# Australia's hydrogen policy compendium: A state of play for the enabling ecosystem

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## The hydrogen policy environment

The Australian Government is undertaking a programme of systemic reform, including publishing a Net Zero Plan, enabling regional development through a new Net Zero Economic Authority, funding infrastructure and technology through enhanced industry policy, and attracting private investment through large scale tax credits and other subsidies through the Future Made in Australia policy package.

Figure 1 shows the current array of Australian Government policy measures that are relevant to hydrogen. This is not an exhaustive list and is provided for illustrative purposes. This document discusses the most important measures from this list for the development of the clean and green hydrogen industry, as shown in Table 1.

| Measure | Policy intent |
|---|---|
| The Safeguard Mechanism | Pricing carbon emissions from heavy industry |
| National Hydrogen Strategy | Setting the strategic intent for the emerging hydrogen industry |
| The Guarantee of Origin Scheme | Certifying carbon emissions |
| Sector decarbonisation plans and the overarching Net Zero Plan | National planning to get to net zero |
| Future Made in Australia Bill | Ensuring major funding support is in the national interest |
| Hydrogen Production Tax Credit and Hydrogen Headstart rounds | Providing hydrogen-specific financial support |
| Carbon Leakage Review | Exploring the need for a Carbon Border Adjustment Mechanism |
| AEMO's Integrated System Plan (ISP) | Planning for renewable electricity infrastructure needs |
| Capacity Investment Scheme | To promote certainty in renewables and storage capacity investments through revenue underwriting |
| Sustainable Finance Roadmap, taxonomy and green bonds | Sustainable finance reform to mobilise private capital and provide transparency |
| The National Energy Workforce Strategy | Planning a workforce to meet the energy transition challenge |
| National Electric Vehicle Strategy | To support uptake of electric passenger vehicles |

*Table 1: Key policy measures for the emerging hydrogen industry*

We address the current state of play as well as the AHC's policy positions, which are in turn discussed in greater detail across a range of submissions made to government consultations.[1]

[1] AHC (2025) *AHC submissions*, https://h2council.com.au/ahc-submissions/.

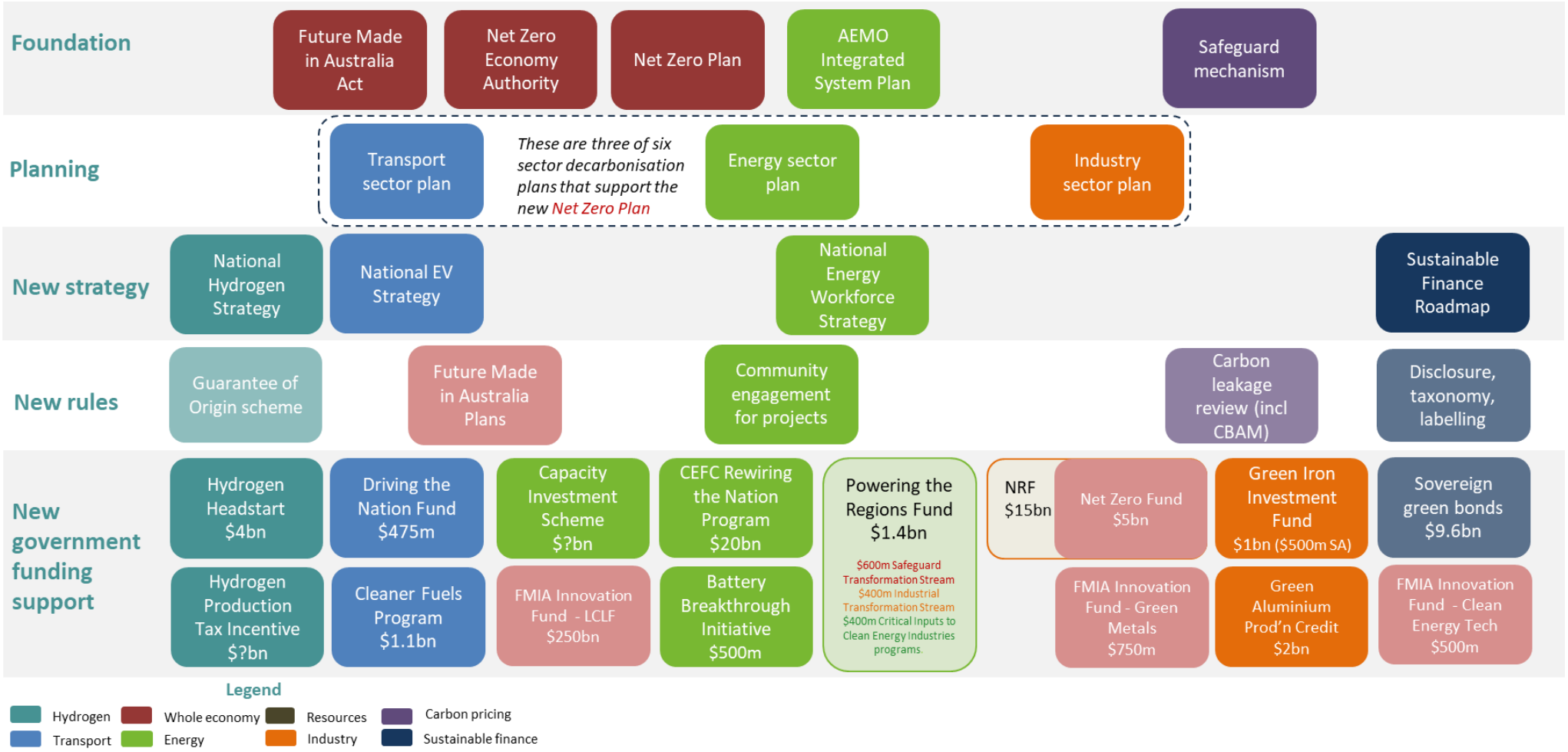


*Figure 1: Australian federal policy environment – key elements for hydrogen*

# 1. The Safeguard Mechanism

**FOUNDATION POLICY – CARBON PRICING**

**Description and status**

The Safeguard Mechanism[2] is the Australian Government's policy for reducing emissions at Australia's largest industrial facilities. The policy sets legislated limits on the greenhouse gas emissions per facility. These limits ('baselines') decline over time, requiring the facility owners to plan for, and invest in, decarbonisation initiatives. While the original Safeguard Mechanism commenced in 2016, it was reformed in 2023 to tighten the baselines and better ensure emissions reductions.

The Safeguard Mechanism applies to industrial facilities emitting more than 100,000 tonnes of carbon dioxide equivalent ($CO_2$-e) per year. There were 219 safeguard facilities in the 2023-24 reporting year.[3]

As part of the Safeguard Mechanism reforms in 2023, the Department of Climate Change, Energy, the Environment and Water (DCCEEW) reviewed production variables[4] to ensure they remained appropriate and effective in meeting the emissions reduction objective. In 2024, a hydrogen emissions intensity target was introduced (for new facilities) at 7.13 t CO2-e/t of gaseous or liquefied hydrogen. This target is to inform a facility's baseline under the Safeguard Mechanism.

The government intends to review the Safeguard Mechanism policy settings in 2026-27.

## AHC position

The amended Safeguard Mechanism is the key government policy to ensure industry decarbonisation aligns with legislated net zero targets and is Australia's core replacement for a carbon price.

It is positive that the Safeguard Mechanism exists, but it does not go far enough.

The legislation only covers the emissions of the nation's highest emitters. It also does not go far enough to incentivise covered organisations to commit stronger or faster action. While there have been promising trials announced, the Safeguard Mechanism – in its role as a pseudo carbon price – will need to be bolstered to accelerate uptake of decarbonisation solutions and increase investment in production facilities for clean and green hydrogen and derivatives.[5]

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[2] DCCEEW (2025) *Safeguard Mechanism*, updated 20 October, https://www.dcceew.gov.au/climate-change/emissions-reporting/national-greenhouse-energy-reporting-scheme/safeguard-mechanism

[3] Clean Energy Regulator (2025) *2023–24 safeguard data highlights*, updated 1 August, https://cer.gov.au/markets/reports-and-data/safeguard-data/2023-24-safeguard-data-highlights.

[4] DCCEEW (2024) *Safeguard Mechanism: Prescribed production variables and default emissions intensities*, see https://www.dcceew.gov.au/sites/default/files/documents/safeguard-mechanism-document-production-variable-definitions-2024.pdf.

[5] AHC (2023) *A fit-for-purpose refreshed National Hydrogen Strategy: next steps for building Australia's hydrogen industry*, August, https://h2council.com.au/ahc-publications/.

In 2025, the Productivity Commission consulted on a range of recommendations to bring to the Australian Government, including a reduced emissions threshold for inclusion into the Safeguard Mechanism.[6] This proposed a lowering of the emissions threshold from 100,000 to 25,000 t $CO_2$-e/year, and had divisive responses. The AHC was supportive of the proposed strengthening of the Safeguard Mechanism but cautioned that this could require broader changes to support the increased number of facilities (more than double) and industries brought into the policy.[7] The Productivity Commission final report is due to the Australian Government in December 2025 and we can expect this advice to be considered within the 2026-27 Safeguard Mechanism Review.

Regarding the production variable emissions intensity target of 7.13 t $CO_2$-e/t of gaseous or liquefied hydrogen, it is unclear how this number was calculated.[8]

Furthermore, under the production variable, hydrogen is considered trade exposed. This refers to the risk of incurring a green premium and how this domestic decarbonisation can be potentially undercut and undermined by imported, emissions-intensive alternatives. Under the Safeguard Mechanism, this vulnerability is recognised and combatted with access to additional support and a potentially lower annual reduction in baseline for trade-exposed industries rather than the standard 4.9 per cent. Provided that Australia is trying to establish hydrogen and its derivatives at scale to address our hard to abate sectors and support our green advanced manufacturing ambitions, we need to protect our domestic production.

[6] Productivity Commission (2025) *Investing in cheaper, cleaner energy and the net zero transformation: Interim report*, Australian Government, August, https://www.pc.gov.au/inquiries-and-research/net-zero/interim/.
[7] AHC (2025) *Investing in cheaper, cleaner energy and the net zero transformation*, submission, 23 September, https://h2council.com.au/wp-content/uploads/2025/09/250923-PC-interim-report-AHC-submission.pdf.
[8] AHC (2024) *Safeguard Mechanism implementation: production variable updates and international best practice benchmarks*, submission, 22 January, https://h2council.com.au/wp-content/uploads/2024/01/240122-Safeguard-Rule-AHC-submission.pdf.

## 2. The National Hydrogen Strategy

**NEW STRATEGY – HYDROGEN**

**Description and status**

The original Australian National Hydrogen Strategy (NHS) was released in November 2019.[9]

A revision to the strategy was announced in 2023, with consultation starting mid that year.

In September 2024 the Australian Government released the final NHS,[10] which was also agreed with all states and territories. The 2024 NHS:

- Sets a 2050 renewable hydrogen production target of 15 million tonnes per year, and 30 million tonnes as a stretch target. There are 5-yearly volume milestones set from 2030.

- Sets a base export amount of 0.2 million tonnes, with a stretch potential of 1.2 million tonnes of renewable hydrogen (or equivalent in hydrogen embodied products) per year by 2030.

- Lists 34 actions, spread across all relevant sectors.

The NHS sets the context for further reports, such as the annual State of Hydrogen report, and 5-yearly National Hydrogen Infrastructure Assessments (from the next iteration, planned for 2025-26).

The NHS is also to be reviewed every five years.

### AHC position

The AHC developed a paper as an input to the Australian Government's process to refresh the NHS.[11] In this paper, we covered all the system elements that need to be in place to have the hydrogen industry develop in the Australian public interest and developed 53 recommendations to guide the thinking and policy making of the Australian and jurisdictional governments.

We were closely involved with the Australian Government's consultation process, with our CEO on the formal advisory group.

The 2024 NHS is very high level, which we understand is a result of it needing to stay relevant in a highly dynamic environment, including the fact of the six sectoral decarbonisation plans and other key policy still being in development. The general approach of the NHS and the major commitments surrounding it – such as the 2024-25 Budget announcements of the HPTI and Hydrogen Headstart

[9] COAG Energy Council (2019) *Australia's national hydrogen strategy*, November, https://www.dcceew.gov.au/energy/publications/australias-national-hydrogen-strategy.

[10] DCCEEW (2024) *National Hydrogen Strategy 2024*, Department of Climate Change, Energy, the Environment and Water, Canberra, September, https://www.dcceew.gov.au/energy/publications/australias-national-hydrogen-strategy.

[11] AHC (2023) *A fit-for-purpose refreshed NHS: next steps for building Australia's hydrogen industry*, August, https://h2council.com.au/ahc-publications/.

2.0 – reflect the positions we have put forward, but we seek clarity on a number of elements. We have mapped all recommendations across to our own and can provide this document on request.

The tables below provide a summarised version of our views and past recommendations. We have taken the NHS actions and allocated them to the following categories:

- Foundational matters
- Demand
- Funding and investment
- Infrastructure
- Industry capability.

*Foundational matters*

We have grouped the 2024 NHS targets and actions together in Table 2, which shows the foundational policy put forward in the NHS, and the AHC's brief commentary.

Overall, the targets appear reasonable, but the NHS does not provide a clear map about they were arrived at, or how the actions explicitly support the targets. We are seeking the NHS to be supplemented by further actions to meet targets and milestones, with responsibility clearly allocated.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| Targets | Australia will produce at least 15 million tonnes of renewable hydrogen per year, with a stretch potential of 30 million tonnes by 2050.<br>In addition to the 2050 hydrogen production target, Australia's progress will be measured against the following annual hydrogen base and stretch production milestones:<br>• 2030: 0.5 - 1.5 million tonnes<br>• 2035: 3 – 5 million tonnes<br>• 2040: 5 – 12 million tonnes<br>• 2045: 9 – 20 million tonnes<br>Australia will export a base amount of 0.2 million tonnes, with a stretch potential of 1.2 million tonnes of renewable hydrogen (or equivalent in hydrogen embodied products) per year by 2030. | The base level of the targets is consistent with mid cases of previous research. The NHS does not articulate how the targets might be met through the actions, and no modelling is publicly available (including through the Net Zero Plan). |
| Green credentials | **Action 1**: Focus government support on renewable hydrogen, complemented by suitable emissions intensity thresholds and other requirements for government-supported hydrogen projects, with GO certificates to form the basis of verification. | Policy is as expected. Note we have previously argued that the Australian Government should remain open to blue hydrogen projects for regions that can support it without unnecessarily delaying renewable/green hydrogen developments. |
| GO Scheme | **Action 30**: Implement the Guarantee of Origin scheme in 2025, and progressively increase the scope of the scheme to support the expansion of the hydrogen industry. | Agree. The GO scheme was successfully launched in 2025 as planned, an intent to expand. |

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| Community engagement and benefit sharing | **Action 19**: Support the coordinated production and dissemination of culturally appropriate and accessible education materials that provide factual information about hydrogen production, and the obligations of project proponents.<br>**Action 20**: Support the inclusion of specific criteria in funding program guidance and obligations in funding agreements with Australian governments that require proponents to adopt best practice when engaging with First Nations communities including benefit sharing.<br>**Action 21**: The Australian Government will encourage the hydrogen industry to adopt best practice stakeholder engagement, including through the development of a voluntary code of conduct, to maintain positive interactions with communities and industry. | The AHC has developed HyFAQ and is in the process of updating this. This resource and the work underpinning it should be used as a reference.<br>AHC progressed the code of conduct work (Action 5.3 under the 2019 NHS) and partnered with others to develop this. This will now be covered by the Australian Government's FMIA Community Benefit Principles which are in development. |
| Planning and implementation | **Action 28**: Monitor emerging risks to domestic hydrogen supply as part of the independent assessment undertaken for the annual State of Hydrogen report, and the 5-yearly review of the National Hydrogen Strategy.<br>**Action 34:** Publish an annual State of Hydrogen report centred around an independent assessment of progress. This will highlight emerging trends that may necessitate minor or urgent policy measures ahead of the next 5-yearly review.<br>**Action 32:** Complete a full review of the National Hydrogen Strategy every 5 years, with the review to include a focus on progress against the targets and milestones detailed in the strategy, and consideration of the need for additional policy measures. | Agree, and we have welcomed the collaboration with the Australian Government on these reports.<br>In the meantime, we are seeking the NHS to be supplemented by further actions to meet targets and milestones, with responsibility clearly allocated. Detailed implementation plans may need to be by sector or ecosystem element. |

*Table 2: Foundation matters addressed in the 2024 NHS and AHC comments on the actions set out*

### *Demand*

Table 3 shows the NHS actions relevant to hydrogen demand. As noted in the table, the AHC position is largely supportive, but we seek greater clarity on the work outlined in Actions 17 and 18, relating to transport and electricity grid support respectively. There is much more to be done across all areas in this table, as discussed through the original submission.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| Demand priorities | **Action 15**: Prioritise support for the development of Australian hydrogen for use in prospective export-facing industries, particularly green ammonia, iron and alumina. | Mostly agree – the AHC has argued for some time that it would be wise to prioritise the hard-to-abate sectors of the economy, and we have identified green chemicals and metals as particularly prospective. However, this action is silent on methanol, which can be produced as a low carbon liquid fuel and could be used in future shipping.<br>The Australian Government has clearly set its priority as domestic use but for export purposes – the action here can be mapped to the FMIA and national interest categories for government financial support. We discuss green metals and chemicals via a range of related policies in this paper. |
| Transport sector | **Action 17**: Support the targeted use of hydrogen for transport, either through direct use in hydrogen fuel cell vehicles or as a low-carbon feedstock for the production of low carbon liquid fuels, alongside support for other pathways like electrification and alternative fuels. | In principle this action is sensible but it is very high level and so it is not clear what the Australian Government sees as the problem to be solved or how this work will be led. This also merges all forms of transport, which complicates matters. We address road transport, aviation and shipping separately in this document.<br>We have previously argued for a national ZLEV strategy for heavy vehicles with both financial and non-financial incentives, as well as a range of analyses.[12]<br>This is also where methanol could be addressed through policy. |
| Electricity grid support | **Action 18**: Support analysis on how hydrogen can optimally support Australia's transition to renewables, including for energy storage, grid firming and via the flexible use of electrolysers. | As above, in principle this action is sensible but it is very high level and so it is not clear what the government sees as the problem to be solved or how this work will be led.<br>We have previously argued that the Australian Government should task AEMO and AEMC with undertaking a full energy market and grid impact analysis for wide scale adoption of electrolysers as flexible load in the electricity grid. This work can then inform more comprehensive net zero modelling.[13] |

*Table 3: Demand side matters addressed in the 2024 NHS, and AHC comments on the actions set out*

### *Funding and investment*

We have grouped several of the NHS actions into the topic of funding and investment, as shown in Table 4. This also connects to relationships with international partners.

[12] Ibid.; pp. 123-126.
[13] Ibid.; pp. 69 -71.

These provide a direction rather than detail, which makes sense for an industry that will take time to develop, and for a strategy that ideally stands the test of time and does not need frequent modification. Some of the actions are already in the process of implementation from past Budgets, such as Action 2, which can be seen as a description of the HPTI.

Overall, we support the approach set out and look forward to further developments.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| Finance reform | **Action 3**: Consider reforms that may further enable specialist investment groups to play a bigger role in supporting the hydrogen industry to mature and secure further finance through traditional capital markets. | Agree, but we seek clarity on process. This matter is urgent.<br>AHC investigated the role of specialist investment vehicles closely through 2025 and identified areas of inefficiency, duplication and gaps to fill.[14] |
| Funding the cost gap | **Action 2:** Provide early policy support to enable the scaling up of the hydrogen industry to achieve production costs that are competitive with incumbent fossil fuels and to secure early offtake agreements.<br>**Action 33:** Monitor the value of direct revenue support in the hydrogen sector and anticipate shifts that allow returns to taxpayers in the future. This will include considering trends in technology costs, international market developments (including policy support in competitor countries) and the pace at which the costs of carbon emissions are internalised within the most prospective hydrogen using sectors. | The NHS actions are high level but work with the FMIA, including the HPTI and Headstart. We have addressed other means of closing the financial gap through a variety of policy submissions.<br>We note that discussions on royalties are a long way away. |
| International partnerships | **Action 29**: Pursue opportunities to leverage investment from other countries who are willing to provide co-funding and make other efforts to build end-to-end global supply chains.<br>**Action 31**: Existing partnerships will be prioritised as vehicles for furthering our international hydrogen objectives. Australia will look for opportunities to grow global markets and build end-to-end supply chains. | Agree with the principle but we note that there have been some problems with our international engagement to date that need to be addressed.[15]<br>We have previously argued for the Australian Government to create an investment proposition to take to international markets. This work will need to be sufficiently funded and requires clear coordination across posts. The Australian Government should develop bespoke joint support packages between Australia and its trading partners that underwrite trade and support necessary infrastructure. We have welcomed the progress on the Australia- |

[14] For example: AHC (2025) *Strategic examination of Australia's R&D system*, submission, 11 April, https://h2council.com.au/wp-content/uploads/2025/04/250411-AHC-submission-Strategic-Examination-of-RD-.pdf ; AHC (2025) *Future Made in Australia Innovation Fund – Program design and consultation*, submission, 6 June, https://h2council.com.au/wp-content/uploads/2025/06/250606-ARENA-FMIA-Innovation-Fund-AHC-submission.pdf ; AHC (2025) *Net Zero Fund proposed design*, submission, 17 October, https://h2council.com.au/wp-content/uploads/2025/10/251017-Net-Zero-Fund-AHC-submission.pdf.

[15] AHC (2023) *A fit-for-purpose refreshed NHS: next steps for building Australia's hydrogen industry*, August, https://h2council.com.au/ahc-publications/, pp. 51-58.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| | | Germany H2Global Joint Tender amongst other bilateral developments. |
| Investment attraction | **Action 22**: Continue efforts across all levels of government to improve the efficiency and effectiveness of regulatory approval processes for safety and environmental protection. | Agree, and we note the FMIA 'front door for investors', which is what we have recommended in the past. This needs to be part of the investment proposition mentioned above. |

*Table 4: Funding and investment matters addressed in the 2024 NHS, and AHC comments on the actions set out*

### *Infrastructure*

The 2024 NHS has a strong infrastructure focus, with many of the actions relating to further analysis and required collaboration with the states and territories. We support the actions as set out and now encourage further Australian Government engagement on the detail. Table 5 provides the relevant NHS actions and our brief responses.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| Hubs and precincts | **Action 4**: Support the integration of hydrogen hubs into the broader scoping, planning and development by Australian governments of industrial precincts. | Agree, this aligns with our recommendation to create Hydrogen Economic Zones or precincts to support regional hydrogen initiatives and connect the relevant supply, demand, infrastructure and workforce.[16] We recommend more Australian Government leadership to support regional development in the national interest and welcome the involvement of the Net Zero Economy Authority. |
| NHIA | **Action 5**: Deliver the next iteration of the National Hydrogen Infrastructure Assessment over 2025 and 2026 in consultation with key infrastructure planning agencies, with subsequent analysis conducted at least every 5 years. | Agree. We note page 50 of the NHS says that consideration will be given to the need for additional analysis to inform the NHIA, which could include:<br>• hydrogen storage needs for different purposes, timeframes and locations<br>• hydrogen pipeline corridors, easements and route alignment<br>• water infrastructure needs, underpinned by the best available science<br>• port capability and capacity, shipping routes and refuelling requirements heavy transport infrastructure needs.<br>We have previously discussed each of these matters in some detail[17] and strongly agree these should be addressed in further analysis, both to support the NHIA and for other policy and planning. |
| Pipelines | **Action 6**: The Australian Government will work with the states and territories and other experts to improve understanding of future | Agree. We previously recommended that the government should develop a national |

[16] Ibid.; pp. 63-65.
[17] Ibid.; pp. 61-87.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| | hydrogen transport needs to inform the next iteration of the National Hydrogen Infrastructure Assessment. | assessment of hydrogen pipeline corridors, easements and route alignment.[18]<br>This work would then inform further policy on necessary coordination, co-funding and regulation. |
| Ports | **Action 9**: Consider the readiness and prospects of ports to store and export hydrogen, import renewable energy components, and to provide safe marine refuelling using low-carbon liquid fuels such as hydrogen, ammonia and methanol. | Agree, but this action is very high level. We have previously recommended[19] that the Australian Government also:<br>• Undertake to support port redevelopments to 2045. The national assessment will clarify what is required, but at the time of the AHC submission, this was expected to be around A$20-$30 billion<br>• Engage with shipping companies operating in Australia and peak bodies to analyse and report back on:<br>  • Current shipping routes.<br>  • Fuels in which they are investing, the relative energy densities of options, and requirements to refuel.<br>  • Bunkering in Australia, to understand if products (including fuels) are to be transported from southern Australia, what the impact is on key matters such as the total journey length and requirement to refuel.<br>  • Opportunities for demonstration projects at suitable ports. |
| Storage | **Action 7**: Support Geoscience Australia's precompetitive data program to identify suitable sites for hydrogen storage opportunities.<br>**Action 8**: Support the establishment of fit-for-purpose and nationally consistent regulatory arrangements for the geological storage of hydrogen. | Agree, but these actions appear unnecessarily limited in scope by focussing only on salt caverns and the remit of Geoscience Australia.<br>We have previously recommended[20] that the Australian Government should assess:<br>• The economic benefit of hydrogen storage, including in supporting the electricity system.<br>• The need for different types of storage for hydrogen, at what scale/volume and in what timeframe.<br>• The fitness for purpose of existing storage measures, including current and new salt caverns, depleted gas reservoirs, line packing in pipes, and above-ground solutions. |

[18] Ibid.; pp. 75-78.
[19] Ibid.; pp. 79-80.
[20] Ibid.; pp. 80-84.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| | | • If more storage is required, the next steps to develop this as needed, including cost recovery mechanisms as required for users.<br>We have also recommended that Australian Government support common user storage developments to 2045. There is a particular need to fund demonstration and pilot projects for large-scale underground hydrogen storage. |
| Water | **Action 25**: Report annual project water consumption by the hydrogen industry through the annual State of Hydrogen report.<br>**Action 26**: To support infrastructure planning by companies and water-planning agencies, future National Hydrogen Infrastructure Assessments will include a focus on water demand and availability for hydrogen production.<br>**Action 27**: Support the consideration of water demand associated with hydrogen production in the development of a new National Water Initiative as a complement to water management policy and frameworks in operation at a state/ territory level. | Agree. There is perhaps a stronger role here for the Australian Government though – we previously argued[21] it should engage across the hydrogen and water divisions and with water utilities and state/territory jurisdictions to analyse and report back on:<br>• Total water availability, mapping across Hydrogen Economic Zones.<br>• The role of the hydrogen industry in maintaining Australia's water balance.<br>• A national plan with water utilities that specifically addresses likely needs and timeframes for manufactured water and water infrastructure for hydrogen. |

*Table 5: Infrastructure matters addressed in the 2024 NHS, and AHC comments on the actions set out.*

### *Industry capability*

Table 6 shows a group of NHS actions that relate to industry capability and how it can be enabled and supported through government policy, planning, and regulation. The topics include RD&D, regulation (primarily safety), workforce and skills development, and manufacturing. We have also included a topic we called demand support, which relates to supporting hydrogen users adopt hydrogen (NHS Action 16).

The topics in the industry capability category are the least developed in the NHS, which leads to important knowledge and operational gaps in the enabling environment for the nascent hydrogen industry.

Whether this relates to under-funded RD&D, gaps in the regulatory framework that lead to uncertainty, a lack of skilled people for the future workforce. We are interested to work with governments to unpack the issues and assist with further policy recommendations and design.

[21] Ibid.; pp. 73-75.

| Topic | 2024 NHS | AHC comments |
|---|---|---|
| RD&D | **Action 11**: Identify opportunities that leverage Australia's research, development and demonstration (RD&D) capabilities to advance hydrogen technology manufacturing in Australia.<br>**Action 13**: Australia will seek opportunities to increase RD&D investment in the TRL 4-6 range through programs and grants, including through ARENA.<br>**Action 14**: Identify opportunities to work with partners on RD&D and position Australia at the forefront of international hydrogen-related research collaboration. | Agree, but these actions could be more specific given what we know already. We have previously suggested the priority topics and next steps.[22]<br>We welcome the focus on TRL 4-6, but the appetite for further policy support is not clear. (Note RD&D on storage is covered with Geoscience Australia action on salt caverns).<br>Overall, the RD&D environment in Australia is concerning, with funding that is fundamentally misaligned with Australia's ambitions to be a leader in innovation and technology. Future limits to international students, with the associated reduction in tertiary funding, will radically increase the existing gap between capacity and ambition. |
| Regulation | **Action 23**: Support the development and adoption of the National Hydrogen Codes of Best Practice in relation to hydrogen and ammonia.<br>**Action 24**: Consider the need for expert forums or bodies to advise governments on safety and environmental protection issues to ensure that best practice approaches are being employed. | Agree, but we note that the Codes still lack context, have an unclear audience and are not proposed to be kept updated.[23] We have previously suggested that the Australian Government identify regulatory gaps and reform opportunities and lead a programme of reform to meet the refreshed NHS targets and milestones.[24] Further engagement with international jurisdictions is encouraged. |
| Workforce | **Action 12**: Support workforce development initiatives at all levels of government in line with responsibilities, with reference to analysis and guidance from key institutions including the Department of Employment and Workplace Relations, Jobs and Skills Australia, and the Jobs and Skills Councils. | Agree, but this action could be more specific and we have previously sought clearer leadership on this matter and workforce modelling (see item 12 in this Appendix).<br>We aware of work at the jurisdictional level that we hope will be inform national policymaking. |
| Manufacturing | **Action 10**: Support the development of sovereign clean technology and emissions-reduction manufacturing industries. | Agree, and we have previously outlined steps to take.[25] Ideally this is managed through DISR as well. See also RD&D above. |
| Demand support | **Action 16**: Work with industry to understand barriers and challenges to hydrogen adoption in prospective domestic sectors, including in the context of developing sectoral decarbonisation plans for energy, industry and transport. | Agree, noting that that the understanding should then lead to measures to prevent or avoid unreasonable barriers. |

*Table 6: Industry capability-related matters addressed in the 2024 NHS, and AHC comments on the actions set out*

[22] Ibid.; pp. 109-115 and AHC (2025) *Strategic examination of Australia's R&D system*, submission, 11 April, https://h2council.com.au/wp-content/uploads/2025/04/250411-AHC-submission-Strategic-Examination-of-RD-.pdf.

[23] AHC (2025) *National Hydrogen Regulatory Review (National Hydrogen Regulatory Guidebooks)*, submission, 2 September, https://h2council.com.au/wp-content/uploads/2025/09/250902-Regulatory-Guidebooks-AHC-submission.pdf.

[24] AHC (2023) *A fit-for-purpose refreshed NHS: next steps for building Australia's hydrogen industry*, August, https://h2council.com.au/ahc-publications/, pp. 115-120.

[25] Ibid.; pp. 67-69, 105-108.

## 3. The Guarantee of Origin

**NEW RULES - HYDROGEN**

**Description and status**

The Guarantee of Origin scheme (GO scheme)[26] is an emissions accounting framework that allows buyers of hydrogen to have confidence in the low emissions claims of producers.

Intended to align with international methodologies, this is Australia's primary means of certifying the emissions intensity not only of hydrogen, but an increasing portfolio of products.

The GO scheme is run by the Clean Energy Regulator (CER) and will allow for a range of variables to be measured, tracked and reported on, and discussions are in progress to extend the coverage of the scheme to a range of other products, such as biogas and green metals.

The GO scheme does not set a policy view on what is an acceptable level of emissions intensity; rather, it provides the means by which covered products can demonstrate compliance with any external emissions requirement.

The GO scheme is voluntary, but compliance is mandated through key Australian Government funding mechanisms, such as Hydrogen Headstart and the Hydrogen Production Tax Incentive.

In September 2024, the *Future Made in Australia (Guarantee of Origin) Bill 2024* was introduced to federal Parliament before being legislated in November 2024.[27] After further development of the Rules and methodologies, the GO scheme commenced on the 3rd of November 2025. This launched the Renewable Electricity Guarantee of Origin (REGO) and Product Guarantee of Origin (PGO) processes, however, the PGO is starting with only hydrogen produced via electrolysis. Consultation on additional hydrogen methodologies and alternative products will be ongoing and incorporated into the scheme in a rolling manner.

### AHC position

There is a clear need for a robust and trusted means of certifying emissions claims for hydrogen, and this has been raised as the industry's primary issue for some years. The AHC has been driving progress on this issue since 2018 and has engaged closely with DCCEEW and the CER. We support their development of a robust and versatile scheme that will meet the needs of a broad range of stakeholders.

[26] Clean Energy Regulator (2025) *Guarantee of Origin Scheme*, Australian Government, https://cer.gov.au/schemes/guarantee-origin-scheme.

[27] Parliament of the Commonwealth of Australia (2024) *Future Made in Australia (Guarantee of Origin) Bill 2024 [Provisions] and related bills*, Parliamentary business, https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/GuaranteeofOrigin.

The concept of a certification scheme for hydrogen has evolved considerably since the release of the initial discussion paper on the development of a Hydrogen Guarantee of Origin in mid-2021. The mechanism now known as the GO scheme provides an architecture for tracking emissions well beyond the 'rubber stamping' concept envisaged by some when the need for a certification scheme was initially raised. By remaining agnostic to production pathway and emissions intensity, DCCEEW has establishing a scheme which can adapt to the needs of industry and consumers beyond merely the production and use of hydrogen.

We are aware of Australian Government efforts, both bilaterally with trading partners and through the International Partnership on Hydrogen and Fuel Cells in the Economy (IPHE) to push for a globally recognised methodology for accounting for emissions and we consider that the GO approach can serve to underpin efforts to ensure that global reporting of emissions related to traded commodities is robust.

There is a range of other national and jurisdictional schemes that relate to emissions reporting, such as a GreenPower Renewable Gas Certification Pilot and the NSW Renewable Fuel Scheme (RFS). These often apply to the same producer of hydrogen and are governed and administered by different bodies; we seek information about how these may overlap with the GO scheme, as well as how the GO scheme will operate alongside initiatives such as the proposed Australian border carbon adjustment.

There is also a need for interoperability – many of the large-scale hydrogen and derivatives projects proposed for Australia have export ambitions and are keen to ensure consistency across international jurisdictions. In addition, AHC members are calling for multilateral interoperability rather than point to point (e.g. Australia-EU, Australia-Japan) interoperability.

As the scheme has only recently commenced, we expect that many of these factors and how they operated in practice will be clarified through 2026.

## 4. Net Zero and sectoral decarbonisation plans

**PLANNING – TRANSPORT, ENERGY, INDUSTRY AND NET ZERO PLAN**

**Description and status**

The Australian Government developed a Net Zero Plan[28] to reach the legislated target of net zero greenhouse gas emissions by 2050.

Led by DCCEEW, and in coordination with other departments, six sectoral emissions reduction plans were developed to support the Net Zero Plan. These cover electricity and energy; transport; industry; agriculture and land; resources; and the built environment. The six sectoral plans were supported by modelling and advice from the Climate Change Authority on targets and pathways, which was released in a major report.[29]

Of the six plans, energy,[30] transport[31] and industry[32] directly relate to hydrogen, and resources is adjacent.[33] Public and targeted consultation was undertaken from late 2023 and throughout 2024.

The sectoral plans, Net Zero Plan, Treasury modelling,[34] and Australian Government's 2035 emissions reduction target (62-70 per cent reduction below 2005 levels) were published in September 2025. Complementary to this, in November 2025, the Australian Government released Australia's NDC Investment Blueprint to guide investments in line with the Net Zero Plan.[35]

These resources provide a coordinated path to net zero, clarifying the Australian Government's vision, strategic objectives and priorities, timelines, and the interlocking, enabling policies.

[28] Australian Government (2025) *Australia's Net Zero Plan*, September, https://www.dcceew.gov.au/sites/default/files/documents/net-zero-report.pdf.
[29] Climate Change Authority (2024) *Sector Pathways Review*, released 5 September 2024, https://www.climatechangeauthority.gov.au/sites/default/files/documents/2024-09/2024SectorPathwaysReview.pdf.
[30] DCCEEW (2025) *Electricity and Energy Sector Plan*, Australian Government, September, https://www.dcceew.gov.au/energy/publications/electricity-energy-sector-plan.
[31] DITRDCSA (2025) *Transport and Infrastructure Net Zero Roadmap and Action Plan*, Australian Government, September, https://www.infrastructure.gov.au/department/media/publications/transport-and-infrastructure-net-zero-roadmap-and-action-plan.
[32] DISR (2025) *Industry Sector Plan*, Australian Government, September, https://www.industry.gov.au/publications/industry-sector-plan.
[33] Note that ammonia to make fertiliser is not under the agriculture sector plan but the industry sector plan.
[34] Treasury (2025) *Australia's Net Zero Transformation: Treasury Modelling and Analysis*, Australian Government, September, https://treasury.gov.au/sites/default/files/2025-09/p2025-700922.pdf.
[35] Australian Government (2025) *Australia's NDC Investment Blueprint: A Blueprint for Investing in Australia's Net Zero Transformation*, November, https://www.dcceew.gov.au/sites/default/files/documents/investment-blueprint-designed.pdf.

## AHC position

We supported the development of the Net Zero Plan (and the six sectoral decarbonisation plans) and engaged with the relevant departments through the process.

Overall, a common theme for AHC across hydrogen use cases is that planning and environmental approvals for the development and construction of supply chains and supporting infrastructure need to begin now. Significant investment decisions will not be taken by private sector actors until there is policy certainty and stability, alongside dedicated and long-term financial instruments. We welcome the Australian Government's dedication in building this ecosystem.

Australian policy and decision makers are creating the economic conditions for the emergence of entire new industries in Australia. The products that could be manufactured, produced, and traded are central to the energy and economic security of our trading and security partners across the region. If we are to be successful in the efforts to decarbonise not only Australia but the region, Australian governments must be willing to increase their risk appetite – to expand the suite of investment options to include equity stakes, large debt financing and expanded contracts for difference to incentivise the uptake of clean molecules in place of those derived from fossil fuels. We commend the Australian Government for its investment in the National Reconstruction Fund (Australia's manufacturing bank) to supplement the important work of the CEFC (Australia's green bank), and the introduction of a suite of targeted funding mechanisms under the FMIA.

Our regional partners – in Japan, Korea, Taiwan, and Singapore as well as across ASEAN – are ready to co-invest and co-design the early mover Australia projects, but not at any price and not without Australia demonstrating willingness to carry some of the cost burden and investment risk. The AHC contends that in the absence of very significant and rapid reallocation of Australian private capital, the scale of the investments required for hydrogen production (power, transmission, storage of electrons, electrolysers, storage of hydrogen as well as downstream uses of the hydrogen such as production of ammonia or reduction of iron ore) necessitate international investment. We are hopeful that the regional and national investment priorities from the sector decarbonisation strategies will direct international partners into hydrogen opportunities.

### *Electricity and energy*

The AHC submission to the Electricity and Energy Sector Plan addressed planning, grid capabilities and the role of molecules.[36]

The AHC supports electrifying where this makes sense, and following the research and data when it comes to the hard to abate areas. Comprehensive and published planning information – defined here as projections and assessments of future energy supply and demand pathways – will assist governments, the private sector and the public to make informed decisions about their options and actions for broader net zero planning.

The challenge for Australia is that we still need to build the renewables capacity that we are relying on to power our future renewable superpower ambition. This is on top of what is required to

[36] AHC (2024) *Electricity & Energy Sector Plan – Discussion Paper*, 26 April, https://h2council.com.au/wp-content/uploads/2024/04/240426-AHC-submission_Electricity-and-Energy-Sector-Plan.pdf.

decarbonise the grid and provide system reliability. The need to build renewables to produce hydrogen is one of the most significant matters for consideration, where governments will be confronted with – and will need to explicitly manage, if not accommodate – competing priorities.

This also relates to electricity prices, where electricity pricing is a key driver of hydrogen costs. Australia is not on track so far, with electricity prices much higher than they need to be for the hydrogen industry to develop as required. Given that Australia's original renewable superpower status was founded on anticipated future cheap electricity prices, this is also a matter of importance for how Australia reaches net zero. Policy initiatives that support hydrogen projects include concessions or exemptions on Transmission Use of System (TUoS) charges, as previously suggested by AHC in various fora. We are also supportive of the Capacity Investment Scheme, as covered under section 10 of this document.

When considering next steps, as we have previously advocated,[37] the REZ and industry hubs model of funding and coordination should be extended to cover so-called Hydrogen Economic Zones (or Low Carbon Precincts) to facilitate planning across industries and with some degree of central (that is, government led) funding and coordination. We believe that the focused parameters of industrial decarbonisation within key regions will assist in identifying and addressing the challenges that arise within the net zero transition. Crucially, this concentrated precinct would supply the data required to inform and sequence wider Australian decarbonisation decisions, as well as provide central locations to develop R&D, explore international partnerships (such as through green shipping corridors) and address barriers (such as common user infrastructure investment).

We must also build Australia's clean energy workforce, as discussed in section 12.

[37] AHC (2023) *A fit-for-purpose refreshed National Hydrogen Strategy: next steps for building Australia's hydrogen industry*, August, https://h2council.com.au/ahc-publications/.

*Transport*

Our submission to the Transport and Infrastructure Net Zero Consultation Roadmap reiterated our recommendation to the Australian Government on its revised National Hydrogen Strategy,[38] where we ask for Australian Government support for hydrogen in heavy road transport with a national ZLEV strategy, fleet trials, transition funds, and either a heavy vehicle fuel efficiency standard or sales target.

Our current view is that these positions are still reasonable,[39] and that a desirable policy instrument for road transport could be a supply chain emissions target that addresses scope 3 emissions for major retailers that use heavy road transport. We expect this would mean minor cost pass through when spread across all consumers (assuming retailers sought to pass costs on).

We suggested that the Australian Government should assess how quickly road vehicle fleets might need to turn over to reasonably meet emissions objectives and consider the demand side mechanisms to encourage this. Incentives need to encourage consumer technology shifts to the longer term low and zero emissions technologies. This seems most promising for battery and fuel cell electric road and rail transport. Government-funded renewable diesel incentives would then be suitable for a specific transition period while it may be needed.

For maritime, we will need to prepare for the planning and infrastructure requirements across Australian ports. Considering the lack of availability of space at existing Australian ports, and that Australia will generally be the taker of shipping company appetites for fuels, the Australian Government may need to nominate the best locations for specific segments of the maritime transition. Timely analysis and decision making must be undertaken to determine the target ports if we are to meet the ambitious whole of economy decarbonisation targets under the Paris agreements, International Maritime Organisation, and national legislation.

Hydrogen as a direct road transport fuel

Australia has twelve hydrogen refuelling stations open and another under construction.[40] This is not sufficient to support transport uses of hydrogen, and the significant Australian Government trial that the industry has been calling for to derisk investment, the Hydrogen Highways initiative, continues to be pushed back and delayed. We note that the 2024-25 federal budget allocated an additional $75 million over four years to the Hydrogen Highways initiative,[41] then the 2025-26 federal budget reallocated this $75 million.[42] The original application results were expected in early 2023, and the industry has no greater clarity on the proposed process.

[38] Ibid.
[39] AHC (2024) *Submission to the low carbon liquid fuels and transport sector plan*, 18 July, https://h2council.com.au/wp-content/uploads/2024/07/240718-AHC-submission-to-LCLF-and-transport-sector-plan.pdf.
[40] HyResource (2025) *Hydrogen Refuelling Stations spreadsheet*, CSIRO, accessed 11 November 2025, updated 15 September 2025, see https://research.csiro.au/hyresource/projects/hydrogen-refuelling-stations/
[41] Treasury (2024) *Budget 2024-25, Federal financial relations: budget paper no. 3*, Australian Government, 14 May, https://budget.gov.au/content/bp3/download/bp3_2024-25.pdf.
[42] Treasury (2025) *Budget 2025-26, Budget measures: budget paper no. 2*, Australian Government, 25 March, https://budget.gov.au/content/bp2/download/bp2_2025-26.pdf.

We have argued for some time that there needs to be pilots and trials of vehicles on Australian roads to be able to inform freight and logistics firms' assessments of total cost of ownership, or TCO. The Hydrogen Highways project was supposed to provide this information. The ongoing delay just furthers the problem that offtake cannot be agreed when the total cost of a fleet replacement to hydrogen fuel cell heavy vehicles remains so uncertain.

There is urgency to test the technology in use in Australia so that there is TCO assurance, the OEMs have the time and confidence to manufacture or retrofit fuel cell heavy vehicles at scale, and Australia can progress beyond trials. This is a multi-year endeavour, and the Australian Government has a necessary role here to reprioritise establishing the hydrogen refuelling infrastructure, helping to accelerate the timeline and derisk fleet transition.

We note that the Hydrogen Production Tax Incentive is legislated to only apply to production facilities that have a minimum capacity on 10MW, which does not cover most hydrogen refuelling stations, therefore making them ineligible.[43] Furthermore, this credit is only expected to apply from 2027-28, which does not incentivise the immediate scale up of hydrogen refuelling stations that will be required to derisk range anxiety and encourage vehicle supply in Australia.

Low carbon liquid fuels (hydrogen as potential feedstock)

We agree that there is an opportunity for Australia to establish a low carbon fuels (LCLF) industry. This supports fuel security, recognises the lower energy density of green fuels, and incentivises decarbonisation through supply. Separate modes of transport and industries are working to unpack the research, trajectory, and timelines of different low carbon fuel options, but there is significant overlap, especially regarding biofuels and hydrogen.

The Australian Government consultation papers on low carbon liquid fuels[44] and the transport roadmap[45] (and subsequent published sectoral plan) have shown a preference for using biogenic feedstock to make future fuels for road and air transport. As we noted in our responses,[46] prioritising biofuels for near term use is a reasonable perspective. However, we caution the Australian Government to not put off harder work to develop at-scale solutions. Biofuels are the transitionary step for most liquid fuel uses while electrification and hydrogen capabilities are scaled up, and they will continue to play a vital long-term role for smaller scale use. In our view biofuels must be enabled but cannot *deprioritise* Australian Government efforts to develop policy to electrify, use batteries, and have the hydrogen infrastructure and supply for when the demand requires it. This obviously varies by transport mode – where hydrogen is used it could be for hydrogen as a fuel (such as for

[43] Treasury (2024) *Hydrogen production tax incentive*, Australian Government, https://treasury.gov.au/consultation/c2024-541265.
[44] DITRDCA and DCCEEW (2024) *Low Carbon Liquid Fuels A Future Made in Australia: Unlocking Australia's low carbon liquid fuel opportunity*, Consultation Paper, https://www.infrastructure.gov.au/sites/default/files/documents/low-carbon-liquid-fuels-consultation-paper.pdf.
[45] DITRDCA (2024) *Transport and Infrastructure Net Zero Consultation Roadmap,* Consultation Paper, https://consult.dcceew.gov.au/transport-and-infrastructure-net-zero-consultation-roadmap.
[46] AHC (2024) *Submission to the low carbon liquid fuels and transport sector plan*, 18 July, https://h2council.com.au/wp-content/uploads/2024/07/240718-AHC-submission-to-LCLF-and-transport-sector-plan.pdf.

heavy road freight) or hydrogen as feedstock (for future maritime or aviation fuels). In any event, building out hydrogen capability and infrastructure will take time and needs to start now to be ready for when it is required.

Renewable diesel and SAF (whether biofuel or hydrogen-based) were merged in these government consultations, but it is important to note that these are not equivalent in terms of their long-term value to Australia's transport decarbonisation efforts. Renewable diesel is expected to have a shorter-term role, such as in heavy road transport and will be used more in regional and rural areas, for vehicles that are not yet ready for retirement, and while the technology and refuelling/recharging networks are being rolled out. Furthermore, incentivising renewable diesel could lead to the perverse outcome of delaying or undermining the transition to electrification, which is already a commercially available and governmentally subsidised technology in some transport modes. In contrast, SAF is a genuinely long-term play.

On the matter of biogenic feedstock, biofuels are of course not all the same; this is a diverse family of feedstocks with their own different emissions characteristics. One thing all biofuels have in common, besides drop-in capabilities, is natural constraints on production. Waste streams are certainly constrained, and crop requirements for land and water can reach the point where biofuel production starts to compete with food.[47] Additionally, there are implications for biodiversity and fertility of land where rising impacts of climate change are expected to already be impacting crop yield. These are finite and vital resources that need to be managed carefully and responsibly.

To add complexity, there will be competition for biofuels for the hard to abate transport modes, particularly in aviation and maritime, where the demand will outweigh the possible supply of biofuels. These modes of transport must strategically sequence their decarbonisation and the feedstocks each can potentially use. We need greater clarity on the natural constraints of biofuels; this is a matter not only of fuel security but also food security.

We are supportive of a LCLF industry in Australia and welcome demand side incentives and policy mandates. These then need to sit alongside investment and infrastructure in the long-term net zero fuel solutions, such as hydrogen. The best approach for aviation would be mandates for future long-term use of SAF, and incentives to help producers and users close the commercial gap.

We also support the Australian Government's commitment to funding to develop a certification scheme for LCLF through an expansion of the Guarantee of Origin scheme, and its plan to build on ARENA's SAF Funding Initiative and introduce the Cleaner Fuels Program.

[47] CSIRO (2023) *Sustainable Aviation Fuel Roadmap*, https://www.csiro.au/en/research/technology-space/energy/sustainable-aviation-fuel.

*Industry*

The Australian Government's industrial sectoral plan covers:[48]

- alumina and aluminium manufacturing;
- food and beverages manufacturing;
- metals refining and smelting;
- cement and concrete production;
- iron and streel manufacturing;
- pulp, paper and paperboard manufacturing;
- chemicals and plastics manufacturing;
- manufacturing and additional industries; and
- waste and resource recovery.

The consultation for the industry sectoral plan was generally not public, with targeted discussions. A paper on potential incentives for building the green metals sector was released in May 2024.[49] The discussion below reflects the AHC's submission to that process. We wrote more comprehensively about industrial hydrogen uses in our August 2023 position paper, and we also completed a report with Australian Alliance for Energy Productivity (A2EP) on decarbonisation options for different high temperature heating applications.[50]

Iron

The AHC strongly supports work to develop the role for hydrogen in steel making.

Hydrogen can support the production of green iron in steelmaking by removing oxygen from the iron ore. Direct reduced iron (DRI) is currently produced at scale with natural gas; however, steelmakers are considering the use of hydrogen for DRI manufacturing to make the steelmaking process $CO_2$-free, and several projects are in train. This could be a significant export opportunity for Australia, as countries seek to reduce their energy consumption and shift to importing iron from countries like Australia rather than importing iron ore and using energy domestically for processing. (The iron-to-steel stage is likely to remain in countries using the steel because steel is a relatively complex and bespoke product.)

While Australia is not a first mover on DRI with hydrogen, we are the largest exporter of iron ore, and so there is a market opportunity. This is particularly as decarbonisation policies start to bite and we can produce hydrogen cleanly. Given that the technologies currently being piloted and trialled (direct reduction furnace technology, electric arc furnace) are not expected to be deployed at scale until the late 2030s/early 2040s, Australian governments and corporates have significant motivation and lead time to ensure investment in the secure supply of hydrogen feedstock for DRI.

[48] DISR (2024) *Industry Sector Plan*, Australian Government, 18 September, https://www.industry.gov.au/publications/industry-sector-plan.
[49] See DISR (2024) *Green Metals, A Future Made in Australia: Unlocking Australia's Green Iron, Steel, Alumina and Aluminium Opportunity*, Consultation paper, May, https://consult.industry.gov.au/unlocking-green-metals.
[50] Australian Alliance for Energy Productivity (2023) *Bringing the heat: Hydrogen's role in decarbonising Australian industrial process heat*, August, https://h2council.com.au/wp-content/uploads/2023/08/Bringing-the-heat-report-for-AHC-25-August-2023.pdf.

However, Australia could still be left behind in the global move to green steel. The bulk of the iron ore currently mined for export in Australia is incompatible for use in the production of DRI as the ore contains too many impurities. Australian iron ore is predominantly hematite-goethite, which, while a higher-grade ore, is not ideal for the DRI process because processing it to the required standard is currently difficult. Magnetite is a lower grade ore but can be processed (a process called beneficiation) for use in DRI processes.

As noted by the Australian Industry Energy Transitions Initiative:

> Developing new methods of processing hematite-goethite for its use in green steelmaking (especially DRI-EAF) could allow continued use of existing mines and infrastructure and preserve Australia's current iron ore markets. The processing of hematite-goethite for use in DRI-EAF technologies is poorly understood and will require R&D to enable commercially viable methods. Furthermore, yield losses during beneficiation will need to be addressed so as to not decrease the economic viability of this route.[51]

There is therefore a fundamental need to develop and demonstrate means of producing DRI from both magnetite *and* hematite-goethite if Australia is to reach its potential in iron exports.

Alumina

Hydrogen can also support green alumina production. Australia is the second largest producer of alumina in the world, and the largest exporter. Primary aluminium is made from bauxite, which is refined to make alumina before being smelted to make aluminium. Refining bauxite to produce alumina has four stages: digestion, clarification, precipitation, and calcination. Digestion takes place at 150-270°C and calcination at temperatures above 1000°C. Hydrogen can substitute for natural gas in calcination and is considered a strong alternative to electrification.

The pathway for green metals is still nascent as the technologies are being developed. We know that there will be requirements for low-cost renewable electricity and hydrogen (as metals processing is energy intensive), and in some cases, the ongoing technology will not be determined until the results of trials and demonstrations have been finalised. Therefore, multiple streams of investment will continue to be required to investigate each technology until there is a clear, proven pathway. For example, ARENA has backed both the electrification and hydrogen studies in the alumina calcination process with the outcomes expected in 2030. The outcomes of studies such as these, alongside industry-led pilot studies and the sustainable finance taxonomies, will assist investors in their long-term investment strategies.

We are pleased to see the dedication to developing the technology pipeline for the processing of green metals under the FMIA agenda, including through the ARENA-administered Innovation Fund (to facilitate commercial scale up) and the Green Metals Innovation Network (to plan for and train the future workforce). It is Australia's opportunity to focus this support and investment on the information gaps and prove up prospective technologies through long term, robust studies and analysis.

[51] Climateworks Centre and Climate-KIC Australia (2023) *Pathways to industrial decarbonisation: Positioning Australian industry to prosper in a net zero global economy*, Australian Industry Energy Transitions Initiative, Phase 3, February, https://www.energy-transitions.org/publications/pathways-to-industrial-decarbonisation/.

Supply side support for green metals end users

The Australian Government's rollout or development of the demand side support models for green metals should where possible be matched with the Hydrogen Production Tax Incentive (HPTI) to simultaneously support demand and supply for priority industries.

The focus on green metals is a comparative advantage for Australia to reconsider the flow of trade of our most valuable resources. This investment into decarbonising and maintaining existing Australian metals processing facilities can contribute to the expansion and diversification of Australian exports and increase Australia's sovereign manufacturing capability, for example in the development of the offshore wind industry. One of the key concerns surrounding this policy is timeliness – Australia's metal processing facilities are aging and need to strategically plan and reinvest in technology that will allow them to trade in an increasingly decarbonised world.

Significant consideration will also need to be given to the downstream costs on construction. Construction already has long lead times and inflated costs due to supply chain challenges, and the green metals industry will inherently have a green premium, which will result in a flow down impact onto the consumer. The challenge requires strategic planning and could benefit from mechanisms that directly support consumer uptake.

One of the greatest opportunities to boost demand is the utilisation of government procurement levers, especially in the use of decarbonised materials in government supported or funded projects, similar to the Biden Administration's *Buy Clean Initiative:*[52]

> Through Buy Clean, the Federal Government is for the first time prioritizing the use of American-made, lower-carbon construction materials in Federal procurement and Federally-funded projects. This is advancing America's industrial capacity to supply the goods and materials of the future while growing good jobs for American workers.

A similar Australian demand side initiative could mandate, where possible, that projects supported under FMIA and other investment vehicles source green cement and metals (as well as the technologies developed and manufactured in Australia) in the construction of any buildings or projects backed by public investment. By committing to being the first customer for green metals and other decarbonised products, the Australian Government creates demand, supports the order book of nascent Australian companies, and reduces risk and uncertainty for subsequent buyers and investors. We are pleased to see this has been progressing at the state level, including the recent announcement for local green steel to be used on major government projects under the Made in WA plan.[53]

[52] Office of the Federal Chief Sustainability Officer (2023) *Federal Buy Clean Initiative,* Council on Environmental Quality, USA Government, https://www.sustainability.gov/archive/biden46/buyclean/index.html. Note that this initiative has since been archived under the Trump Administration, but remains a great case study for Australian consideration.

[53] Cook, R. & Sanderson, A.J. (2025) *Government projects to be built with green steel that's Made in WA*, media release, Government of WA, 9 November, https://www.wa.gov.au/government/media-statements/Cook%20Labor%20Government/Government-projects-to-be-built-with-green-steel-that's-Made-in-WA-20251109.

This type of initiative would ideally be supported by a strong and rigorous Australian carbon border adjustment mechanism (CBAM) to avoid the perverse outcome of parallel imports of cheaper, more emissions intensive materials undercutting Australia's decarbonisation investment and efforts. The Australian Government should also consider an ASEAN level CBAM, both to strengthen regional investment partnerships and initiatives aimed at increasing friendshoring in critical sectors and to increase the likelihood of successful industrial decarbonisation.

We also support the Australian Government's commitment to funding the development of a certification scheme for green metals through an expansion of the Guarantee of Origin scheme. Given that the nascent green metals industry will require significant investment and attract a green premium, it is vital that there is robust certification of the emissions intensity across the product lifecycle. There is not yet a globally agreed definition of 'green' or 'clean' for metals, and there is significant work to be done in designing adequate emissions recording; however, this work will safeguard against greenwashing and facilitate investor confidence.

We recommend that the expansion of the Guarantee of Origin Scheme covers green metals to align with international best practice for the measurement and certification of scope 1, 2, and 3 emissions for the production of DRI and green steel.

## 5. The Future Made in Australia Bill

**FOUNDATION – WHOLE ECONOMY**

**Description and status**

The Future Made in Australia (FMIA) package was first raised in the 2024–25 Budget, and a Future Made in Australia Bill[54] was referred to the Senate Economics Legislation Committee for inquiry[55] before passing through Parliament in September 2024.

The FMIA was essentially Australia's answer to the US Inflation Reduction Act.[56] It sets out a process to identify sectors of national interest which might then receive government financial support through key agencies, such as ARENA.

It also sets out that an applicant for, or recipient of, FMIA support must have a Future Made in Australia Plan, which demonstrates community benefits, defined by compliance with principles set out in the Bill and in subsequent rules.

Five sectors have been stated to already be aligned with a new National Interest Framework[57] under the Future Made in Australia policy package: renewable hydrogen, critical minerals processing, green metals, low carbon liquid fuels, and clean energy manufacturing, including battery and solar panel supply chains.[58]

The final coverage of funding/financial support bodies is not yet clear, but the FMIA provisions may ultimately reset how the Australian Government provides a range of funding to key industries, including all business-as-usual activities of ARENA and Export Finance Australia. There is also necessary overlap between topics covered through the FMIA and the sectoral plans, with the key examples being green metals and low carbon liquid fuels.

While the FMIA Bill has been passed, the subordinate mechanisms are still being developed, including the front door for investors (trial commenced September 2025), community benefit

[54] Parliament of the Commonwealth of Australia (2024) *Future Made in Australia Bill 2024*, 'A Bill for an Act to unlock investment in a Future Made in Australia, and for related purposes', see https://parlinfo.aph.gov.au/parlInfo/download/legislation/bills/r7219_first-reps/toc_pdf/24084b01.PDF;fileType=application%2Fpdf#search=%22legislation/bills/r7219_first-reps/0000%22.

[55] Parliament of the Commonwealth of Australia (n.d,) *Future Made in Australia Bill 2024 [Provisions] and the Future Made in Australia (Omnibus Amendments No. 1) Bill 2024 [Provisions]*, Parliamentary business, accessed 5 September 2024, https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Economics/FutureMadeinAustralia#:~:text=On%204%20July%202024,%20the%20Senate.

[56] While the IRA and hydrogen funding have been systematically rolled back under the Trump Administration, the introduction of the IRA undeniably spurred global competition to land hydrogen projects.

[57] Treasury (2024) *Future Made in Australia National Interest Framework: Supporting paper*, 14 May, see https://treasury.gov.au/sites/default/files/2024-05/p2024-526942-fmia-nif.pdf

[58] Australian Government (2024) *Budget 2024-25 A Future Made in Australia*, see https://budget.gov.au/content/factsheets/download/factsheet-fmia.pdf.

principles (general consultation within FMIA Bill and further anticipated), hydrogen production tax incentive (legislated February 2025, details to come), green aluminium production credit (consultation October 2025), Innovation Fund (consulted on in March 2025), and the Cleaner Fuels Program (announced in September 2025) among further instruments.

Following the 2025 federal election, the ownership and delivery of the FMIA agenda was shifted to be shared by both the Department of Climate Change, Energy, the Environment and Water and the Department of Industry, Science and Resources, with Treasury playing a supportive role.

### AHC position

The FMIA is a vital Australian Government response to changes in global supply chains and energy security, as well as a necessary step to reinvigorate Australian capabilities and grow economic complexity.[59] The energy transition is hugely challenging, but it also presents an important opportunity for Australia to develop competitive advantage in renewable energy production, technology and use within the global marketplace, as well as ensuring ongoing prosperity in our region.

Notably, of the five industries aligned with the National Interest Framework, hydrogen plays a vital role in most, including green metals, low carbon liquid fuels, clean energy manufacturing (such as electrolysers), and renewable hydrogen itself. There has already been progress in the demand side mechanisms of green metals and low carbon liquid fuels, and, coupled with the FMIA Innovation Fund and Hydrogen Headstart, the overall policy framework should help derisk investment into the hydrogen value chain.

#### *A front door for investors*

The FMIA Bill seeks to create a front door for investors, to "provide a single point of contact for investors and companies with major, transformational investment proposals, delivering a coordinated approach to investment attraction and facilitation for these projects".

We welcome this intent, and note it is aligned with our own advocacy. For some time now, the AHC has observed that the complexity and uncertainty of the investment environment and the overall ecosystem (multiple states, regulatory differences, permitting within states) is making hydrogen project proponents' decisions unnecessarily difficult. There is a need for investors and other decision makers to recognise meaningful investments in new infrastructure and technology, and the current environment is not conducive to this. Government thus has a role to direct investors' attention to the opportunities; to help create value propositions that investors recognise.

[59] AHC (2024) *The Future Made in Australia Bill*, 26 July, https://h2council.com.au/wp-content/uploads/2024/07/240726-AHC-FMIA-submission.pdf.

*Community benefits*

The FMIA Bill seeks to hold recipients of significant funding accountable to the community by aligning corporate activity with government expectations on community benefits. The community benefit principles set out in the FMIA Bill are:

> *(a) that Future Made in Australia support should provide community benefits, in particular by:*
>
> *(i) promoting safe and secure jobs that are well paid and have good conditions; and*
>
> *(ii) developing more skilled and inclusive workforces, including by investing in training and skills development and broadening opportunities for workforce participation; and*
>
> *(iii) engaging collaboratively with and achieving positive outcomes for local communities, such as First Nations communities and communities directly affected by the transition to net zero; and*
>
> *(iiia) supporting First Nations communities and traditional owners to participate in, and share in the benefits of, the transition to net zero; and*
>
> *(iv) strengthening domestic industrial capabilities, including through stronger local supply chains; and*
>
> *(v) demonstrating transparency and compliance in relation to the management of tax affairs, including benefits received under Future Made in Australia supports; and*
>
> *(b) any other principles specified in the rules for the purposes of this paragraph.*

We are supportive of the principles and their role to guide decision makers on how FMIA outcomes would benefit the community.

We note that delivery on the intent is likely to differ across Australia given the diversity of communities that will benefit, differences in opinion about how communities would like to benefit, and the maturity of different sectors covered by the FMIA. There will be a balance required so that processes for demonstrating benefit do not stifle the innovation the funding was intended to support.

Project proponents are often already reporting to government on how they meet objectives outlined in the community benefit principles, and these existing approaches can readily be reviewed and used. We urge an assessment and consolidation of existing obligations to ensure they align with the FMIA, rather than the imposition of a requirement for a new set of plans to be developed which may just add administrative burden without necessarily providing additional benefits. Key examples include the Australian Industry Participation (AIP) Plans required when participants receive Australian Government funding,[60] alongside Environmental Management Plans, Stakeholder Management Plans and Cultural Heritage Management Plans.[61]

[60] Department of Industry, Science and Resource (n.d.) *Australian Government funded projects*, Australian Government, https://www.industry.gov.au/major-projects-and-procurement/australian-industry-participation/australian-government-funded-projects.

[61] You can find more information of the AHC positions regarding the community benefit principles in recent policy submissions: AHC (2025) *Future Made in Australia Innovation Fund – Program design and consultation*, submission, 6 June, https://h2council.com.au/wp-content/uploads/2025/06/250606-ARENA-FMIA-Innovation-Fund-AHC-submission.pdf and AHC (2025) *Consultation on Hydrogen Headstart Round 2*, submission, 7 August, https://h2council.com.au/wp-content/uploads/2025/08/250807-Headstart-round-2-AHC-submission.pdf.

## 6. The Hydrogen Production Tax Incentive

**NEW GOVERNMENT FUNDING SUPPORT – HYDROGEN**

### Description and status

The Hydrogen Production Tax Incentive (HPTI) is a tax credit aimed at addressing the cost of hydrogen production to support the Australian industry getting to scale.

The HPTI has been legislated as AU$2 per kg of hydrogen, for facilities larger than 10MW per facility, and for production at under or equal to a 0.6kg $CO2e/kgH_2$ threshold.

The HPTI will be available for hydrogen produced from eligible facilities for up to 10 years between 1 July 2027 and 30 June 2040.

While the HPTI was committed in the 2024-25 federal budget as AU$6.7 billion over 10 years, in practice this is an uncapped incentive.

The HPTI connects with (and sits under) the FMIA, and any money provided will be subject to the community benefits principles being met. The process for this compliance has not yet been clarified.

The Future Made in Australia (Production Tax Credits and Other Measures) Bill 2024 was introduced into Parliament in November 2024 and passed in February 2025. Subordinate details have not yet been released.

### AHC position

Within the overall FMIA approach, the HPTI is a most welcome hydrogen initiative that signals to Australian investors and the rest of the world that Australia is back in the game for attracting project investment, and the technology, capability and workforce opportunities that come with it.[62]

The announcement and funding of the HPTI signals the confidence of the Australian Government in the hydrogen and derivatives industries and provides a recognition that clean molecules and fuels will be needed if Australia is to achieve whole-of-economy decarbonisation.

We are pleased to note that the Australian Government is developing support models under the FMIA for particular end uses, such as for green metals and low carbon liquid fuels. We support these demand side initiatives and see them as being matched with the HPTI to simultaneously support demand and supply for priority industries. It is vital that the different initiatives are able to work together for those projects that are eligible.

[62] AHC (2024) *The Hydrogen Production Tax Incentive*, 12 July, https://h2council.com.au/wp-content/uploads/2024/07/240712-AHC-HPTI-submission_final.pdf.

There is a diversity of views within the AHC membership on some of the details of the HPTI as set out in the Bill, but overall we think that the design strikes the right balance to drive sustainable industry growth.

We note that at $2/kg the HPTI is less than other schemes. Ideally the HPTI would be twice as much at least to close the commercial gap. However, we note that this was an unlikely outcome for this policy at this time. We also note that the Australian Government has recognised that more is required, and that Hydrogen Headstart is intended to support a small number of first movers in the years prior to the HPTI taking effect. The commencement of the second round of Hydrogen Headstart is very welcome.

We also note that the IRA[63] was becoming encumbered with additional criteria for eligibility that were commonly considered to stifle the growth of the hydrogen industry. With the HPTI, the Australian Government can reclaim some of the attention and investment dollars that shifted from here to the US.

The HPTI is an uncapped incentive, meaning that any and all projects that meet the eligibility criteria will receive the $2/kg of hydrogen over the specified timeframes, and any one project can receive as much or as little as the hydrogen it produces. This design feature has been welcomed by both industry and the AHC.

Regarding the eligibility criteria, we understand the Australian Government's desire to focus on large scale projects, and to tighten project delivery as much as possible. We suggest that lessons already learned in hydrogen have shown that greater flexibility is required at this stage, such as for:

- **Timing**: We note that the subsidy is set for only ten years, rather than for fifteen, which would be in line with the support provided by other nations as well as the expectations of industry and lenders.

  The AHC strongly urged an extension of the end date for the HPTI to 30 June 2045, in order to enable the long lead times required by projects and in recognition of the difficulties in securing workforce for project delivery.

- **Size**: We believe that the HPTI should in principle be available to all projects – that is, not limited to use or size. There will be a need to demonstrate capacity and seriousness of intent of course, so as to maintain legitimacy of the initiative and not reflect an unnecessary administrative burden for the government. This may mean a minimum size is required; we suggested 1 MW rather than the 10MW proposed.

  A 1 MW size limit may, in fact, be necessary to incentivise investment in domestic decarbonisation opportunities. If these smaller projects remain excluded, it is likely they will be considered less attractive as investment propositions and will find it increasingly difficult to attract private capital, with the flow on impact on regional and domestic decarbonisation efforts.

[63] While the IRA and hydrogen funding have been systematically rolled back under the Trump Administration, the introduction of the IRA undeniably spurred global competition to land hydrogen projects. This policy was the benchmark for the development of hydrogen incentives, and was a common comparison in the development of the HPTI.

Similarly for site coverage, we suggested that there would be a need to address multiple sites within a specified region, and the AHC supported the definition utilised in the Hydrogen Headstart process to date. This would provide for facilities that have had to spread beyond one specific site due to land use constraints but are demonstrably within the same industrial or operational zone.

- **Commercial structures**: The commercial structures for project delivery are quite varied, with a range of domestic and international investors often included in joint venture or SPV arrangements. In some instances, government-owned or backed entities are also equity holders (domestic Australian government as well as international). We would have hoped that this definition in the guidelines be entity-agnostic, thereby extending eligibility to companies, trusts, and partnerships. This inclusive approach would significantly enhance the effectiveness of the incentive by ensuring that the type of holding vehicle does not impede the achievement of the HPTI's objectives.

  The complexity of structuring should also be reflected in the final eligibility criteria, with members also seeking clarification around the transferability of the tax incentive benefits within and between the commercial partners. This is important to clarify as it will have implications for investors into Australian backed projects.

- **Carbon emissions maximum**: The AU$2/kg of hydrogen under the HPTI equates (approximately) to the US$1/kg subsidy previously proposed under the IRA for emissions between 0.45 and 1.45kg of $CO_2e$.[64] Given currency exchange, the Australian figure is slightly more generous than the US was for projects above 0.45kg $CO_2e$ (to the 0.6kg $CO_2e$ threshold). The Australian figure is then less competitive for very low emissions hydrogen and obviously there is no support at all where emissions are higher than 0.6kg $CO_2e$.

  We recognise that this is a renewable hydrogen initiative and a higher emissions intensity to account for non-renewable hydrogen is not contemplated in the policy. We note that this may limit Australia's competitive value in importing markets which are currently open to higher emissions hydrogen.

  Even for hydrogen projects using electrolysis, there may be benefit in starting with a slightly higher carbon emissions level so that grid-connected projects can get up in the medium term and progress the industry to scale.

Finally, the incentive has not been indexed for inflation, and we strongly recommended that the Australian Government reconsidered this decision. It is the industry standard for electricity power purchase agreements (PPAs) to be indexed to inflation or CPI; not indexing the HPTI is inconsistent with industry standards and expectations. A lack of inflation adjustment for the HPTI means the real value of the tax offset will have declined more than 10 per cent by the time the HPTI comes into effect, and by around a third by the time it expires (based on Commonwealth Budget 2024-25 CPI inflation forecasts).

[64] As mentioned above, in the development of the HPTI, the IRA was used as a comparison to measure competitiveness. Obviously, this outlook shifted in 2025.

## 7. Hydrogen Headstart

**NEW GOVERNMENT FUNDING SUPPORT – HYDROGEN**

**Description and status**

Hydrogen Headstart is a grant programme, first announced in the May 2023 federal Budget. The initial value was AU$2 billion, to be shared between two or three Australian projects.

A process was undertaken by the Australian Government to consult on design principles. First round submissions were received, with a shortlist of six projects publicly announced in December 2023. Shortlisted parties submitted their more detailed submissions in July 2024. The Hydrogen Headstart funding was awarded in 2025 to Copenhagen Infrastructure Partners for the Murchison Green Hydrogen Project (AU$814 million) and Orica for the Hunter Valley Hydrogen Hub (AU$432 million).

In the 2024 federal Budget a second round of Hydrogen Headstart was announced, with a further AU$2 billion allocated. This process opened for consultation in July 2025, EOIs in October 2025 and is expected to continue through the coming year for a proposed decision outcome between October and December 2026.

**AHC position**

The Hydrogen Headstart is a welcome initiative for the hydrogen industry, and we have been pleased to see the announcements for Round 1 and the commencement of Round 2.

Hydrogen Headstart is intended for the first-of-a-kind projects to reduce the commercial gap ahead of the HPTI coming into effect. We remain hopeful that the funding will *sufficiently* close what we know is a widening commercial gap, as a result of inflationary pressures and higher than expected electricity prices. Many of our members have advised us that Hydrogen Headstart still needs to be stacked with other price and non-price benefits to make a difference, including support mechanisms from overseas.

From learnings in Round 1, AHC recommended that Round 2 could be more collaborative.[65] A partnership between the proponent and the Australian Government to see strategically important projects supported in the public interest. In order to potentially address some of the issues that led to delays in the due diligence of projects short listed under Headstart Round 1, we suggested that due diligence for projects participating in Headstart Round 2 should align with the timing of FEED as there is a higher estimation certainty in project costs, meaning that negotiations with ARENA and other lenders are likely to be more credible. Similarly, the requirement in the indicative grant contract that asked projects to have locked in confirmed offtake before all financing is completed was unrealistic – all project proponents that AHC had spoken with were agreed that confirmed offtake could occur only once project costs are locked down.

[65] AHC (2025) *Consultation on Hydrogen Headstart Round 2*, submission, August, https://h2council.com.au/wp-content/uploads/2025/08/250807-Headstart-round-2-AHC-submission.pdf.

It will be important that projects and ARENA then work together to anticipate and manage the kinds of challenges that have already become familiar across the sector. These include input cost volatility between EOI and final submission, chilling global risk sentiment affecting capital raising, and a resulting need for reasonable flexibility on development milestones. This is particularly in response to conditions outside proponent control. We would expect that upon submission of an EOI to ARENA, proponents could engage in initial conversations to clarify any areas of uncertainty or address issues that might otherwise preclude eligibility. We also prompted clarity on the process for those projects that submit expressions of interest that are well regarded but do not progress to full application.

## 8. The Carbon Leakage Review

**NEW RULES – CARBON PRICING**

**Description and status**

In March 2023 the Australian Government announced a review of carbon leakage[66] as part of its reform of the Safeguard Mechanism.

Lead by Professor Jotzo from the Australian National University, the overarching intention of the review is to assess the impact of carbon mitigation policies on the viability of existing industries, as well as on investment attraction.

The Review was focused on an assessment of carbon leakage risks, the development of policy options to address carbon leakage, and an assessment of the feasibility of a carbon border adjustment mechanism (CBAM), particularly in relation to steel and cement.[67]

A second round of consultation was opened in November 2024 which provided an overview of the review's modelling and analysis. Initial results identified commodities for the material carbon leakage list over time: cement, clinker and lime; ammonia and derivatives; steel; and glass. There is additional support for clinker and cement which are expected to have more pronounced risks, and therefore, are likely to be recommended for the first tranche of support mechanisms, including potentially a border carbon adjustment (BCA).

The final report has not been published, but the Industry Sector Plan[68] noted that the Review found the Safeguard Mechanism was effective in the short-medium term, but some sectors could need additional measures over time. The Industry Sector Plan suggested that a BCA could be incorporated into the 2026-27 Safeguard Mechanism Review.

### AHC position

We support the Carbon Leakage Review. In an increasingly carbon constrained world, many nations are exploring carbon border leakage mechanisms, so as to prevent unfair dumping of products produced in countries without significant decarbonisation policies and intentions. The most prominent mechanism is the CBAM in the European Union.[69]

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[66] Carbon leakage occurs where companies move their facilities to jurisdictions with weaker emission constraints. This is bad for the original host industry because it loses a source of GDP and it is bad for the planet because it results in higher global emissions.

[67] DCCEEW (2023) *Public consultation on the proposed approach to assess and address carbon leakage risk, as part of the Carbon Leakage Review*, https://consult.dcceew.gov.au/consultation-proposed-approach-carbon-leakage-risk-as-part-of-the-carbon-leakage-review.

[68] Australian Government (2025) *Industry Sector Plan*, September, https://www.industry.gov.au/sites/default/files/2025-09/disr-industry-sector-plan.pdf.

[69] European Commission (2024) *Carbon Border Adjustment Mechanism*, see https://taxation-customs.ec.europa.eu/carbon-border-adjustment-mechanism_en.

An Australian CBAM (or BCA as the Review was calling it) would increase the volumes of green energy/products domestically produced, as it would aim to avoid parallel imports of grey products, such as cement and steel (but ideally also hydrogen, ammonia and urea), which otherwise would undermine Australia's decarbonisation efforts and investment.

We have argued that it makes sense that we need to protect emerging, domestic production, and so hydrogen, ammonia and urea should be included on the carbon leakage list.[70] Hydrogen is feedstock for ammonia, which is feedstock for urea.

Including hydrogen, ammonia and urea (or the best combination) on the Australian carbon leakage list would:

- **Align with other jurisdictions:** Global policy and legislative trends indicate that the remit of carbon border adjustment schemes will increase to cover a range of products beyond fossil fuels or their replacements such as hydrogen, ammonia and methanol.
- **Align with the Safeguard Mechanism:** The Safeguard Mechanism (a major consideration of the Carbon Leakage Review) now has a hydrogen production variable, which is considered trade-exposed. Additionally, ammonia production is already covered under the Safeguard Mechanism, with the ammonia industry one of Australia's most emissions intensive. In fact, ammonia and derivatives production is completely covered under the Safeguard Mechanism, which makes it ideal for inclusion in an Australian BCA.
- **Make room for future new industries by defraying the green premium:** Australia will need to develop a hydrogen supply chain to realise our energy transition. This includes decarbonising our existing industries, such as ammonia. Across seven sites, Australia supplies over 2Mtpa of ammonia and imports the remaining demand. As we look to transition and expand our green ammonia production, this will naturally be delivered at a green premium, leaving Australia's ammonia producers at risk to traditional fossil fuel ammonia being imported at a lower cost. A BCA can help defray the green premium.

  We also note that Australia imports over 80 per cent of its urea, mostly from the Middle East. A BCA on urea (or hydrogen or ammonia, its precursors) will provide a means to reduce Australia's reliance on imports by incentivising domestic supply.

In the context of hydrogen, the considerations of the Guarantee of Origin scheme should be incorporated into the operations of the BCA.

In our view it is vital that policy seeks to not only find the balance between the direct costs to reach industrial decarbonisation objectives and the costs of keeping strategically viable industries in Australia, but also includes the major indirect costs. This then requires an assessment of the industries in question to not only consider economic criteria, but also address:

- each industry's role in the economy, including contribution to GDP, regional prosperity and quality jobs;

[70] AHC (2023) *Re: Public consultation on the proposed approach to assess and address carbon leakage risk, as part of the Carbon Leakage Review*, 15 December, see https://h2council.com.au/wp-content/uploads/2023/12/231215- Carbon-Leakage-Review-AHC-SUB_for-submission.pdf.

- relative timeframes for likely pathways to decarbonisation both in Australia and potentially competing countries, and effects on the above; and
- the relative mobility of each industry (that is, the necessary investment and threshold for moving investment away from Australia).

Assessment and analysis of the impacts of high energy prices in the EU (for example, the impact on the petrochemical industries), alongside the carbon pricing and CBAM measures, would be illustrative as a counterfactual for proposed Australian reforms. These experiences may illustrate the types of policies that would need to be in place in Australia to prevent capital flight as well as (hopefully) incentivise investment.

Whilst the Review notes that the purpose of a BCA is not to protect domestic industry and output, the AHC position is that Australia's suite of policies for addressing whole of economy decarbonisation should, where possible, be aligned with and work to enhance public investment strategies. For example, the Future Made in Australia Act (FMIA) and National Hydrogen Strategy signal Australia's ambition to be a market creator for the commercial scale hydrogen industry, with the intention of encouraging private capital to invest in sectors identified as critical to Australia's future economic prosperity. The hydrogen production tax incentive is intended to commence in 2027, and inclusion of hydrogen in the BCA would provide additional investment certainty for projects currently under development and seeking offtake as they approach FID in line with these dates.

The issue of carbon leakage goes beyond the movement of carbon, it also captures the movement of industries. In the absence of a carbon tax and without inclusion of hydrogen and its derivatives in carbon leakage mitigation policies, we risk parallel imports of not just grey commodities, but blue and green commodities that will force out domestic investment and innovation. In our view, hydrogen must be included on the first tranche of the BCA carbon leakage commodity list, which will provide the necessary investment and legislative certainty to companies investing across the hydrogen value chain.

## 9. AEMO's Integrated System Plan

**FOUNDATION - ENERGY**

**Description and status**

The Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP) is a scenarios-based roadmap for the National Electricity Market to transition to net zero by 2050. It sets out the required generation, storage and network investments. In the absence of an alternative, the ISP is used by many in the energy industry as the primary modelling for the future energy system.

AEMO also develops an Inputs, Assumptions and Scenarios Report (IASR) relates to the inputs, assumptions and scenarios it proposes to use in its next year's forecasting and planning activities, including the ISP.

The 2024 ISP and associated material was released in June 2024.[71] AEMO is currently developing the 2026 ISP and is working to include recommendations from the Energy and Climate Change Ministerial Council such as better integration of gas.[72] The 2026 ISP is scheduled to be published on 25 June 2026, with multiple opportunities to engage throughout the process.

### AHC position

AEMO's modelling is key to how Australian stakeholders, especially governments, view and make decisions regarding the future energy portfolio, including the infrastructure, planning and policy required. AEMO recognises the necessary role of hydrogen in Australia for tackling the hard to electrify sectors and achieving net zero, and we are pleased to see that this is touched on in each of the IASR scenarios set out by AEMO.

However, AEMO proposed that the 2025 IASR scenarios would be largely similar to the previous 2023 version.[73] We did not agree with this approach. There has been significant policy progressed since 2023 which impacts hydrogen, and this ambition and strategic direction should be reflected in the development of AEMO scenarios and forecasting. Even in its 'niche' uses (such as green iron and ammonia/methanol production), hydrogen will require a significant and long-term boost to Australia's electricity system – both on and off grid – as well as in other infrastructure such as pipelines.

[71] See AEMO (2024) *2024 Integrated System Plan*, June, https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2024-integrated-system-plan-isp.
[72] Energy and Climate Change Ministerial Council (2024) *Response to the Review of the Integrated System Plan*, Australian Government, see https://www.energy.gov.au/sites/default/files/2024-04/ecmc-response-to-isp-review.pdf.
[73] AEMO (2024) *2025 IASR Scenarios*, Consultation Paper, 17 July, see https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2024/2025-iasr-scenarios/consultation-paper.pdf?la=en.

In our view, the material that should be accounted for includes:

- all modelling and work undertaken for the revised National Hydrogen Strategy;
- the modelling undertaken by the Climate Change Authority for the Net Zero Plan (the Sector Pathways Review);
- other government work on the sectoral decarbonisation plans;
- the findings relating to business cases from Hydrogen Headstart; and
- Treasury modelling and consultation on the HPTI.

Further, we would expect the policy intent of the above and the broader FMIA to also inform AEMO's understanding of scenarios, given that industrial policy and funding initiatives will likely affect energy use by type and location. While much of the analysis and data will not be public, it should be shareable within the Australian Government to support planning.

The above data would support the current ISP, but we note that the natural parameters of the ISP means that some important analysis is still currently out of scope. For Australia to appropriately sequence the complex energy transition, we need advanced planning and regular reassessment across the wider net zero undertaking. Modelling could identify efficiencies and opportunities such as for developing common user infrastructure. It could also clarify understanding and assist policy development on the role for hydrogen in supporting the electricity grid, whether as a means of storage to be then fed back into the grid when needed, or where electrolysers act as a flexible load.

We need additional, interconnected data that interrogates the intricacies of the complete system. This level of planning is a significant task but would provide the required confidence to invest, navigate risk and identify opportunities. We note that enhanced whole of system modelling is underway, which includes infrastructure investment mapping, better integration of gas in the ISP and improvements to the hydrogen electrolyser load modelling.[74]

We encourage the Australian Government to consider the scale of modelling and forecasting required to decarbonise effectively and sequence efficiently, and fund publicly available and granular modelling across the entire net zero system.

[74] AEMO (2024) *ISP Methodology Consultation*, October, https://aemo.com.au/consultations/current-and-closed-consultations/2026-isp-methodology.

## 10. The Capacity Investment Scheme

**NEW GOVERNMENT FUNDING SUPPORT - ENERGY**

**Description and status**

In late 2023, the Australian Government announced the expansion of the Capacity Investment Scheme (CIS, previously a pilot only) to target a total of 32 GW of new capacity nationally. In July 2025, this was uplifted to 40 GW, made up of 26 GW of renewable capacity and 14 GW of clean dispatchable capacity (primarily for batteries but potentially including hydrogen for long duration storage).

The Australian Government will provide revenue underwriting for successful CIS tender projects, with an agreed revenue 'floor' and 'ceiling'. This in intended to decrease financial risks for investors.

The Australian Government is negotiating Renewable Energy Transformation Agreements with states and territories, which includes delivering around half of the capacity (18 of 32 GW) of the expanded CIS.

The expanded CIS will be rolled out from 2024 to 2027. There will be regular competitive tenders held approximately every 6 months, with the first pilot tender having launched in May 2024. Auction results for this tender were announced on 4 September 2024, supporting six large scale battery projects.[75] To date, there have been a further 4 tenders completed.[76]

There are three more CIS tenders currently in progress for: WEM generation (successful bids expected March/April 2026), WEM dispatchable (successful bids expected March/April 2026) and NEM generation (successful bids expected May 2026).[77]

The expected costs of CIS contracts are confidential.

### AHC position

The AHC has not formally provided a public position on the CIS. However, we support all efforts from the government to encourage investment in renewable energy and storage developments. This is for the sake of the energy transition as a whole, as well as greater availability of renewable electricity for hydrogen developments.

[75] DCCEEW (2024) 'Capacity Investment Scheme supports 6 new projects in Vic and SA', website, accessed 4 September 2024, see https://www.dcceew.gov.au/about/news/capacity-investment-scheme-supports-6-new-projects-vic-sa.
[76] DCCEEW (2025) *Closed CIS tenders*, Australian Government, https://www.dcceew.gov.au/energy/renewable/capacity-investment-scheme/closed-cis-tenders.
[77] DCCEEW (2025) *Open CIS tenders*, Australian Government, https://www.dcceew.gov.au/energy/renewable/capacity-investment-scheme/open-cis-tenders.

We note with interest the findings of the Climate Change Authority[78] that the design of the CIS is unlikely to attract tenders from necessary long duration storage options such as pumped hydro storage, which has lead times of over eight years and relatively high upfront costs. It is also considered unlikely to support more nascent technology or provide the longer-term signals needed for investment in the electricity sector beyond 2030.

[78] Climate Change Authority (2024) *Sector Pathways Review*, 5 September, page 32, see https://www.climatechangeauthority.gov.au/sites/default/files/documents/2024-09/2024SectorPathwaysReview.pdf.

## 11. The Sustainable Finance Roadmap, taxonomy and green bonds

**NEW STRATEGY, NEW GOVERNMENT FUNDING SUPPORT – SUSTAINABLE FINANCE**

**Description and status**

Following consultation in 2023, the Australian Government released a Sustainable Finance Roadmap[79] in June 2024.

The Roadmap sets out a range of actions to reduce barriers to investment into sustainable activities, explicitly addressing improved transparency on climate and sustainability, financial system capabilities, and Australian Government leadership and engagement.

Important elements include:

- Mandatory climate-related financial disclosure requirements for large businesses and financial institutions, that took effect in 2025. The bill on this matter passed the Senate in September 2024.
- The government's partnership with the Australian Sustainable Finance Institute (ASFI) to develop an Australian sustainable finance taxonomy, which was released in June 2025. This covers 'green' and 'transition' activities that contribute to climate change mitigation, in six priority sectors, as well as 'do no significant harm' and 'minimum social safeguard' criteria. The taxonomy is currently voluntary and in the pilot phase.
- The release of green bonds with the first green bond issued on 4 June 2024. The bond line is AU$9.6 billion in size and will start maturing in 2034. The Government will provide green bond investors with regular and transparent allocation and impact reporting. Annual reporting will be published on the AOFM website.

### AHC position

There is an apparent consensus on the need for increased policy and regulatory action to increase the rate of capital reallocation away from fossil fuels and activities incompatible with net zero. However, despite this consensus, the rate of capital flows to new energy projects (relative to capital flows in traditional extractive industries or technology investments) remains too low and too slow.

Feedback from AHC members indicates that it is not a shortage of capital that has prevented projects from progressing to FID and construction. Rather, lenders have proven to be risk averse, unwilling to finance projects developing clean molecule supply chains.

The AHC welcomed the roadmap and the range of actions it put into place.[80]

[79] The Australian Government the Treasury (2024) *Sustainable Finance Roadmap*, June, see https://treasury.gov.au/sites/default/files/2024-06/p2024-536290.pdf

[80] AHC (2023) *Re: Sustainable Finance Strategy*, 1 December, see https://h2council.com.au/wp-content/uploads/2023/12/231201-Sustainable-Finance-Strategy_AHC-submission.pdf.

We do seek for the various initiatives within the roadmap to explicitly account for clean and green hydrogen. Australia has existing and emerging capabilities in producing, moving, storing, and using hydrogen and its derivatives. For these capacities to increase, the requirements for the supply chains need to be explicitly considered and modelled, rather than emerge as implied within the taxonomies.[81]

We also note that the taxonomy is available for use on a voluntary basis by both the private and public sectors. In our view, the sustainable finance taxonomy is a significant policy to assist investor due diligence, and we prefer this is mandated rather than voluntary.

[81] AHC (2024) *Australian Sustainable Finance Taxonomy V0.1 consultation*, 7 July, see https://h2council.com.au/wp-content/uploads/2024/07/240707-AHC-submission-to-ASFI.pdf.

## 12. The National Energy Workforce Strategy

**NEW STRATEGY - ENERGY**

**Description and status**

The National Energy Workforce Strategy[82] will seek to ensure Australia has the workforce it needs to meet its net zero ambitions.

The stated aims of the strategy are to:

- Build on existing workforce resources to identify current and future skills gaps in the energy sector and help plan for energy workforce needs.
- Provide a national framework for coordinating existing and planned workforce-initiatives from the Australian, state and territory governments.
- Foster an environment that enables the clean energy workforce to grow, adapt and build the skills and capability we need to reach net zero emissions by 2050.
- Build on the work of Jobs and Skills Australia through the Clean Energy Capacity Study while not undertaking additional workforce projections.

A consultation paper was released in August 2024, where this described the need to address shortages in the clean energy workforce. The strategy was anticipated to be considered by Energy Ministers in December 2024, but there has not been any further formal update.

### AHC position

Clean energy projects are experiencing current skill shortages in critical occupations. For example, the 2023 Skills Priority List (SPL) found that 73 per cent of Electrotechnology and Telecommunications Trades and 100 per cent of Construction and Trades Worker occupations were in shortage nationally.[83] The Powering Skills Organisation (PSO) continues to identify worsening skills shortages and the need for more diverse skills to cater for the net zero transition in its 2025 Workforce Plan.[84]

Skill shortages will be exacerbated in the coming years as renewable energy projects of growing scale are deployed at a more rapid rate. In 2023, Jobs and Skills Australia (JSA) found that Australia needed an additional 32,000 electricians and 450,000 construction jobs to 2030 to meet legislated

[82] DCCEEW (2025) *National Energy Workforce Strategy*, Australian Government, https://www.dcceew.gov.au/energy/workforce#:~:text=The%20Australian%20Government%20is%20developing%20a.

[83] Jobs and Skills Australia (2023) *2023 Skills Priority List: Key Findings Report,* Canberra, https://www.jobsandskills.gov.au/sites/default/files/2023-10/2023%20SPL%20Key%20Findings%20Report.pdf.

[84] Powering Skills Organisation (2025) *2025 Workforce Plan: High Load, Short Supply*, https://poweringskills.com.au/wp-content/uploads/2025/08/PSO_2025_WorkforcePlan_v24_Summary-Report.pdf.

2030 decarbonisation targets.[85] It concluded that policy settings would not deliver the workforce needed to meet existing targets. It also found that while clean energy would provide a pathway for some transitioning workers, this workforce is too small to supply the rapidly growing needs of industry. While 2023 modelling, this report is referenced centrally in the Australian Government's 2025 Net Zero Plan.[86]

The need for a workforce skilled in handling hydrogen will add to these current requirements. While there is an existing workforce in hydrogen, the roles are largely in-house for major chemical producers and refiners, and the workforce is relatively small scale.

As shown in Figure 4, the future clean and green hydrogen industry will be much more complex, with a diverse range of newer roles in addition to a need for more traditional electrical trades, construction workers and process engineers. These newer roles to make hydrogen include handling feedstocks of various types, electrolyser manufacturing and maintenance, and handling liquid hydrogen. Further jobs are then created to use hydrogen and hydrogen products in a range of ways, such as in maintaining vehicles, exporting ammonia, producing green metals, and producing low carbon liquid fuels such as sustainable aviation fuel.

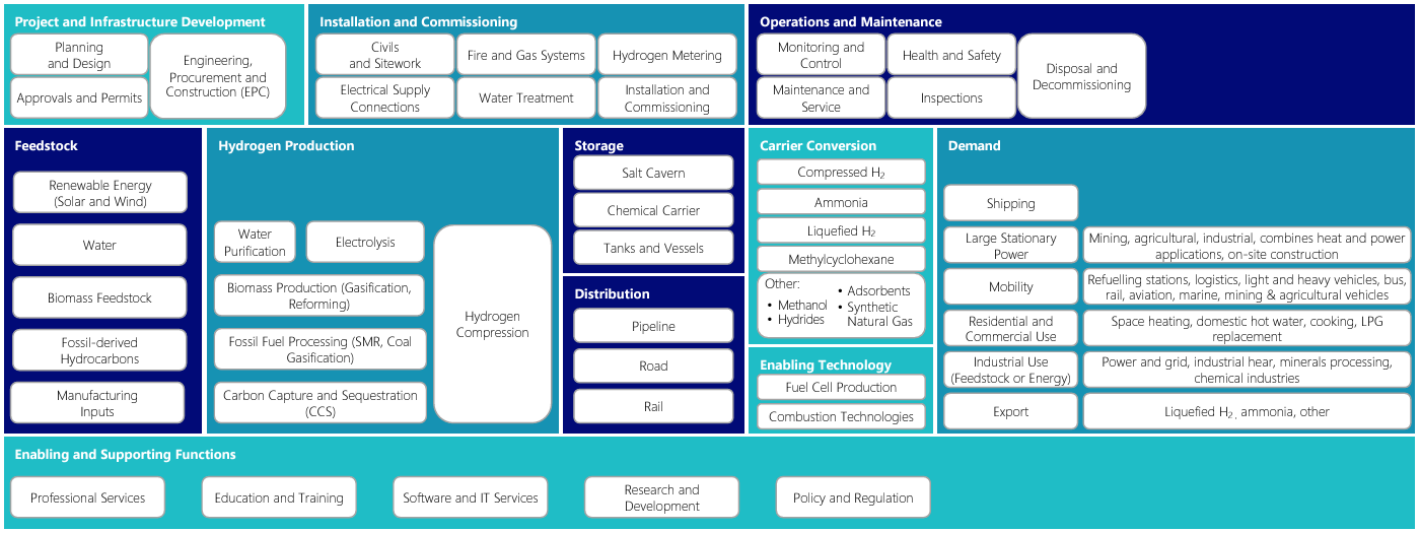


*Figure 2: Hydrogen supply chain framework. Source: ARUP 2023.*[87]

The diverse array of what is considered a hydrogen job in the emerging industry has, unfortunately, led to the workforce being insufficiently understood and modelled, and has left data gaps. There is still very little clarity and publicly available modelling on the scale, composition, location and pace of the emerging clean and green hydrogen workforce, let alone how this will be affected by the ambition and investment of the FMIA.

[85] Jobs and Skills Australia (2023) *The Clean Energy Generation*, Canberra, https://www.jobsandskills.gov.au/sites/default/files/2023-10/The%20Clean%20Energy%20Generation_0.pdf.
[86] Australian Government (2025) *Australia's Net Zero Plan*, https://www.dcceew.gov.au/sites/default/files/documents/net-zero-report.pdf.
[87] Arup (2023) *Powering Up: Seizing Australia's Hydrogen Opportunity by 2040*, National Energy Resources Australia, see https://h2council.com.au/wp-content/uploads/2023/04/230331-NERA-Powering-Up-HETS-Study.pdf.

There needs to be better assessment of the current and forecast hydrogen workforce. This modelling needs to comprehensively cover the full hydrogen value chain within Australia, either in a single or series of work packages. This would need consistent methodologies and inputs, as well as a degree of flexibility for key policy changes. The Australian Government is the natural owner of this undertaking; it already holds the strategic direction and action plan for Australia's policy framework, as well as the most extensive knowledge bank of Australian hydrogen projects through the Hydrogen Hubs, Hydrogen Headstart, and ARENA and CEFC processes.

The HPTI is proposed to start providing $2/kg for hydrogen produced from 1 July 2027, which means that projects will be racing and competing to ensure that they are producing from the start date, maximising their incentive. It is therefore vital that we collectively understand, model, communicate and begin addressing any issues in preparation for this date.

## 13. The National Electric Vehicle Strategy

**NEW STRATEGY - TRANSPORT**

**Description and status**

Released by the Australian Government in 2023, the National Electric Vehicle Strategy[88] sets out to get more EVs on the road and support EV charging infrastructure. FCEVs was covered in the basic definition of EVs.

A light vehicle Fuel Efficiency Standard was announced in the strategy, and this measure came into effect on 1 July 2024.

Primarily battery-focussed, the strategy only addresses hydrogen in a brief discussion about the establishment of hydrogen highways; that is, refuelling networks for key freight routes. Other than this there is no substantive discussion about hydrogen.

A comprehensive and in-depth review of the strategy will be undertaken in 2026.

### AHC position

We raise only for completeness: the AHC does not have a position on the National EV Strategy other than to note it is disappointingly silent on what is needed for hydrogen in transport, and also does not meaningfully address heavy vehicles. We have advocated for some time for heavy vehicle policy,[89] and for hydrogen infrastructure and demand support within this.

[88] DCCEEW (2023) *National Electric Vehicle Strategy*, https://www.dcceew.gov.au/sites/default/files/documents/national-electric-vehicle-strategy.pdf.

[89] For example: AHC (2025) *Investing in cheaper, cleaner energy and the net zero transformation*, submission, September, https://h2council.com.au/wp-content/uploads/2025/09/250923-PC-interim-report-AHC-submission.pdf.

## 14. Australia's clean energy investment ecosystem

**NEW GOVERNMENT FUNDING SUPPORT - ALL**

**Description and status**

The Australian Government is constantly adding and amending the clean energy investment ecosystem, especially with the array of incentives under the FMIA.

This includes but is not limited to:

- 2x $2b Hydrogen Headstart Program (ARENA)
- $6.7b Hydrogen Production Tax Incentive (Treasury)
- $475m Driving the Nation Fund (ARENA)
- $1.1b Cleaner Fuels Program (DCCEEW)
- Capacity Investment Scheme (ASL)
- $1.5b FMIA Innovation Fund (ARENA) – $750m for green metals, $500m for clean energy technologies and $250m for LCLFs
- $20b Rewiring the Nation Program (CEFC)
- $500m Battery Breakthrough Initiative (ARENA)
- $1.4b Powering the Regions Fund (ARENA)
- $5b Net Zero Fund (NRFC)
- $1b Green Iron Investment Fund (DISR) – up to $500m allocated to support the Whyalla steelworks
- $2b Green Aluminium Production Credit (Treasury)
- $9.6b Sovereign green bonds (AOFM)

### AHC position

We welcome the diverse range of funding mechanisms to support the development and deployment of clean energy technologies and projects. In 2025, this ecosystem has grown and inevitably spurred discussions on the efficiency of the existing and proposed government incentives.

There are numerous funding programs and specialist investment vehicles (SIVs) for clean technologies and renewable energy in Australia and yet ongoing issues accessing government programs. Each of these funding sources has unique objectives which often overlap. The funds do not, however, coordinate or hand over eligible projects between funding programs or between assessment stages. This translates to the same project or technology often needing to start again with each party, going through multiple lengthy application processes which consumes significant resources. For smaller organisations with limited resources, this hurdle can be enough to not apply, potentially restricting the speed to market. We note that this even occurs for different programs managed within the same organisation. The Net Zero Economy Authority recently highlighted similar

challenges to the Treasurer and the Minister for Finance as part of the process to identify regulatory reform opportunities and support the Australian Government's productivity agenda.[90]

The breadth and range of funding available is significant, with a commensurate level of difficulty in navigating the processes to access this funding. It is worth noting that, according to publicly available information, not one of the federal level or state level investment vehicles has met its investment targets. Given that there is widespread agreement that there is no shortage of ideas, innovation or entrepreneurial talent in Australia, one of the avenues to unlock the funding is to decrease the complexity and improve the triage and case management of potential investments.

With the growing complexity of the funding environment, there is a need for increased collaboration and cohesion, not only to minimise duplication and administrative burden on applicants but also for these SIVs themselves. With a re-elected federal government focused on the National Interest Framework under the FMIA, this is an opportune moment for reform. This might commence with a targeted audit of all SIVs and their programs to find solutions to inefficiencies and duplication, and maximise the value of government funding. In our view, the Australian Government should work to develop a 'touch once, use many times' model that guides applicants through this complex environment.[91] The model would wrap around each technology or project, big or small, and provide a case management approach that stewards businesses through the eligible programs, so as to safeguard and incubate Australian innovation.

In the meantime, for recommendations in reducing bottlenecks, encouraging participation across all applicant sizes and maximising benefits on government incentive programs, please review our relevant policy submissions.[92]

[90] Ross, I. (2025) *Response letter*, Net Zero Economy Authority, submission, 1 August, https://www.finance.gov.au/sites/default/files/2025-08/DISR%20-%20Net%20Zero%20Economy%20Authority%20-%20Response%20Letter_Redacted.pdf.

[91] We note that this philosophy aligns with the front door for investors program but is required at an increased capacity. Alternatively, a whole-of-government Investment Committee for clean technologies and renewable energy programs could be appropriate.

[92] AHC (2025) *Net Zero Fund proposed design*, submission, October, https://h2council.com.au/wp-content/uploads/2025/10/251017-Net-Zero-Fund-AHC-submission.pdf ; AHC (2025) *Investing in cheaper, cleaner energy and the net zero transformation*, submission, September, https://h2council.com.au/wp-content/uploads/2025/09/250923-PC-interim-report-AHC-submission.pdf ; AHC (2025) *Future Made in Australia Innovation Fund – Program design and consultation*, submission, 6 June, https://h2council.com.au/wp-content/uploads/2025/06/250606-ARENA-FMIA-Innovation-Fund-AHCsubmission.pdf, and; AHC (2025) *Strategic examination of Australia's R&D system*, submission, 11 April, https://h2council.com.au/wp-content/uploads/2025/04/250411-AHC-submission-Strategic-Examination-ofRD-.pdf.