero rLPG by 2050 would reduce CO₂-e emissions by up to 1.94 million tonnes every year.

About GEA

GEA is the national peak body representing the downstream gas fuels industry, encompassing Liquefied Petroleum Gas (LPG) and associated gases – including a raft of new renewable gases such as bioLPG, synthetic renewable LPG (rLPG) and renewable Dimethyl Ether (rDME). The industry comprises major companies, medium and small businesses across the gas fuels supply chain including producers, refiners, fuel marketers, equipment manufacturers, gas transporters, consultants and service providers.

Having engaged directly with the Australian Government Department of Industry, Science and Resources, Department Climate Change and Energy, relevant Ministers and Shadow Ministers, as well as state and territory governments, GEA has provided seminal research undertaken by Frontier Economics on LPG's path to zero emissions.

LPG supply can begin this transition as soon as 2025-26, offering governments, industries and household consumers another important string in their bow to deliver on 2030 targets and beyond. We see these developments as complementary to government objectives in shifting to renewable energy, while offering customers diversity in choosing the zero energy sources that suit their needs.

Importantly, we have made it clear to all governments – and do so again here – that the LPG sector is not seeking any government funding. That is, we require no subsidies, seed or project funding or the like to facilitate the transition.

We simply seek a level playing field. That is, recognition and inclusion of bioLPG, rLPG and rDME technologies in the array of government considerations, programs and mechanisms so homeowners and businesses can choose the path to zero best for them.

Examples for LPG to Achieve Net Zero & Actual Zero Emissions

BioLPG:

- Derived from plant and vegetable waste.
- Derived as a by-product from biodiesel and/or Sustainable Aviation Fuel production using the Hydrotreated Vegetable Oil process.
- Identical to LPG. A simple 'drop in' replacement.
- Same storage, transport infrastructure and appliances. No change. No additional capital costs.
- Net zero as an 80% renewable gas.
- Potential to be actual zero as related sectors (i.e. farming and transport) reduce their emissions.

rLPG:

- Synthetically produced from green hydrogen and CO₂ taken from the atmosphere.
- Identical to LPG. A simple 'drop in' replacement.

- Same storage, transport infrastructure and appliances. No change. No additional capital costs.
- Is an actual zero gas – that is, the only CO₂ expended in its use is what was captured in its creation. No offsets are required.

rDME:

- Derived from methanol.
- Chemically similar to LPG (propane and butane).
- Can be blended with rLPG up to 20% with no change to appliances.
- It can fully replace LPG, however, would require minor changes to existing appliances.
- Derived from gasification and catalytic synthesis or electrolysis (i.e. green H₂) and catalytic synthesis.
- It is net zero, but can be actual zero as related sectors (i.e. transport) reduce their emissions.

Consultation Questions

Energy Efficiency Measures: *Question 1: What energy efficiency measures would your organisation consider utilising to reduce emissions?*

Gas Energy Australia is urging the inclusion of LPG as an energy efficiency measure for reducing emissions in the maritime sector. LPG stands out as a cleaner alternative compared to traditional marine diesel, offering an immediate 20% reduction in emissions. Notably, LPG is positioned as a cleaner option than LNG (Liquefied Natural Gas), providing a more sustainable and environmentally-friendly fuel source for the maritime industry. As renewable gases, such as bioLPG and synthetic renewable LPG (rLPG), are developed in the coming years, LPG's emissions are expected to decrease to zero, making it a compelling choice for the immediate and long-term.

Information Accessibility: *Question 2: Is there sufficient information available to maritime industry stakeholders about energy efficiency measures? What are the barriers to accessing this information?*

Australia's maritime sector plays a pivotal role, handling 99% of the nation's international trade. The information available from the Bureau of Infrastructure and Transport Research Economics indicates the substantial volume of cargo and port calls in 2020-21. However, there is a need for increased awareness and accessibility to information regarding the benefits of switching from marine diesel to LPG as a clean and sustainable fuel option. A concerted effort to disseminate detailed information on the advantages of LPG, including its immediate emissions reduction and transition to net-zero and, ultimately, actual zero emissions, is crucial for fostering informed decision-making in the maritime sector.

To this end, GEA would be pleased to provide the department and its stakeholders with the Frontier Economics research 'Pathways to Zero Emissions for LPG' to foster informed discussion and consideration.

Applicability of Technologies: *Question 3: How do the energy efficiency technologies suitable for international shipping differ in their applicability to domestic vessels?*

European nations and the US provide incentives encouraging fuel switching from marine diesel to gas. To be fair, this typically involves LNG given those nation's long association with LNG.

Across the globe, there has been a sea-change with gas-fuelled ships increasing from 18 vessels in 2010 to 936 vessels today in service and another 876 on order.

Perversely, this means Australia gets the world's clunkers – diesel-powered cruise and freight vessels – navigating through our waters and docking at our ports.

Meanwhile, three of the most recent private acquisitions to our shipping fleet are powered by LPG. With a view to decades in operation, LPG is the fuel of choice for its immediate emissions reductions and its short and longer-term flexibility as a net zero and actual zero option.

Adopting LPG also prevents the inherent dangers posed by marine diesel ships. If a diesel ship were to run aground, collide with another vessel or sink in Australian waters it would be an ecological disaster without parallel for our pristine beaches, waters and the sea life they support.

Such an incident would have far-reaching and long-term ramifications for local businesses, fisheries, tourism operators, hospitality venues and a host of associated impacts. This scenario is entirely avoidable. Gas-fuelled vessels are clean and, in the event of an incident at sea, the gas can be released, dissipating without environmental impact as it neither slicks nor sediments.

All new vessels in Australian waters, including ferries, should be geared for gas. Supporting such a shift would set-up our maritime sector to achieve net zero in the short-term, and actual zero over the medium term, while immediately reducing the risks to the environment.

The recent acquisition of three vessels in Australia powered by LPG demonstrate the applicability of LPG to domestic needs.

This includes international trade vessels, coastal shipping, and even domestic ferries, showcasing the versatility and effectiveness of LPG as a clean and efficient energy source.

Barriers to Investment: *Question 4: What are the barriers your organization faces in investing in energy efficiency technologies or measures?*

As mentioned at the outset of this submission, GEA and its members are not seeking any funding to pursue the development and commercial availability of bioLPG and rLPG.

If/when Australia embarks on building or acquiring new vessels for a coastal shipping fleet, we submit that including LPG in government considerations would be prudent.

Phasing out oil-based ships, which present a clear danger to Australia's pristine waters and shores, and replacing them with demonstrably cleaner and safer renewable LPG-run vessels, is a no-brainer.

We would be happy to work with the department and/or stakeholders to demonstrate the bona fides of these new technologies.

This is easily facilitated as LPG is already a proven performer, with the gas already used successfully in Australian shipping operations.

By emphasising LPG's cleanliness, Gas Energy Australia aims to address concerns related to emissions and underscore the advantages of choosing LPG over other fuel options, ultimately contributing to a cleaner and more sustainable maritime industry.

Technical Considerations: *Question 5: What are key technical considerations that your organisation considers when exploring alternate energy sources?*

Technical considerations for Gas Energy Australia encompass the reliability, scalability, and compatibility of LPG as a marine fuel. Importantly, LPG stands out as a notably cleaner option compared to other energy sources, including LNG, providing an immediate reduction in emissions but moving to net-zero and actual zero emissions with renewable gases in bioLPG and rLPG.

As a one-for-one replacement for conventional LPG, bioLPG and rLPG require no ongoing transitional issues, costs or practical impediments.

Barriers to Low Emission Energy Sources: *Question 6: From the following list, what are the primary barriers to investing in low emission energy sources in the maritime sector? Can you comment on what your organisation thinks about each of these factors?*

Gas Energy Australia acknowledges the significance of various barriers to investing in low emission energy sources in the maritime sector, including:

- **Cost:** New ships running on LPG would incur no extra costs upon transitioning to net zero bioLPG and, ultimately, using rLPG in the same vessel with the same engine and components. There is and will be a premium on renewable forms of energy, however, Gas Energy Australia asserts, based on the Frontier Economics modelling, that as technology advances and economies of scale are realised, costs will become more competitive, making cleaner options financially viable.
- **Technology Choice:** The choice of technology is crucial, and Gas Energy Australia is committed to thoroughly evaluating options. We see LPG as a superior choice due to its immediate emissions reduction and short to medium-term transition to net-zero and actual zero emissions.
- **Fuel Availability/Infrastructure:** Infrastructure development for alternative fuels, such as LPG, is well established. Indeed Australia exports some 70% of its LPG production. As the CSIRO has stated, with 5 billion litres of SAF available in Australia from 2025 and some 15 biorefineries slated in the production of bioLPG, the sector is on a path for growth. Further, as green hydrogen ramps up to scale come the mid-2030s, Australia is in the enviable position of producing hydrocarbons, including rLPG, at will.
- **Regulations and Standards:** Evolving regulatory frameworks are considered, and Gas Energy Australia is committed to complying with and contributing to the development of regulations that promote environmentally friendly and sustainable practices in the maritime industry. Recognition of bioLPG and rLPG as the exact same molecule as conventional LPG is well-established. GEA is working with federal and state governments on piloting bioLPG and rLPG as renewable gases for Australian application.
- **Safety:** Safety concerns are paramount, and Gas Energy Australia emphasises that LPG, as a cleaner fuel, has inherent and long-stranding record of safety advantages. In the event of an incident at sea, LPG can be released, dissipating without environmental impact, unlike some other fuel options. If a diesel ship were to run aground, collide with another vessel or sink in Australian waters it would be an ecological disaster without parallel for our pristine beaches, waters and the sea life they support. Such an incident would have far-reaching and long-term ramifications for local businesses, fisheries, tourism operators, hospitality venues and a host of associated impacts. This scenario is entirely avoidable.

By actively promoting LPG as a cleaner and safer alternative, Gas Energy Australia aims to contribute to the reduction of emissions and foster sustainable, affordable and secure domestic energy supply for the maritime sector.

Medium and Long-Term Investments in Low Emission Energy Sources:

Question 7: Given many low/zero emission propulsion systems are still in the early stages of development, how is your organisation considering its medium and long-term investments in low emission energy sources?

- **Immediate Focus on Proven Technologies:** GEA and its members are prioritising investments and development option in proven technologies, such as LPG, which can deliver immediate emissions reduction benefits. While bioLPG and rLPG are emerging in Australia, they are well-established in Europe and north and south America. The opportunity is in considering Australia's coastal shipping fuel needs, Australia can be in the vanguard in using these gases, which has the advantage of already being tried and tested.
- **Continuous Monitoring and Contribution:** Gas Energy Australia remains actively engaged with members in monitoring and contributing to the development of emerging technologies. This involvement includes collaborating with industry stakeholders, research institutions, and government bodies to stay abreast of advancements.
- **Balanced Approach:** The organisation emphasises a balanced approach, recognising the current viability of certain technologies while contributing to the ongoing research and development of emerging solutions.
- **Transition to Sustainable Energy:** Gas Energy Australia is committed to transitioning toward sustainable energy sources in the short, medium and long-term. This includes fostering the evolution of cleaner technologies and contributing to the achievement of net-zero and actual zero emissions goals, aligning with broader industry and environmental objectives. LPG is different in that it has a clear, commercially viable and relatively easy path to decarbonise, produce bioLPG and rLPG at scale on an affordable basis, while providing Australian government and industry with secure domestic supply.

Case Study: Origin LPG Powered Fleet

Origin Australia

Embarking on a path of sustainable shipping leadership, Origin are driving innovation with the introduction of three groundbreaking vessels—Gaschem Homer, Gaschem Iliad, and Gaschem Odyssey. These globally unprecedented ships are fuelled by Liquefied Petroleum Gas (LPG), a departure from conventional diesel, establishing a new benchmark for eco-friendly maritime transportation. This initiative is a pledge to reduce emissions, promote domestic product outsourcing, and foster a sustainable future. Operating along Australia's eastern seaboard and the Pacific region, these vessels, distinguished by innovative designs, optimize efficiency, resulting in an 8% reduction in overall fuel consumption compared to conventionally powered ships. The transition to LPG aligns with the 2050 International Maritime Organization (IMO) targets for greenhouse gas reduction and contributes to IMO Energy Efficiency Design Index (EEDI) compliance, advocating for energy-efficient equipment and engines on new ships.

Beyond environmental benefits, these LPG-powered ships significantly enhance efficiency and cost-effectiveness. Mitigating Scope 3 emissions, they eliminate the necessity to export 90,000 tonnes of domestic product overseas, eliminating the use of 6,000 tonnes per annum of marine diesel fuel on Very Large Gas Carriers (VLGC). Simultaneous bunkering with LPG cargo reduces diesel bunker operations, resulting in an annual saving of 470 bunker barge hours, thus improving efficiency and reducing emissions. This strategic transition leads to an impressive 20% reduction in carbon emissions, a notable 95% reduction in sulphur dioxide, a 20% reduction in nitrogen oxide, and an extraordinary 99% reduction in particulate emissions.

Source: [Origin LPG Powered Fleet](#)

Conclusion

GEA's hopes that, from this submission, there is greater understanding leading to recognition that LPG is different and can be a viable option in the maritime industry.

The global momentum towards gas-fuelled ships, combined with the environmental advantages and fuel security offered by LPG, underscores the urgency for Australia to embrace this transition. As the nation's maritime fleet navigates the complexities of decarbonization, the adoption of cleaner fuel options is essential to safeguard Australia's pristine marine ecosystems and coastal regions.

LPG has a unique value proposition in the gas space, with a vital role to play as a renewable energy source that can quickly and relatively easily fully decarbonise.

We encourage governments to change their rhetoric to recognise that not all gases are the same and see this reflected in public discourse. LPG presents a solution to the growing problem of coal-fired power coming out of production, at the same time as renewable sources like solar, wind, etc., struggle to meet expected targets.

Based on current domestic demand, replacing all conventional LPG with synthetic actual zero rLPG by 2050 would reduce CO₂-e emissions by up to 1.94 million tonnes every year.

Finally, the LPG sector has undertaken to complete this transition without any call on government funding. However, the need for governments to recognise this transition is vital to giving the industry confidence to invest in these renewable technologies.

For More Information

Should you require more information, have questions or wish to discuss any elements arising from this submission, please contact:



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