HIRINGA ENERGY

AUSTRALIAN CARBON CREDIT UNIT (ACCU) REVIEW - RESPONSE

Australian Government

Department of Climate Change, Energy, the Environment and Water

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CONSULATATION RESPONSE

Who we are

Hiringa Energy is a privately owned hydrogen company founded in New Zealand, with a strategic focus on hydrogen solutions for hard-to-abate sectors including chemical feedstocks and heavy transport. Hiringa is active in Australia with a Sydney-based team, pursuing this strategy including via the Good Earth Green Hydrogen and Ammonia ("GEGHA") project in partnership Sundown Pastoral Company, with assistance from the NSW Government's Hydrogen Hubs Initiative – see www.gegha.com.au.

Since 2016, Hiringa has been developing low-carbon hydrogen production projects to supply industry, agriculture and transport, including utility-scale wind and solar to hydrogen and ammonia production. In mobility, Hiringa is currently installing and commissioning the first phase of a low-carbon hydrogen refuelling network in New Zealand, with four high-capacity sites in the North Island to be online by the end of 2023. A similar network is in the planning stages for Australia.

What we think

Hydrogen and its derivatives are potentially material pathways to abatement in Australia, and this response is hydrogen-oriented. It leverages Hiringa's on-the-ground, international and domestic project development experience to advise what we believe are critical opportunities to improve operation of the Australian Carbon Credit Unit ("ACCU") Scheme to better attract and accelerate carbon abatement projects which support Australia's emissions reduction commitments.

Broadly, Hiringa support the introduction of a transparent, proponent-led process for developing and modifying methods as soon as practicable. By accepting all Independent Review recommendations,[1] we appreciate that the Australian Government has identified an opportunity to increase the Scheme's participation, innovation, flexibility, responsiveness and adaptability to better capitalise on contemporary technology options and a globally competitive project landscape. In our view, the most important finding from the Independent Review was in relation to recommendation 5, that *'it is important to provide incentives for all emissions reduction options'*.[2]

While we applaud the actions already undertaken, further changes are required (in addition to those proposed) to fully leverage Australia's carbon abatement potential.

The current approach will result in a missed opportunity to maximise the decarbonisation potential from hydrogen projects in Australia, due to the diversity of use-cases, fragmentation of users, and impracticality of registering a large number of projects by such a diverse group of users.

We believe these challenges can be overcome via further reform, both within and outside the scope of this discussion paper. We also believe that doing so should be prioritised by the Department of Climate Change, Energy, Environment and Water ("DCCEEW") because of hydrogen's unique potential to decarbonise several of Australia's hardest-to-abate, highest-emitting sectors.

[1] See https://www.dcceew.gov.au/sites/default/files/documents/independent-review-accu-exec-summary.pdf
[2] See page 6, Executive Summary - Final Report Recommendations and Key Findings | December 2022 (dcceew.gov.au)

Hiringa's response to the 2023 *National Hydrogen Strategy Review* ("NHS Review") advocates for the prioritisation of domestic end-use projects over exports. Part of our reasoning is the importance of Australia's decarbonisation over isolated economic benefit. However, fiscal recognition of carbon abatement continues to play a substantive role in determining project commerciality.

The ACCU Scheme is a material driver in not only incentivising onshore investment, but ensuring projects target domestic end-use and associated domestic abatement. Recognition of hydrogen-related abatement must be in addition to generation-style credits, else Australian projects may seek to be developed to support foreign jurisdictions meet their own decarbonisation commitments – as is the current focus of much of Australia's hydrogen industry, with limited progress (as noted in the NHS Review and our submission).

A general recognition of hydrogen-related abatement value is desirable – like LGCs and SMCs

To illustrate the importance of ACCU-related revenue in hydrogen projects, if the parameters were an assumed notional abatement average of 20 tCO_2e per tonne of hydrogen in use (for example, in substitution of diesel liquid fuels, or methane-based feedstocks) and assuming a \$40/tCO_2e ACCU price, then the abatement value in ACCU terms would be equivalent to \$0.80/kg. For Guarantee of Origin ("GO") measured carbon intensity of 2.4tCO2e per tonne of hydrogen[3], this embedded carbon in hydrogen manufacture would be subtracted, and the net value would be reduced to \$0.704/kg.

Access to this abatement value – in our submission, we describe this as an **"Australian Hydrogen Abatement Certificate" or AHAC** – would represent a material, long-term, durable basis to support the hydrogen industry and associated abatement of sectors including heavy transport, agriculture, chemical manufacturing, and others beyond Hiringa's scope of activity. It would also support both the onshore manufacturing of currently-imported, emissions-intensive inputs to the Australian economy (such as diesel, jet fuel, ammonia and fertilisers), and value-adding activity associated with upgrading Australian export in a low-emissions manner (such as beneficiation of raw iron ore towards 'green steel').

An AHAC would accrue to a producer, rather than the user creating the abatement. It would not be the same as an ACCU, but would be related to it, in terms of value and in representing (more broadly) abatement. There are already precedents for building Australia's emissions-reduction architecture in this way around the 'blue chip' standard of ACCUs, including Safeguard Mechanism Credits ("SMCs"), and the convergence of the value of LGCs or successor Renewable Energy Guarantee of Origin ("REGO") certificates with ACCU-measure abatement value.

Both SMCs and LGCs/REGOs address sector-specific abatement outside the strict scope of ACCU methods (including addressing the certificates to producers in the case of LGCs / REGOs), while being accepted as an appropriate policy mechanism to support the abatement ultimately being created. The complexity of the multiplicity of hydrogen (and hydrogen-derivative) use-cases and users (many potentially relatively small) are a strong basis to create another hydrogen-specific, producer-facing, but ACCU-linked, policy mechanism of this type.

One potential option is to develop a suit of hydrogen methods or modules for a relatively small number of AHAC types, using a 'cradle-to-gate', rather than 'cradle-to-grave' lifecycle assessment.[4] Based on the embedded carbon intensity of those products, which could be supported by GO architecture, a conservative estimate could be placed on the abatement value depending on the category of end-use. For example, a hydrogen-based transport module

[3] Based on the UK threshold for their Low Carbon Hydrogen Standard of 20gCO_2e/MJ_{LHV}, and hydrogen's LHV of 120MJ/kg.
[4] See GP-RGCP-Consultation Paper-Final-extended.pdf (greenpower.gov.au)

could be developed based on an assumed fleet-average carbon abatement value for displacing diesel, based on the most likely use-case of heavy trucks.

Hydrogen's carbon abatement potential

Hydrogen and its derivatives possess unique characteristics making it the efficient technology vector to decarbonise several of Australia's hardest-to-abate sectors. By definition, a 'hard-to-abate' sector is one where the efficient abatement cost is relatively high, particularly when the need for a sector-wide scale of the solution is considered.

There are some particular cases where sectoral characteristics drive high abatement cost, but also tend to favour hydrogen as the efficient solution - including:

- **Incumbent cost is high:** Hydrogen may have the opportunity to compete with relatively expensive incumbent high-carbon alternatives – such as the value in energy-equivalent terms of diesel. In energy units of GJ (used more typically for methane gas), diesel at a typical terminal-gate price of A$2/L[5] is about A$40/GJ. We note this is the level which AEMO considers to be high enough to cap the rolling-average wholesale methane gas spot market in extreme conditions,[6] given it corresponds to an electricity cost of over $300/MWh assuming a typical combined-cycle gas turbine efficiency. Diesel is a relatively expensive source of energy, which assists hydrogen to compete.
- **Hydrogen (or derivatives) already in use:** Hydrogen is already used widely as a chemical feedstock, but often needs to be converted from fossil fuel sources, for example in the process of steam methane reforming. This precursor process adds additional cost to the methane feedstock, which again supports the relative economics of directly supplying hydrogen and avoiding the cost of this process. Importantly, by definition the market already exists which is very supportive for long-term firm offtake and therefore, project investability.
- **Hard to serve the user:** Geographic isolation and dispersion of customers and uses can raise abatement cost challenges – and so, may suit distributed deployment of hydrogen manufacturing close to customers at medium scale. This is especially the case when primary energy input from renewable electricity is also local – which may more than compensate for diminishing returns to scale compared to more centralised production.

Examples of hard-to-abate industries which possess these characteristics, where hydrogen is well-placed to drive decarbonisation, include:

- **Agriculture**, which contributes ~80% of Australia's nitrous oxide emissions (via ammonia and other fertilisers)[7] and ~13% of total greenhouse gas emissions.[8] Agriculture will be a sectoral focus for Australia's 2035 national abatement target;[9] and
- **Heavy transport**, responsible for ~19% of domestic emissions with road freight accounting for ~38% of that total.[10] Government projections indicate emissions from articulated and rigid trucks will continue to increase until 2030 where they will be 6 $MtCO_2e$ higher than 2005 levels.[11] Hydrogen and hydrogen

[5] See: https://www.aip.com.au/pricing/terminal-gate-prices
[6] See: https://aemo.com.au/en/energy-systems/gas/short-term-trading-market-sttm/data-sttm/set-gas-market-prices
[7] See https://www.agric.wa.gov.au/climate-change/reducing-nitrous-oxide-emissions-agricultural-soils-western-australia
[8] See https://www.climatecouncil.org.au/resources/australia-agriculture-climate-change-emissions-methane/
[9] See https://www.dcceew.gov.au/climate-change/emissions-reduction/net-zero
[10] ClimateWorks (2020). Decarbonisation Futures
[11] The Department of Industry, Science, Energy and Resource (2021) Australia's Emissions projections 2021

derivatives are also well-placed to address other heavy transport sectors including shipping and segments of the aviation industry.[12]

Taking agriculture as an example:

Average Australian fertiliser consumption was ~5.4 Mt p.a. between 2012 - 2017. Based on more recent nitrogen consumption data attributed to the fertiliser industry,13 in 2020 ~1.9 Mt of high-carbon ammonia was consumed as a feedstock to support domestic consumption of ~3.9 Mt of fossil fuel-based nitrogen fertilisers.[14] While much of Australia's nitrogen-based fertiliser market is imported, looking at global averages for synthetic nitrogen, ~59% of emissions are associated with use, with the remaining 41% tied to production and transportation.[15] As such, there is significant carbon abatement potential through adoption of low-carbon hydrogen-based nitrogen fertilisers within Australian agriculture.

Hiringa Energy and Sundown Pastoral Co are undertaking the Front-End Engineering Design ("FEED") process for our Good Earth Green Hydrogen and Ammonia ('GEGHA') project, with Financial Investment Decision ("FID") planned for 2024. GEGHA will see an integrated solar energy to hydrogen and ammonia operation implemented at the Wathagar cotton ginning facility in northern NSW, producing low carbon and traceable cotton for export. GEGHA was purposely scoped based on Sundown's anchoring offtake requirements and will deliver ~3,800 tpa of low-carbon anhydrous ammonia (equivalent to displacing ~6,800 tpa of imported high-carbon urea) to Sundown and neighbouring agribusinesses, via 12 MW of electrolysis capacity[16] supported by 27 MW of on-site solar PV.

The GEGHA project demonstrates an important use-case for the abatement potential of low-carbon hydrogen within regional hard-to-abate sectors including agriculture, industrial manufacturing and heavy transport. In additional to ammonia as a fertiliser, GEGHA facilitates direct use of hydrogen on-farm to replace LPG in cotton drying, and diesel in irrigation pumping and mobile farm equipment, as well as on-road for heavy vehicle refuelling in the region – including the logistics of moving agricultural produce to port.

The project concept is scalable and repeatable, with feasibility underway for a 50 MW project capable of producing 20,000 tpa of low-carbon ammonia to service demand more broadly in agricultural 'valleys' at low distribution cost, compared with inland distribution from remote coastal imports.

Challenges for hydrogen abatement under and Proponent-led approach

Hydrogen projects face significant structural challenges under the priority development framework. The proponent-led process will deliver greater flexibility and adaptability to better accommodate hydrogen's potential, but the same barriers persist which will continue to limit abatement outcomes at scale.

These include:

[12] An area where Hiringa is partnering with Air NZ and Airbus: https://www.airnewzealand.com.au/press-release-2022-air-new-zealand-announces-mission-next-gen-aircraft-partners

[13] See https://fertilizer.org.au/Portals/0/Documents/Publications/Information%20and%20Education%20Paper%20-%20The%20Australian%20Fertilizer%20Industry%20review%202021.pdf?ver=2021-11-29-005345-453

[14] Ammonia feedstock estimate based on ammonia comprising 82kg of nitrogen (N) per kg of ammonia (NH_3), and 1.6 million tonnes of N applied to soil, assuming that all N originated from an ammonia source.

[15] See https://www.nature.com/articles/s41598-022-18773-w#change-history

[16] See: www.gegha.com.au and https://www.abc.net.au/news/rural/2023-08-07/sundown-pastoral-hiringa-energy-green-hydrogen-ammonia-moree/102696380

- **Diversity of use cases:** Given ACCUs are created based on the additional abatement associated with specific activities, there needs to be a large number of methods developed to cover the quite diverse use cases of hydrogen. An example of this might be the use of hydrogen in transport as a diesel or petrol substitute, where actual abatement will vary based on the types of vehicle, ranging across hydrogen fuel cells, hydrogen combustion, dual-fuel partial substitution, on and off-road vehicles, and vehicles ranging in size from small cars to the heaviest trucks.
- **Fragmentation of users:** Given ACCUs accrue to the entity creating abatement, the transport example also highlights a challenge, where the end-customers may range from major transport operators through small businesses (such as many smaller trucking operators) to individual drivers.

Applying these issues to the GEGHA project –

Many of Australia's hard-to-abate sectors are hard-to-abate due to the inappropriateness of previously available decarbonisation tools and models. The GEGHA model seeks to overcome traditional hard-to-abate barriers by implementing innovative, decentralised and localised medium-scale hubs which leverage 'sector coupling' in regional areas to efficiently decarbonise agriculture, industrial manufacturing and heavy transport.

Problematically, from an ACCU perspective this creates significant challenges in developing individual methods for each use-case and end-user. For example, even within agriculture there are various potential end-uses including different agricultural commodities, farming techniques and application styles, as well as fertiliser types which may be substituted via a low-carbon solution. It is not practical let alone commercial for Hiringa to drive individual method development for a diversified range of potential offtakers – particularly where prima facies, as the producer rather than the user of the low-carbon substitute product – it would receive no ACCUs and no financial benefit.

A key finding of the Independent Review is that a 'proponent-led method development model would promote innovation by giving proponents the flexibility to develop or adapt new approaches to carbon abatement'. While this is true compared to the priority-setting process, what has been proposed does not adequately resolve these challenges to the extent required to meaningful impact the availability of hydrogen projects to support Australia's decarbonisation ambitions. In our view, what has been proposed falls short of realising effective facilitation of innovative carbon abatement solutions.

Feedback on aspects of the proposed proponent-led framework

'Modules approach'

Hiringa supports the proposed 'modular' approach for changing methods to allow for particular ways of implementing one or more existing methods to account for regional or other circumstances. This is a positive change which will partly address the aforementioned structural barriers prohibiting abatement through hydrogen projects.

Care should be taken in how strictly a modular approach is applied. We acknowledge the importance in upholding the Scheme's integrity, however too rigid an application will discourage applicability to hydrogen investment. A modular approach may bring about greater revenue certainty (ACCU credits) or 'bankability' where projects have diversified, flexible or uncertain offtake compositions.

We encourage further consideration for how this could be applied to capture various use-type and end-use categories more broadly.

Promoting participation and efficiency

We acknowledge the steps taken to minimise the application burden for new method development, and in particular to fast-track Expression of Interest ("EoI") development. Broadly, we support:

- The open-mindedness of DCCEEW to explore different support models including cost-recovery, and other departmental facilitation support. We do not support grants, because the application process is yet another layer of time and resource burden, and the outcome of that process in itself is uncertain.
- Facilitating stakeholder collaboration where method developers bring forward similar proposals to the Integrity Committee. However, this process should be managed carefully, and it may be limited in its success because method developers working on similar projects may be reluctant to disclose information or ideas, as this may give an indication to pipelined investments or other trade secrets.

Even factoring available support the proponent-led process will be costly, both in terms of elapsed time and resources. In our opinion very few proponents are likely to invest that time, given the cost and uncertainty of outcome, and the fact that the application may be quite narrow, or reliant on customers registering projects and receiving ACCUs, not proponents.

While well-intended, a proponent-led process may actually favour larger stakeholders due to increased availability of capital and resources, but also because the projects undertaken by those proponents are likely to be larger scale, and as such derive a greater financial benefit if successful (justifying the investment). While this is positive in terms of abatement delivered, it is not truly equitable, nor does it support rural or remote communities who are generally speaking, not the primary concern of large stakeholders likely to be driving method development.

Timeframes

The discussion paper gives various indications for the timeframe in which methods and modules may be developed, ultimately allowing for a period of up to 2 years. We note that in the context of a hydrogen project potentially requiring one or more new methods, this is a prolonged timeframe if the ACCU method is (as it should by definition be) a critical support required for a project to move forward. It is incompatible with ambitions of the hydrogen industry to increase its speed of deployment, which is one of the key concerns noted in the NHS Review.

Australian Government purchasing of ACCUs

We support the Australian Government targeting ACCU purchase to encourage new method development, innovation and to stimulate broader economic and social outcomes. In particular we believe industry will find targeted or banded auctions for specific themes, participants or activities an attractive delivery mechanism. In this way the ACCU process could be formally leveraged to implement outcomes arising from review of the National Hydrogen Strategy.

We welcome further discussion on any matters set out in our reply.

Yours faithfully,

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