12 June 2024

Submission: Green metals: unlocking Australia's Green Iron, Steel, Alumina and Aluminium Opportunity

The Australian Pipelines and Gas Association (APGA) represents the owners, operators, designers, constructors and service providers of Australia's pipeline infrastructure, connecting natural and renewable gas production to demand centres in cities and other locations across Australia. Offering a wide range of services to gas users, retailers and producers, APGA members ensure the safe and reliable delivery of 28 per cent of the end-use energy consumed in Australia and are at the forefront of Australia's renewable gas industry, helping achieve net-zero as quickly and affordably as possible.

APGA welcomes the opportunity to contribute to the Department of Industry, Science and Resources' consultation on unlocking green metals opportunities for a Future Made in Australia. There is an enormous global industry in green metals that is waiting in the wings, and Australia has the opportunity to be a world leader in production. This does rely on our ability to capitalise on our comparative advantages in feedstocks – for metals, and for the gaseous energy required to process them – and our ability to decarbonise these inputs.

APGA supports a net zero emission future for Australia by 2050[1]. Renewable gases represent a real, technically viable approach to lowest-cost energy decarbonisation in Australia. As set out in Gas Vision 2050[2], APGA sees renewable gases such as hydrogen and biomethane playing a critical role in decarbonising gas use for both wholesale and retail customers. APGA is the largest industry contributor to the Future Fuels CRC[3], which has over 80 research projects dedicated to leveraging the value of Australia's gas infrastructure to deliver decarbonised energy to homes, businesses, and industry throughout Australia.

APGA recommends that the Federal Government recognise the strategic importance of a robust renewable gas industry for developing a green metals industry in Australia.

Green metals of the future will be made with green hydrogen – but the green metals of today will be made with biomethane and even natural gas. A national Renewable Gas Target will enable investment in the hydrogen and biomethane supply chains required to reach net zero green metals while natural gas is used to start the transition.

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[1] APGA, *Climate Statement*, available at: https://www.apga.org.au/apga-climate-statement
[2] APGA, 2020, *Gas Vision 2050*, https://apga.org.au/gas-vision-2050
[3] Future Fuels CRC: https://www.futurefuelscrc.com/

Green metals are inextricably linked with the renewable gas industry

Developing green metals opportunities in Australia relies on the development of a strong and viable renewable gases industry. If Australia fails to facilitate domestic renewable gas production, green metals production will not be a viable industry.

The consultation paper correctly identifies that Australia has considerable efficiencies in its vertically-integrated steel and aluminium production chains. This can be taken one step further by considering Australia's equally strong and efficient gas production and infrastructure supply chains. These supply chains can be augmented to carry renewable gases – green hydrogen at minimal cost, and biomethane with no modifications.

Australia has comparative advantages in the production of both green metals and renewable gases due to an abundance of feedstock. Our resource potential for producing green hydrogen is limited only by the ability to produce renewable electricity. Australia is also rich with biomass reserves for the production of biomethane in a circular economy.[4]

Heat and carbon are necessary inputs to the current manufacturing processes for metals, and producers are actively decarbonising these processes through the use of renewable gases. Traditional coal blast furnaces for steelmaking can be replaced with direct reduction of iron (DRI) using hydrogen. Alumina refiners, which cannot electrify all their processes, are investigating using green hydrogen[5] in smelters to replace natural gas – biomethane could be used immediately in these same furnaces.

To supply the renewable gas necessary will require considerable domestic investment. Producers have made great strides in small projects that are actively decarbonising capital city natural gas distribution networks. In Sydney, Jemena's Malabar plant is producing biomethane from wastewater and injecting it directly into the grid.[6] In Adelaide, AGIG is injecting a 10% green hydrogen blend into the natural gas network in Tonsley,[7] and is expanding production to supply greater Adelaide and also Gladstone and Albury/Wodonga.

These developments are a promising start from the renewable gas industry and demonstrate the willingness to invest. But additional signals from governments are required for investments at the scale and cost necessary to supply a green metals industry.

Regulatory support required – including for biomethane

There are considerable barriers to address to provide the necessary signals for investment in this new industry. Investors need clear indications of market demand and regulatory certainty to justify investments, and at present the lack of this has hampered development.

The *National Greenhouse and Energy Reporting Scheme* recognises the emissions intensities of renewable gases. In practice the usefulness of this is limited. There is currently no way to

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[4] ENEA Consulting, 2021, *Australia's bioenergy roadmap*, developed for ARENA, https://arena.gov.au/assets/2021/11/australia-bioenergy-roadmap-report.pdf
[5] ARENA, 2021, *Renewable hydrogen could reduce emissions in alumina refining*, https://arena.gov.au/news/renewable-hydrogen-could-reduce-emissions-in-alumina-refining/
[6] ARENA, 2024, *Malabar Biomethane Injection Plant*, https://arena.gov.au/projects/malabar-biomethane-injection-project/;
[7] AGIG, 2024, *Hydrogen Park South Australia*, https://www.agig.com.au/hydrogen-park-south-australia

report the emissions intensities of renewable gases that have been blended into common user infrastructure carrying natural gas. This means that for the natural gas networks carrying blended biomethane or green hydrogen, the reduced emissions intensity of that infrastructure is not recognised. This initial blending is critical to providing the access to a broad range of customers to justify scaling up investments. The lack of recognition also affects the market tradability of renewable gases certified under the GreenPower scheme.

There are positive changes being made to address regulatory and investment barriers. DCCEEW has commenced early development of a market-based method that will recognise the emissions intensity of renewable gases in common-user infrastructure. The Guarantee of Origin Scheme will provide a certification pathway for green hydrogen for the purposes of carbon accounting frameworks – though it does not yet include biomethane.

The Federal Government's Hydrogen Headstart program is a powerful positive signal for investment in green hydrogen production, though it is not available for biomethane developments. The hydrogen production tax incentive will go further to support development of hydrogen projects through providing a flat $2/kg green hydrogen tax credit. Unfortunately, this incentive also excludes biomethane projects. The credit equates to $17/GJ, and an incentive of this scale would make tens of petajoules per annum of biomethane cost competitive with natural gas market prices on the east coast.

Alongside the significant supports in place to encourage hydrogen production, additional support is required for biomethane. Biomethane is a tested and mature technology internationally, but requires those regulatory scaffolds to promote investment domestically. Production credits and subsidies support the supply side of industry foundation.

A national Renewable Gas Target is needed to support demand

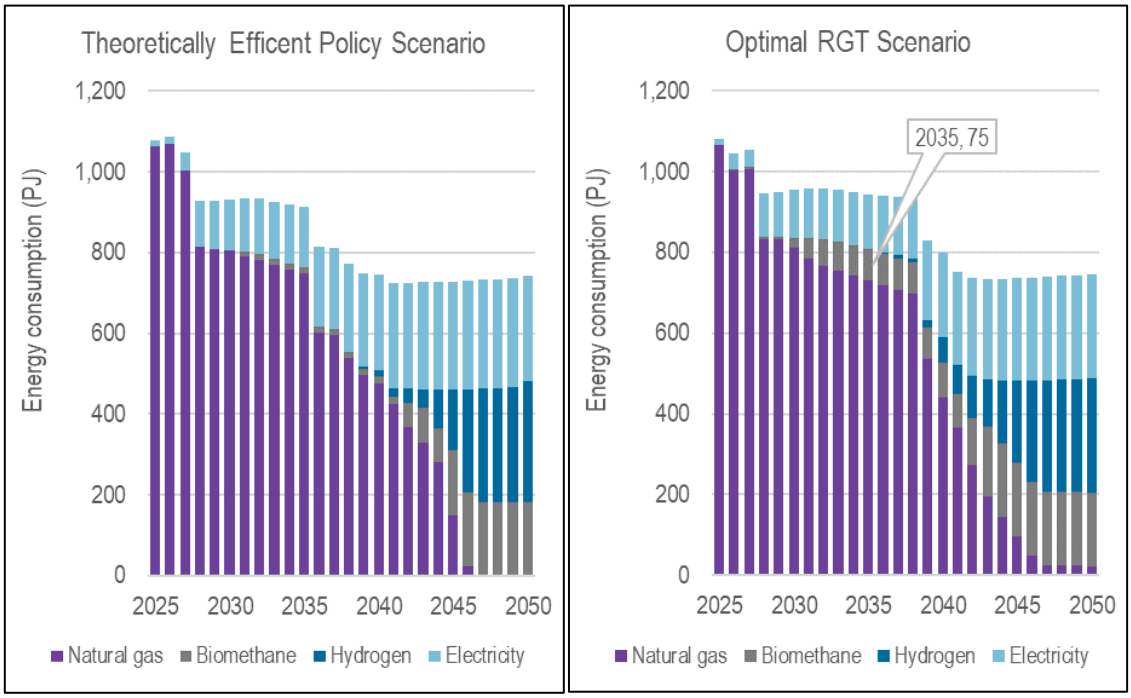
Alongside supply-side policies, demand-side incentives are also required. APGA has been advocating for a national Renewable Gas Target (RGT) to provide a strong signal for investment. This has precedent in the successful Renewable Energy Target, which supercharged the roll-out of renewable electricity by derisking investments.

To explore this, APGA commissioned ACIL Allen[8] to design an RGT. This work demonstrated how an RGT would boost investment in renewable gases and contribute to least-cost economy-wide decarbonisation. The Optimal RGT scenario achieved the least cost net zero pathway while kick-starting renewable gas supply by 2030, delivering an average abatement cost of $150/tonne CO_2-e.

The fuel mixes for the Theoretically Efficient Policy scenario and the Optimal RGT scenario (Figure 1) demonstrate the value of an RGT to deliver renewable gas development. It also shows that biomethane will be critical in the early stages of the roll-out, well ahead of delivery of significant volumes of hydrogen from the late 2030s.

[8] ACIL Allen, 2024, *Renewable Gas Target: Delivering lower cost decarbonisation for gas customers and the Australian economy*, https://apga.org.au/renewable-gas-target

Figure 1: Theoretically Efficient Policy and Optimal RGT scenario fuel mixes



APGA anticipates that once the renewable gas market is enabled through a market-based method and an RGT, similar to the renewable electricity market since the year 2000, the renewable gas market will develop to multiple times its current size.

Australia will need access to renewable gas as part of an efficient transition, and to enable other 'green economies' such as green metals. Governments will need to implement mechanisms to develop renewable gas and ensure it is available for hard-to-electrify sectors and as a feedstock for other sectors, in a timely manner. An RGT offers a viable and cost-effective approach to deliver these benefits.

Green metals start with natural gas today

As discussed previously, Australian metals manufacturers are forging ahead to decarbonise their industries. Many of the processes and technologies being considered for the future can begin decarbonising by first transitioning from coal use to natural gas, and then to using biomethane and ultimately hydrogen.

Australia's largest steel manufacturer BlueScope is currently investigating options for low-emissions iron and steelmaking in Australia, including through DRI and for renewable gases to directly power blast furnaces.[9] This will require use of natural gas to manufacture DRI until green hydrogen becomes viable in the late 2030s or 2040s. DRI processes can be configured to use natural gas and transitioned (at relatively low cost) to hydrogen once it is price competitive.

[9] BlueScope, 2023, *Submission to the Future Gas Strategy Consultation Paper,* https://www.steel.org.au/Membership/media/Australian-Steel-Institute/Submission%20documents/Future-Gas-Strategy-consultation-paper-submission-131123-FINAL.pdf

BlueScope is also engaged in several commercial discussions on the development of biomethane projects across the East Coast gas market. BlueScope is a signatory to the Renewable Gas Alliance's Renewable Gas Challenge, which aims to support the development of renewable gases such as biomethane including through biomethane certification.

To discuss any of the above feedback further, please contact me on +61 422 057 856 or jmccollum@apga.org.au.

Yours sincerely,

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Consultation questions

As the majority of questions are targeted for green metals producers and customers, APGA's comments are limited questions 18-30.

What external constraints may be limiting the production of green metals, including capital investment, technological barriers and access to renewables and hydrogen?	
18. What factors would enable the acceleration of metals decarbonisation? For producers, what levels of production would be feasible over time?	Factors associated with acceleration of metals decarbonisation are both economic and regulatory. Producers must have access to necessary inputs at reasonable cost. For many this means access to renewable gases and associated technologies. Access to renewable gases at the necessary price and scale to justify investment will need other government incentives or policies, such as a Renewable Gas Target and emissions intensity recognition under NGER. Producers also need access to markets that are willing or incentivised to pay any premium for green metals.
19. What are the best examples of a 'green premium' being established for low emissions products? What actions could improve demand for these products?	The renewable energy target and associated certificate scheme permitted customers to purchase 'green energy' at a premium, and so established the tradeability of green products. Importantly, anyone utilising this market can now benefit from the emissions reductions of that renewable energy. Residential users can also directly participate. The NSW Government has established a recognition and certification scheme for renewable gases, the GreenPower Renewable Gas Certification.[10] Industrial and commercial customers (not residential) can purchase Renewable Gas Generation Certificates (RGGOs) from certified producers. In the absence of a target mechanism the

[10] GreenPower, 2024, *Renewable Gas Certification*, https://www.greenpower.gov.au/about-greenpower/renewable-gas-certification

	usefulness of the scheme is currently limited. There is currently no way for purchasers of RGGOs to have the emissions reduction benefit recognised through NGER reporting.
20. What are the key production volumes, cost profiles and price assumptions that would support minimum commercial viability for green metals production?	APGA defers to the expertise of metals manufacturers on this question.
21. How would adopting renewable energy and green hydrogen impact on your current costs and the commercial viability of your operations, if you were able to implement them right now? a) How does this compare to interim or transition fuels?	APGA notes that this question should also consider biomethane as a renewable gas. Biomethane is a current and mature technology, and will act as a bridge between natural gas and green hydrogen as well as being an important contributor in its own right. Natural gas is effectively an interim fuel between processes that require high heat or carbon that currently use coal. Where this cannot be electrified, it can be transitioned from coal to gas (such as direct reduction iron in steelmaking), which can then be decarbonised using renewable gas. Renewable gases are currently more expensive than natural gas, and this cost gap will remain while incentives are absent for investment in economies of scale.
22. What are your estimates of the cost-gap differences between producing green metals and traditional metals, across your planned decarbonisation pathway (per tonne)? a) How do you expect this to change over the next 20 years? Please include what data or assumptions you have factored into your calculations. b) How do the cost gaps differ if you are able to use recycled metals as inputs?	Although not a producer, APGA expects that cost gap differences will be relative to the cost of non-metal inputs. That is, the cost of renewable electricity and renewable gases – or their offset alternatives. Renewable electricity can be effectively offset through trading and certification schemes. The same is not directly true of renewable gases, although some offset exists through Australian Carbon Credit Units (ACCU) for some products.[11] The cost of this offset is thus set to the price of an ACCU, not the cost of the renewable gas itself, limiting the incentive to invest.

[11] For example, some gas retailers such as AGL and RedEnergy permit customers to purchase 'renewable gas' offset with ACCUs at a premium, similarly to the premium applied to renewable energy purchase - https://www.redenergy.com.au/carbon-neutral-gas/

How existing policies are shaping decarbonisation strategies and investment decisions	
23. To what extent has government support influenced investment thinking in Australia in respect to projects targeting decarbonisation? a) What impact will the government's industry investment measures, such as the National Reconstruction Fund and Future Made in Australia Innovation Fund, have on your transition? b) What impact will the government's recently announced renewable hydrogen measures have on your transition? c) What impact do the government's policies to incentivise renewable electricity generation, storage and transmission have on your transition? We are seeking views on the types and design of supply side options that should be considered.	Recent policies such as the Hydrogen Headstart and the Hydrogen Production Tax Incentive notwithstanding, much of government's policies and actions regarding decarbonisation has focused on electrification of current fossil fuel demand, without commensurate investment in a renewable gas alternative decarbonisation pathway. This focus has failed to provide sufficient market signals for scaled investment in renewable gases to decarbonise current gas demand, to the detriment of other industries that will rely on access to decarbonised gas such as green metals. This has had other impacts as well. The focus on electrification has increased demand on the NEM, where energy storage is not yet sufficiently scaled to meet this demand in VRE droughts – increasing reliance on coal and increasing the emissions intensity of the grid. Policies such as the Capacity Investment Scheme, which ideologically exclude gas, have similarly provided a disincentive to invest in the critical gas powered generation capacity required to support the grid in its transition. To address this APGA recommends that the Federal Government implement a National Renewable Gas Target to provide a signal to market for investment, similar to the Renewable Energy Target.
24. What approach and features do you consider to be most effective? For example: a) Which incentive would lead to the biggest increase in private investment in green metals production across production, investment, and innovation-linked incentives?	APGA is agnostic to the specifics of a Renewable Gas Target, however work by ACIL Allen provides several scenatis for a national RGT.[12]

[12] ACIL Allen, 2024, *Renewable Gas Target: Delivering lower cost decarbonisation for gas customers and the Australian economy*, https://apga.org.au/renewable-gas-target

b) What are the merits of receiving incentives through the tax system relative to grant-based funding? c) Would a 'contracts for difference' scheme or other program designs be preferred? d) What length and timing of support is required for long-term viability? e) Are there any additional features or design principles that would enhance the efficacy of support to produce green metals?	APGA has also considered various proposed options, including in Western Australia[13] and Victoria.[14] For green metals, any incentive scheme would necessarily increase demand on renewable gases as the industry scales up. APGA considers this to be a good thing but defers to green metals producers on the specifics of any schemes.
25. Are there parts of the value-chain that require particular support (for example, energy inputs, green alumina or iron inputs, or green aluminium or steel production)? a) Should support be prioritised towards certain parts of the value chain in the first instance?	APGA defers to the expertise of metals manufacturers on this question.
26. Where support is provided across a value chain, such as intermediate metal outputs, what design features are necessary to ensure support is effective for producers with different levels of vertical integration?	APGA defers to the expertise of metals manufacturers on this question.
27. What eligibility thresholds would be appropriate to access production incentives? For example: a) A minimum amount of green production output (for example, tonne of metal). b) Emissions intensity reductions per unit of production (for example, tonne CO2 emitted per tonne of metal). c) Eligible business size (for example, minimum facility production capacity).	Eligible facilities under the Hydrogen Production Tax Incentive are limited to larger facilities over 10 MW, which will incentivise projects that will produce hydrogen at scale. The HPTI also provides an emissions intensity threshold. While APGA defers to the expertise of metals manufacturers on appropriate specifics, a minimum capacity and emissions intensity threshold would also be appropriate for green metals.
28. Should incentive levels be varied for different thresholds? For example, different incentive levels for different emissions intensity reductions per unit of production.	APGA defers to the expertise of metals manufacturers on this question.

[13] APGA, 2022, *Renewable Hydrogen Target for electricity generation in the South West Interconnected System* in Western Australia, https://apga.org.au/submissions/renewable-hydrogen-target-for-electricity-generation-in-the-south-west-interconnected-system-in-western-australia

[14] APGA, 2023, Victorian Renewable Gas Consultation, https://apga.org.au/submissions/victorian-renewable-gas-consultation

29. Should there be time limits for accessing production support? If so, what should the duration be and when should it commence, cease, or phase down?	The HPTI limits support to 10 years from 2027, which appears to be an appropriate period to model a green metals incentive time limit.
30. What would be an appropriate level of incentive to support the development of competitive production for green alumina, aluminium, steel and iron?	APGA defers to the expertise of metals manufacturers on this question.