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ARENA – via webform

ARENA – Hydrogen Headstart – Round 2 Consultation – July 2025

Energy Networks Australia (ENA) welcomes the opportunity to make a submission to the consultation on the design of ARENA's Hydrogen Headstart – Round 2.

ENA represents Australia's electricity distribution and transmission, and gas distribution networks. Our members provide over 16 million electricity and gas connections to almost every home and business across Australia.

ENA is supportive of effectively functioning markets and regulatory frameworks to help Australia achieve efficient investment and affordability and availability of gas, while at the same time creating markets to be able to decarbonise the end uses of gas, especially industry.

Summary of recommendations

- ENA recommends that the Program Objectives be broadened to cover a wider range of renewable gases to include both renewable hydrogen and biomethane.
- ENA recommends redefining this Eligibility Criteria by referring to “significant scale up from existing operating projects to inform further scaling up and commercialisation of renewable gas technology”.
- ENA recommends that modifying the existing funding allocation could increase the opportunities for renewable gas and provide additional opportunities to decarbonise.
- ENA recommends that a criteria for project evaluation includes a metric of \$/“lessons learnt” instead of \$/kg H₂ produced.
- ENA recommends that ARENA adopts a portfolio approach for Hydrogen Headstart round 2 by prioritising those other uses over other projects that mainly focus on ammonia.

1. Program Objectives

ENA recommends that the Program Objectives be broadened to cover a wider range of renewable gases to include both renewable hydrogen and biomethane.

This could support the specific application of hydrogen to its most prospective use cases and also support the broader development of biomethane to decarbonize the broader demand for gas in Australia's industry.

The proposed design for the program objectives appears to revolve around producing renewable hydrogen and accelerating its commercial viability as well as supporting domestic decarbonisation in Australia's manufacturing and export industries.

These objectives seem to imply that decarbonising industry, which continues to require gaseous fuels as either a feedstock or to supply high temperatures, can only be done using hydrogen. Biomethane is a renewable gas with the capability to decarbonise industry today. Common criticisms of biomethane include that the technology is undeveloped and that the volumes of biomethane would be insufficient to make a significant impact. Both of those are inaccurate assumptions.

- While biomethane is in its infancy in Australia, there are more than 1650 biomethane plants in Europe, feeding into gas networks and powering industrial estates. This is

producing significant biomethane volumes and has resulted in countries like Denmark being able to source 40 per cent of its gas demand from biomethane with a plan to reach 100 per cent by 2034.

- Within Australia, a new report for Energy Networks Australia by Blunomy (<https://www.energynetworks.com.au/news/media-releases/biomethane-breakthrough-turning-waste-into-energy-new-report-calls-for-biomethane-expansion/>), has found that approximately 400 PJ pa of biomethane is recoverable today from available feedstocks. This is more than the natural gas demand for power generation and industry on Australia's east coast. And that opportunity can expand over time with better recovery practices and supportive policies.

However, biomethane, like hydrogen, is not commercially viable compared to natural gas at its current prices without additional incentives. The Blunomy report notes that the first 50 PJ of biomethane could be produced at a cost between \$10 and \$27/ GJ, which is significantly less than renewable hydrogen.

Biomethane and renewable hydrogen will both play a key role in the energy transition. For example, Australia's Hydrogen Strategy identifies some prospective use cases for hydrogen.

Currently natural gas is used to produce hydrogen in the ammonia production process. Decarbonising this process can be achieved by replacing natural gas with renewable hydrogen. This could be done with minimal impact on the ammonia production process as hydrogen is produced outside of that process and could be replaced with renewable hydrogen delivered to site via pipelines or manufactured locally.

Similarly, iron could be manufactured using hydrogen instead of coal or natural gas, and once again this process could be decarbonised with renewable hydrogen. However, producing iron using renewable hydrogen would require a significant process change due to the different chemistry of converting iron ore to iron with coal or gas compared to doing so with hydrogen. Alternatively, the use of natural gas in iron making could be replaced with biomethane, delivered by the same pipelines currently delivering natural gas, without any process modifications.

Decarbonising other manufacturing industries that need a gaseous fuel for high temperatures (e.g. cement or glass production) can be achieved using renewable hydrogen and/or biomethane or a mixture. The benefit of using biomethane is that the fuel characteristics would be the same as natural gas and this would not require any process modification as biomethane is a drop-in fuel for natural gas.

2. Proposed Eligibility Criteria

a. End use

ARENA is proposing that all end uses of hydrogen or hydrogen derivative products are eligible, including where the product is exported are eligible and that a preference be given to those end uses identified in Australia's Hydrogen Strategy, 2024.

While hydrogen in gas networks is rightly considered eligible, it is important to clarify that blending is not an end use as presently indicated in ARENA's Merit Criteria. The National Hydrogen Strategy does not expressly classify blending as an end use, rather it primarily refers to blending as a way of transporting hydrogen to customers and making use of existing infrastructure.

The NGER legislation was amended in June 2025 to include a methodology that introduces market-based reporting of emissions from consumption of biomethane and hydrogen. Gas infrastructure is a key enabler of this amendment as it allows projects producing renewable gas to supply into the gas network and industry off-takers to secure the emissions benefit of that renewable gas.

b. Facility size (min 50 MW)

The facility size from Hydrogen Headstart was set as a minimum of 50 MW and the shortlisted applications included facility sizes of 50 to 1,625 MW. However, renewable hydrogen production plants are modular and once a module is designed and optimized, they can be combined to create larger plant sizes. While there will be learnings from integrating those modules, and potential cost reductions of each module, the main benefit arises from building modules, and integrating these. It is unclear whether specifying a minimum size is required to learn the lessons from integrating modular components. Indeed, it could have the unintended consequence of increasing the cost of the project without creating any major benefit.

Shell was one of the first global companies to install and commence operating a 10 MW electrolyser facility at its Rhineland Refinery in 2021 in the Refhyne I project (<https://www.shell.com/what-we-do/hydrogen.html>). This is based on the ITM Trident stack technology, which are 2 MW stacks (<https://itm-power.com/products/trident>). Essentially, the 10 MW facility consists of 5 lots of 2 MW stacks, that operate independently to provide the refinery with hydrogen. Scaling up to the 100 MW Refhyne II project would build on the same modular technology.

Similarly, the Hydrogen Headstart shortlisted projects would rely on combining modular electrolyser technology. It is unclear whether a requirement of at least 50 MW - which could have 25 lots of 2 MW electrolyzers - would have any significant benefits in terms of proving a concept and sharing learnings, compared to a smaller level of say 20 MW – which could have 10 lots of 2 MW electrolyser.

The Consultation paper identifies that 5 x 10 MW production facilities along a refuelling highway would not meet the eligibility criteria of 50 MW. But this does not recognise that facilities with a name plate capacity of 50 MW consist of smaller modules. Flexibility may also be useful to reduce costs that may arise due to localised electrical network constraints.

Clearly there is a need to scale up the size of renewable hydrogen projects but the benefit could be in scaling from existing operating projects rather than setting a minimum project size.

Previously, ARENA supported a Large Scale Solar program, which aimed to scale up the size of commercially viable solar farms. Some of the largest projects supported by this program included the 56 MW solar farm near Moree (<https://arena.gov.au/knowledge-bank/moree-solar-farm-lessons-learnt-report/>) and the 102 MW solar farm near Nyngan (<https://arena.gov.au/knowledge-bank/agl-knowledge-sharing-report-6/>). Some of the lessons learnt from these projects include:

- Moving early to secure land options in the preferred location;
- Competent site selection and due diligence;
- Early engagement with network providers to understand connection protocols and the suitability of connection to the grid;
- Commissioning of inverters;
- Improved installation practices (leading to cost reductions);
- Integration of a new intermittent generation supply in a remote area of the grid;
- Etc

The lessons learnt are partially related to the project size (e.g. impact on voltage control of remote grids) but most of the lessons are project related and agnostic to scale. However, the successful completion of these projects had minimal impact on the cost of the key modular component being the solar panel, which was likely the most expensive component. It is unclear whether the same lessons could have been learnt with smaller projects, which could have been achieved at a lower cost through lower purchase of the modular solar PV panels.

Similarly, setting a minimum size of 50 MW for an electrolyser plant, which as mentioned above will be built from modular 2 or 5 MW size electrolyser stacks may not necessarily lead to the right lessons to be learnt.

ENA recommends redefining this Eligibility Criteria by referring to “significant scale up from existing operating projects to inform further scaling up and commercialisation of renewable gas technology”.

This change would also support the inclusion of biomethane projects as an eligible fuel as most of the biomethane projects are at smaller scale than 50 MW.

3. Funding Allocation

The Consultation paper outlines the Government’s funding allocation to Hydrogen Headstart.

Biomethane is a flexible and proven emissions-reduction solution, particularly where electrification is not practical, cost-effective, or desirable. With mature, commercially viable technologies already driving widespread global adoption, demand internationally is expected to grow by 15% annually over the next decade (based on today’s policy settings). Recent studies confirm that Australia has significant untapped potential. With abundant bioresources and strong agricultural foundations, it is well placed to position biomethane as a key part of its broader decarbonisation strategy.

Australia has a diverse range of feedstocks well-suited to anaerobic digestion making biomethane a technically mature, low-risk solution. Additionally, biomethane can be distributed through the existing gas networks, solidifying its central position in the energy system.

The first 50 PJ p.a of biomethane can be brought to market at between 10 and 27 \$/GJ. Technology allowing for the production of biomethane at scale is evolving and the market for biomethane is limited by the current cost of production. While demand is expected to grow and improvements in technology are expected to drive down production costs, there remains a number of challenges faced by first movers in this sector. Further support is needed to bring down biomethane costs and enable market development and increase supply potential.

Targeted policy support for biomethane is essential to develop this market and free up natural gas for LNG export.

ENA recommends that modifying the existing funding allocation could increase the opportunities for renewable gas and provide additional opportunities to decarbonise.

The proposed policy amendments could include:

- Extend the Hydrogen Headstart program to include all renewable gases, ie biomethane.
 - There would be no cost to the Budget as funds have already been allocated to this program as part of the Future Made in Australia legislation.
 - A separate sub target for renewable hydrogen and biomethane could be set to ensure both technologies can develop.

- Expand the Hydrogen Production Tax Incentive to include biomethane and rename it as the Renewable Production Tax Incentive. This would provide an incentive for companies to commence medium to large scale production of biomethane in Australia at a time when the biomethane market is still developing.
 - There would be no additional costs to government.
- Introduce a national Renewable Gas Target for industry that will propel innovation, reduce costs, boost supply chains, enhance economies of scale and drive decarbonisation solutions that are critical to the long term sustainability of Australian industry.
 - There would be no additional costs to government.

4. Proposed Funding Mechanism - Value for Money

ARENA's assessment of value for money should move beyond a narrow focus on lowest dollars per kilogram production cost to better reflect the full costs and risks of delivery. While large scale projects may appear more cost effective on paper, they often depend on complex delivery models involving major infrastructure, long term offtake arrangements and significant capital investment that can be difficult to deliver.

A more balanced approach that takes into account storage, transport, shared infrastructure, project maturity and likelihood of execution would provide a more realistic view of value and support projects that are genuinely ready to proceed and deliver outcomes.

ENA recommends that a criteria for project evaluation includes a metric of \$/”lessons learnt” instead of \$/kg H₂ produced.

9. Portfolio Approach

The proposed design notes that ARENA may adopt a portfolio approach to deciding which projects will be awarded funding. The six shortlisted projects for Hydrogen Headstart round 1 had strong elements of providing hydrogen as feedstock to an ammonia process with the two projects shortlisted for funding support being strongly focused on ammonia production (one for a new project and the other for retrofitting an existing ammonia facility).

As noted in the hydrogen strategy and above, there are other industries and end uses where renewable hydrogen can lead to decarbonisation.

ENA recommends that ARENA adopts a portfolio approach for Hydrogen Headstart round 2 by prioritising those other uses over other projects that mainly focus on ammonia.