



# **HORIZON 2035**

Decarbonising Australia's heavy industry



# Executive summary

The global push to decarbonise heavy industry gives Australia a rare opportunity to transform its industrial base, capture new export markets, and establish itself as a global leader in clean-technology manufacturing.

Australia’s natural advantages in world-class renewables, critical minerals like iron ore and bauxite, and skilled engineering capabilities create a strong growth platform. Yet realising this potential, demands closing production cost gaps, targeting markets willing to pay low-carbon premiums, and adopting pragmatic transition pathways that balance competitiveness with accelerated decarbonisation.

While many clean-technologies remain early-stage, the energy transition offers a clear path to revitalise domestic manufacturing. This means building competitive green value chains that leverage abundant renewables and key feedstock access.

Three anchor opportunities, green ammonia (via green hydrogen and renewables), green iron (via hydrogen reduction or electrolysis, leveraging iron ore reserves), and green aluminium (via renewable smelting and green alumina), offer the clearest route to long-term industrial renewal and economic growth, positioning Australia to lead in the next generation of global clean industry.

Success in these anchors could unlock tens of billions in additional economic value and tens of thousands of direct and indirect jobs by 2035, scaling further by 2050 under ambitious green export scenarios.

## Acknowledgements

This project received grant funding from the Australian Government.

# Opportunity landscape

Industrial decarbonisation presents a sizeable opportunity for Australia to manufacture clean-technology products in an emerging market with few established incumbents.

Industrial activities account for 34% of Australia’s total emissions, but this substantially understates exposure.<sup>1</sup> In 2024, Australia exported 866 million tonnes of iron ore. The total Scope 1 to 3 emissions from this industry alone is 227% of Australia’s domestic emissions.

This market already contributes A\$169 billion towards total global clean-tech investment of more than A\$2 trillion in 2024. While industrial decarbonisation accounted for approximately 5% of clean-technology investment in 2024, under a net-zero trajectory this could grow to more than 40% by 2050, representing trillions of dollars in investment.<sup>2</sup>

Australia’s advantages include world-class renewables, critical minerals and skilled workforce. Global competitiveness demands targeted strategies to close cost gaps, build domestic demand, scale through renewable-powered clusters, and enable First Nations leadership across the value chain.

## Pathway to achieving competitiveness

Australia has a narrow window to build globally competitive clean industrial manufacturing. Success rests on four foundations:

- 1. Rare Endowments
- 2. Access to Demand
- 3. Industrial Ecosystem
- 4. Strategy

Australia’s proactive strategy must shift from “dig and ship” to “mine and make,” capitalising on nascent market openings and limited incumbent competition to build sovereign capabilities in clean-technology supply chains before the window closes.

Notes/Sources: 1. National Greenhouse Accounts Australia (2024). 2. Ibid.

## 1. Rare endowments

Leverage ultra-low-cost renewables and supply-side incentives to close production cost gaps.

## 2. Demand

Target premium markets ready to pay for green-intensive products.

## 3. Supply-chain ecosystem

Build clusters that accelerate innovation, scale, and material reuse across anchors.

## 4. Strategy

Redefine transition pathways using hybrid approaches and existing infrastructure.

“ In 2035, green ammonia, iron and aluminium industries could **add \$31 billion in economic value** and create over 85,000 jobs.”



Anchor opportunities could add up to A\$260 billion to Australia's economy and support 192,500 jobs by 2050.

## | Sector overview

Australia's industrial sector stands at a critical intersection in the transition to net zero. Hard-to-abate industries such as steel, cement and fertiliser production drive around 34% of national emissions through energy- and carbon-intensive assets and core process chemistry that cannot be decarbonised with simple fuel swaps or efficiency alone.

These sectors face entrenched structural challenges that complicate decarbonisation. Decades of weak productivity and high construction costs have eroded manufacturing competitiveness, compounded by a small, fragmented domestic market and underdeveloped industrial ecosystems. Steel and aluminium operations compete with low-cost imports from regions rapidly adding capacity, while many proposed clean projects, including hydrogen-based iron and ammonia, stall at feasibility amid regulatory complexity and uncertain cost-competitive pathways.

Current momentum is not yet matching Australia's ambition. Australia aspires to industrial clean-tech leadership but risks falling behind as global peers deploy low-emissions facilities and

lock in future supply chains. Legacy plants remain tied to emissions-intensive configurations with long asset lives and few viable retrofit options, leaving them exposed as international markets, standards and trade measures increasingly favour low-carbon production.

Yet Australia's inherent strengths provide a strong basis for industrial decarbonisation and renewal. World-class renewable resources, abundant high-grade mineral reserves and deep engineering capability position Australia to develop green iron, alumina and aluminium.<sup>3</sup> Turning this potential into reality will require clean industrial projects to move beyond feasibility into construction and operation, supported by targeted policy, shared infrastructure and clear long-term signals.

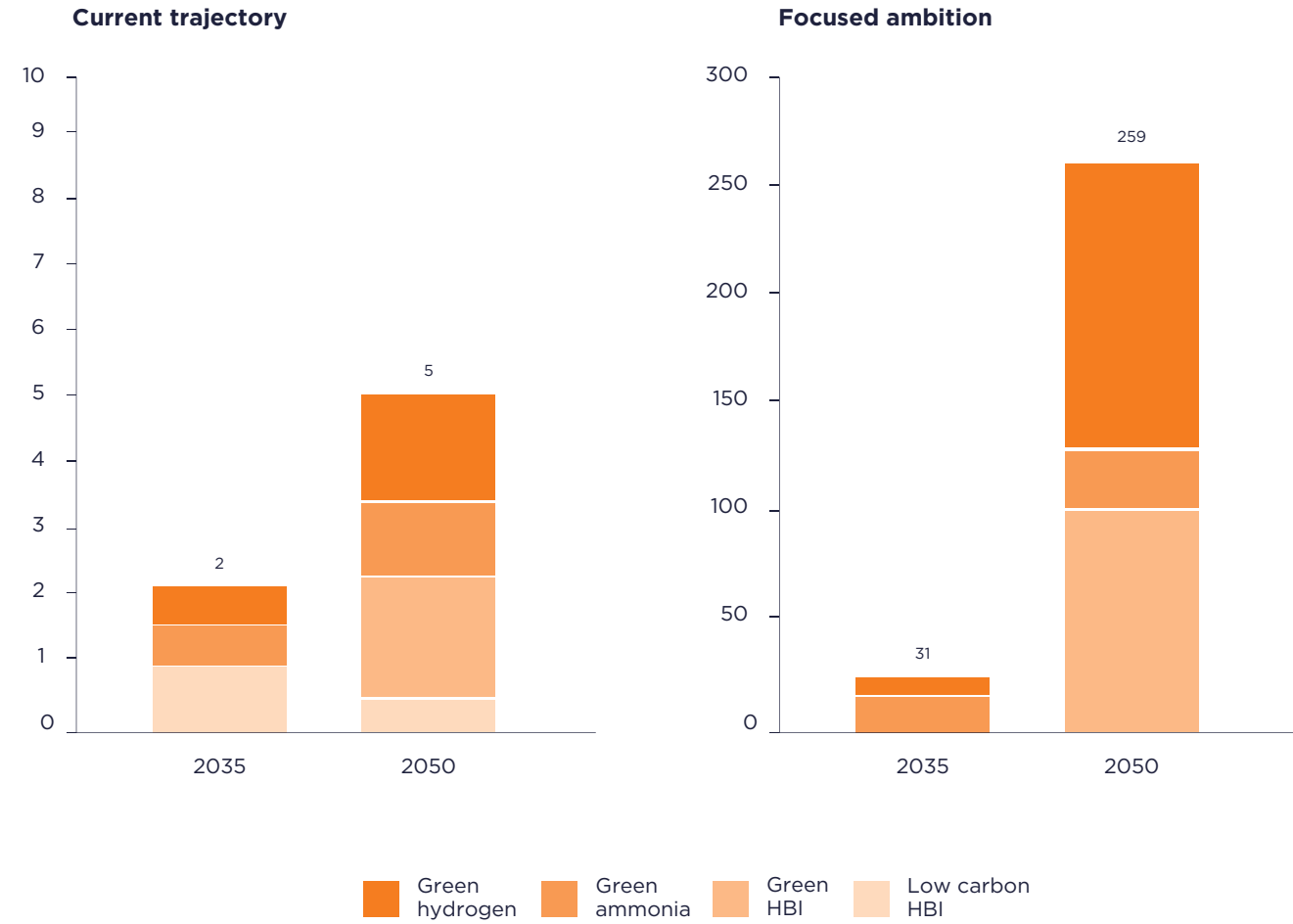
If Australia can align its industrial decarbonisation ambition with practical pathways to build and operate green anchor opportunities, it can sustain exports, attract international capital and secure high-quality jobs in a decarbonising global economy.

# Size of the prize: economic value

If Australia successfully develops the green industrial sector, it could become a major pillar of the national economy, delivering substantial growth and positioning Australia as a global leader in clean industrial technologies.

By pursuing the three anchor opportunities (green ammonia, iron, and aluminium), Australia could contribute A\$31 billion in GVA to its economy by 2035. Assuming Australia overcomes challenges and implements the actions outlined, these anchors would deliver this Gross Value Added through construction, operations, and supply chain activity. By 2050, the opportunities could scale to A\$260 billion in GVA under a focused ambition scenario.<sup>4,5</sup>

For scale, these figures rival the Australian oil and gas industry's current A\$100 billion+ annual GVA.



GVA estimation under current trajectory and focused ambition scenarios (A\$bn)

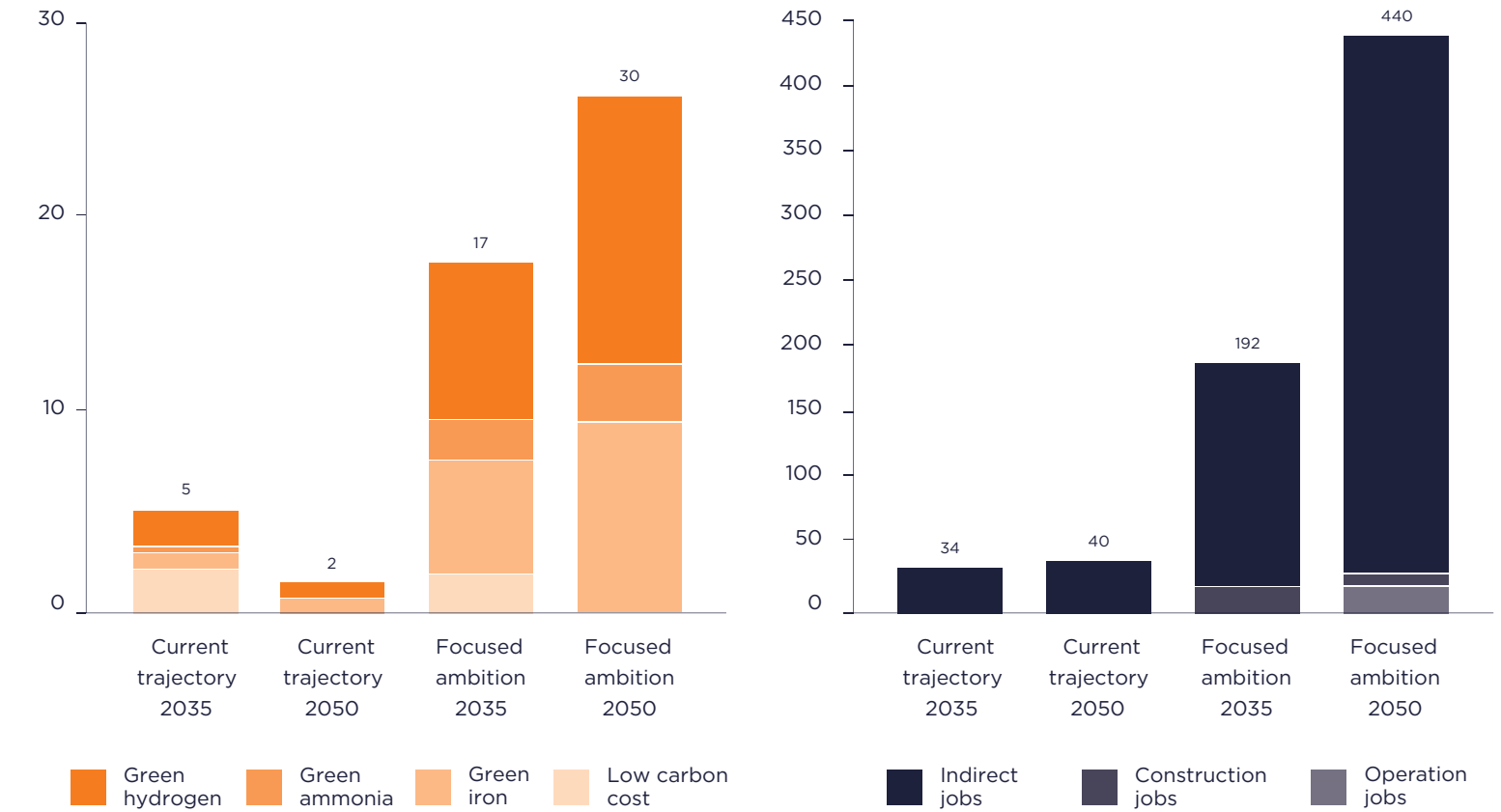
Notes/Sources: 4. CyABS (2025). 5. AEP (2024).

# Size of the prize: jobs

Anchor opportunities could transform Australia's industrial landscape. Under the focused ambition scenario, green ammonia, iron and aluminium manufacturing are expected to support around 85,000 jobs by 2035 across construction, ongoing operations and indirect roles.

By 2050, total employment associated with these anchors could rise to nearly 200,000 jobs nationwide, as projects scale and supply chains mature.<sup>6</sup> These figures rival the current employment footprint of Australia's oil and gas industry, positioning industrial decarbonisation as a cornerstone of future economic renewal.

Beyond direct employment, this growth would sustain long-term job pipelines through successive construction phases, ongoing plant operations and revitalised regional supply chains linked to the clean energy transition.



Jobs estimation under current trajectory and focused ambition scenarios (000' Full-Time Equivalent (FTE))

Notes/Sources: 6. Independent analysis Cyan Ventures and Deloitte.



## Anchor opportunities

Three of four key pathways to success are identified as “anchor opportunities.” These are opportunities with strong potential for Australia’s long-term competitiveness and may also contribute to improving supply chain resilience.

## Green ammonia

Australia can position itself for global green ammonia leadership. The country currently produces around 0.425 million metric tons of grey ammonia annually, primarily used for mining explosives.<sup>7</sup> Green ammonia, produced by combining green hydrogen with nitrogen through electrolysis powered by renewable energy, is rapidly emerging as a versatile zero-carbon energy carrier and fuel, especially relevant for decarbonising high-emission sectors such as mining and shipping.

With 95% of ammonia projects expected to be low-carbon or green, Australia is well-positioned to lead the global green ammonia market.<sup>8</sup> This advantage stems from abundant renewables,

port proximity, and policy-driven Asian markets (e.g., Japan/Korea). Early domestic offtake from mining adds minimal -2% to explosives costs, stimulating scale.

While challenges such as feedstock costs and capital requirements remain, competitiveness is expected to improve through ultra-low-cost renewables, hybrid plant designs, and government policies. Green ammonia also offers a clear use case for scaling domestic green hydrogen production, which in turn supports growth in other clean industries like green iron manufacturing.

	Timeline					Optimal location considerations
	2025 - 30	30 - 35	35 - 40	40 - 45	45 - 50	
Transition pathways						<ul style="list-style-type: none"> <li>High wind and solar resource</li> <li>Access to low-cost gas</li> <li>Access to carbon storage (e.g. depleted oil fields)</li> </ul>
Priority markets	<ul style="list-style-type: none"> <li>Mining industry - explosives</li> </ul>		<ul style="list-style-type: none"> <li>+ shipping</li> <li>+ fertilisers</li> </ul>			
Scale	<ul style="list-style-type: none"> <li>Domestic focused: conversion of current plants and small number of additional smaller scale plants (&lt;1mtpa)</li> </ul>		<ul style="list-style-type: none"> <li>Exports focused: develop globally significant capability as a competitive leader in green (multiple &gt;1mtpa plants)</li> </ul>			
Structural cost reductions	<b>Unique endowments:</b> <ul style="list-style-type: none"> <li>Ultra-low-cost renewables (ULCR)</li> </ul>		<b>Industrial ecosystem:</b> <ul style="list-style-type: none"> <li>Shared CAPEX infrastructure</li> <li>Co-location with suppliers</li> </ul>		<b>Demand:</b> <ul style="list-style-type: none"> <li>Long-term offtake certainty</li> <li>Domestic demand</li> </ul>	<b>Strategy:</b> <ul style="list-style-type: none"> <li>H2 tax credit</li> <li>Additional public support</li> </ul>



### Overarching pathway to competitiveness for green ammonia

Notes/Sources: 7. 20 Institute for Energy Economics and Financial Analysis (2024). 8. CSIRO HyResource (Projects Spreadsheet) (2025) – derived from electrolyser and non-biomethane or coal gasification derived production pathways.

# Green aluminium

Australia's abundant renewable energy and existing aluminium production capacity provide a strong foundation for leading the transition to low-carbon aluminium. Smelting accounts for nearly 60% of emissions across the aluminium value chain, making renewable power substitution the critical leverage point.<sup>9,10</sup>

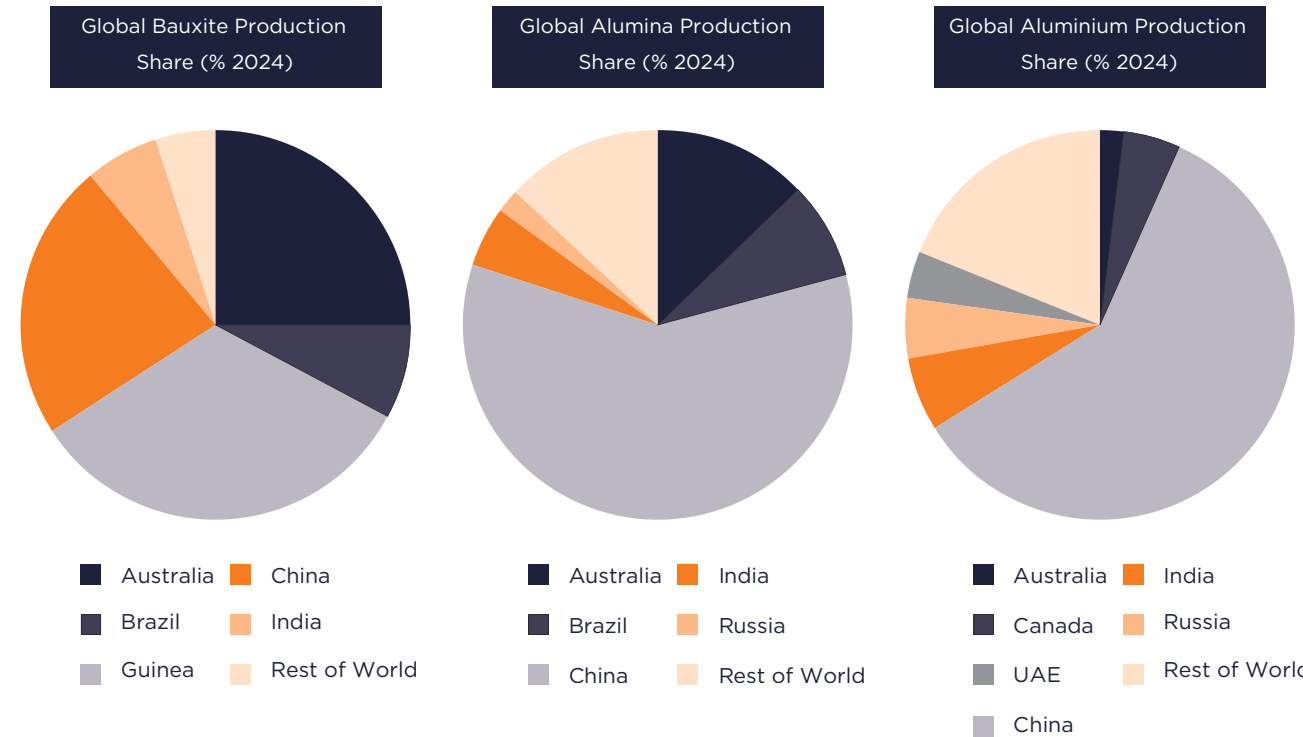
Australia's four smelters, located in Tasmania (Bell Bay), Queensland (Boyne Island), Victoria (Portland), and New South Wales (Tomago), are well placed to directly reduce emissions through renewable energy adoption. Rio Tinto's Bell Bay smelter has already transitioned to hydroelectric power, demonstrating near-term possibilities, while the A\$2B Green Aluminium Production Credit from 2028 supports the others.

Australia smelts about 15% of its alumina domestically<sup>11</sup>, exporting most to key Asian markets like China, Japan, and Korea. Competitive renewables and emerging technologies like inert anodes enable lower carbon intensity across the value chain over time.

Coupled with Australia's competitive renewable energy prices and ongoing innovation, this positions green aluminium as a premium product for sustainability-driven markets like automotive and electronics, where premiums (~1-1.5% cost impact) can be absorbed.

**Australia ranks as the world's 2<sup>nd</sup> largest producer of bauxite and alumina, and 6<sup>th</sup> largest producer of aluminium, in the global chain.**

Notes/Sources: 9. Emission drivers: Australian Aluminium Council - Alumina (2022), Australian Aluminium Council - Bauxite (2022), AEMO (2025), 10. Total emissions: Australian Aluminium Council - Sustainability (2022), 11. Australian Aluminium Council (2021).



Global shares of aluminium production<sup>1</sup>

Graph Notes/Sources: 1. United States Geological Survey - Mineral Commodity Summaries (2025).

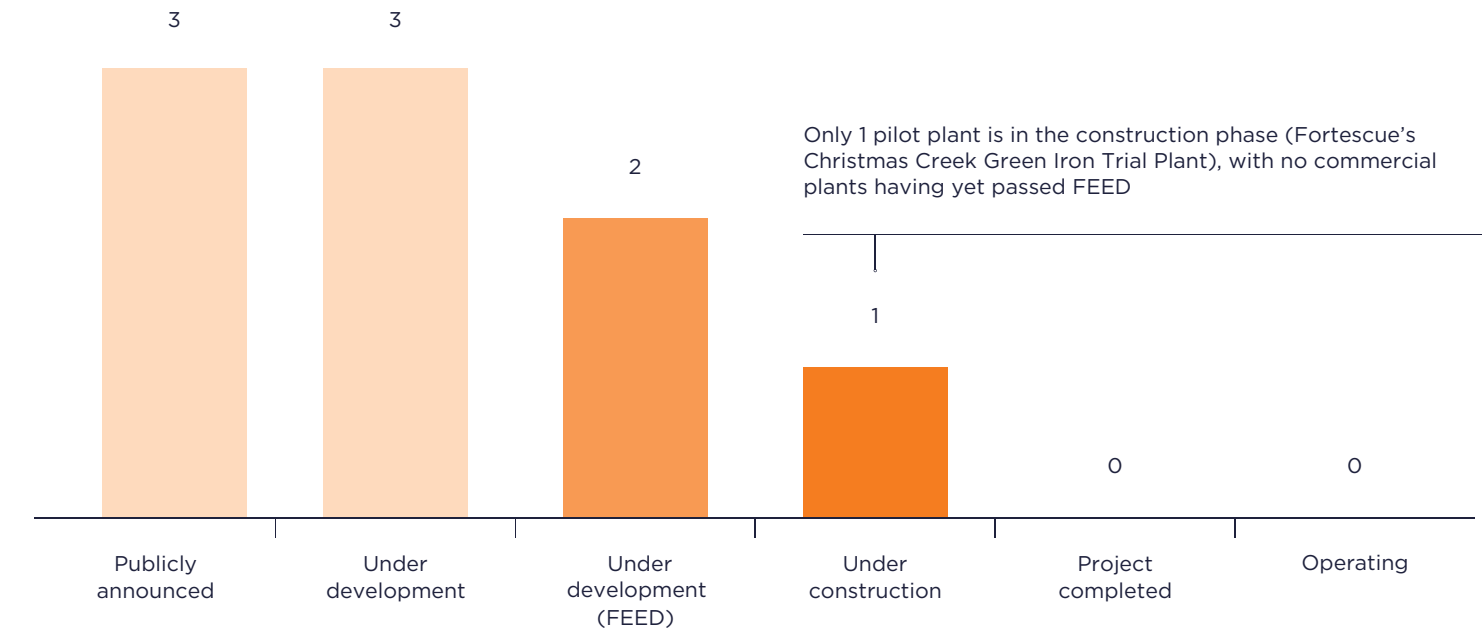
# Green iron

Australia holds the world's largest hematite iron ore reserves (~52,000 Mt, 98% in Western Australia's Pilbara region), powering its dominance as the top global exporter DRI-EAF (~902 Mt in 2024, mostly to China).<sup>12</sup> Green iron, produced via green hydrogen (HBI), electric smelting, or electrolysis, represents a prime chance to extend this edge into low-emission steelmaking amid Asia-Pacific demand surges

While Australia excels in raw ore exports to markets like Japan and Korea, it has no full-scale green iron facilities yet. Pilbara hematite's non-magnetic nature demands costly beneficiation for DRI pathways, putting it at risk versus easier ores from Brazil and Guinea, innovation in ESF or electrowinning is essential to stay ahead.

The low-carbon pipeline features four projects (all green/low-carbon: Fortescue's under construction for 2025, GSWA's hybrid in WA, NeoSmelt pilot in Kwinana, Port Hedland's HBI), sited near ores, renewables, and ports in WA/QLD, bolstered by the Green Iron Fund. Success depends on cost reductions, hybrid pathways, premium markets, and First Nations partnerships at optimal sites.

Notes/Sources: 12. Government of Western Australia (2025).



Australian green iron project pipeline - pilot and commercial scale (number of projects)<sup>1</sup>

Graph Notes/Sources: 1. Data from DISR (2024), updated to reflect current market conditions. Includes full-scale and demonstration scale projects.

# First Nations opportunities

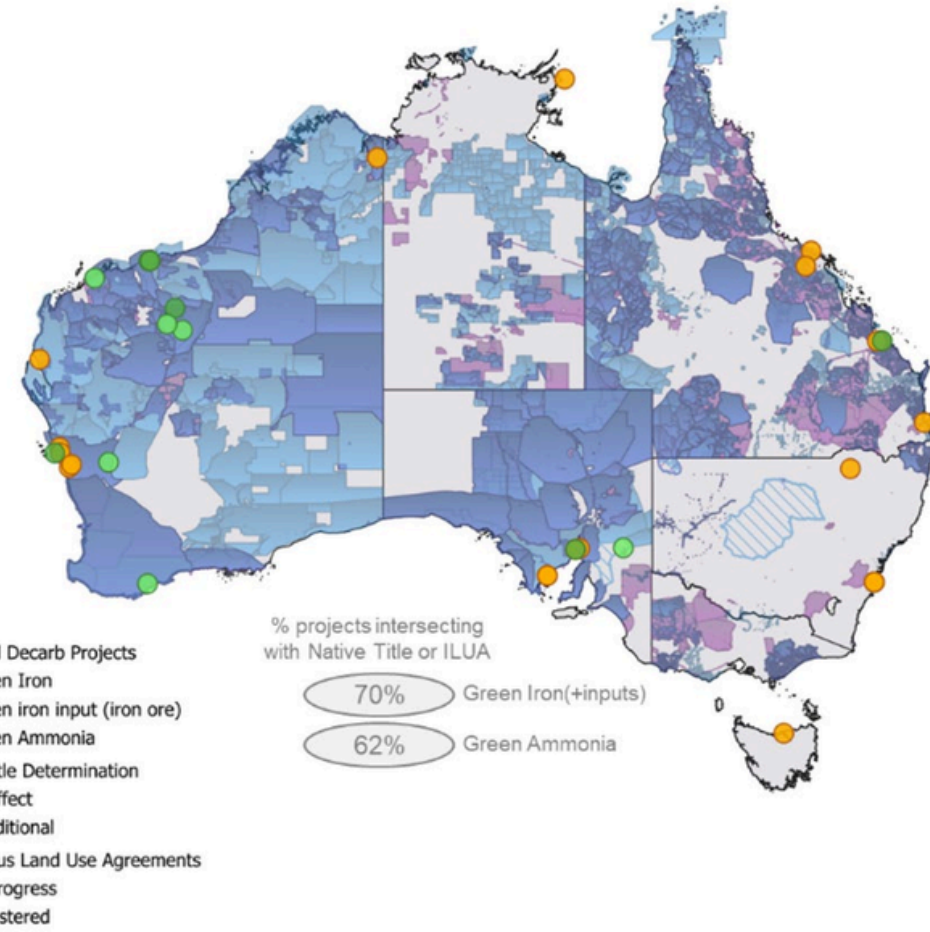
First Nations engagement, collaboration and partnership, is a critical enabler to clean-technology opportunities.

First Nations engagement, collaboration, and partnership are critical enablers of Australia's clean-technology opportunities, particularly industrial decarbonisation. Nearly half of energy infrastructure for net zero by 2060 sits on First Nations Estate, with 70% of green iron projects and 62% of green ammonia pipelines intersecting Native Title/ILUA lands.

First Nations businesses are well positioned to partner and lead in clean energy transition, bringing distinctive strengths, including strong regional presence where clean-tech clusters, cultural knowledge for sustainable development, and growing technical/entrepreneurial capabilities across 13,500+ businesses.

Critical pathways span land-linked opportunities (green iron/ammonia via ILUAs/equity), direct clean-tech entry (recycling, electrolysers), and enabling services (construction, project development, environmental management).

**65% of iron ore assets and up to 79% of critical minerals projects are located on land with established native title or other procedural rights.**



Green iron and green ammonia projects intersecting with First Nations Native Title and Indigenous Land Use Agreements (ILUA)

# Making it happen

Australia wins by leveraging unique natural advantages in renewable energy and iron ore feedstocks to achieve cost leadership in green industrial manufacturing. High labour and infrastructure costs remain challenges that must be offset through scale, policy, and innovation.

Differentiated competitiveness	Description
Local customisations	Unique features for Australian conditions (e.g. CST for high irradiance)
Geopolitical sub-markets	Trade barriers create Australia-preferred niches (e.g. military metals)
Innovation with commercial edge	Commercialised tech/IP advantages (e.g. low-emissions ore upgrading)
Made in Australia premium	ESG/quality credentials command price premiums

These cost and differentiation pathways position anchor opportunities for long-term leadership. Several key actions are underway, with more needed to scale and sustain competitiveness.



# Achieving Australia's potential

Australia stands at a turning point to lead global clean-tech manufacturing.

Australian start-ups, scale-ups, industry, and research institutions pioneer technologies, creating a thriving green industrial ecosystem from anchor opportunities to adjacent value chains.

From pioneering technologies to new green products, genuine collaboration with businesses, communities, and government is essential.

Together, we turn Australia's abundant clean energy and industrial expertise into lasting prosperity.

**The opportunity is immense, but success requires collective action.**

We invite industry leaders, policymakers, investors, and communities to connect with Powering Australia, explore the plan, and work together to build a cleaner, more resilient, and competitive future.

For further information and to engage with our team, please contact Powering Australia.





#### **Acknowledgement**

Powering Australia wishes to acknowledge the First Nations peoples of Australia and recognise their enduring connection to Country through culture, people, place and story. We honour the knowledge systems that have sustained these lands and waters for thousands of generations and recognise the vital role of First Nations leadership and self-determination in shaping a just and sustainable future. As Australia undergoes a significant clean energy and industrial transition, we acknowledge the importance of respectful partnership, cultural integrity, and shared purpose to realise the full opportunity of the Clean Energy Transition.