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Australia's green iron journey: Racing against time, waiting on technology

- *Australia must not delay beginning its green iron journey. Although emerging ironmaking technologies still need to be developed that can use Pilbara iron ore in low-carbon iron and steelmaking, Australia does not need to wait for them.*
- *Producing lower-emissions iron and steel without coal via DRI-EAF and high-grade ore is a mature pathway already in use at commercial scale outside Australia. Building domestic iron ore processing capacity using proven, available technologies is essential to stay competitive with the likes of Brazil, Canada and the Middle East.*
- *Developing new high-grade magnetite iron ore operations – along with the necessary concentrate and pellet facilities – can take up to a decade to reach stable production. While a few magnetite projects are progressing, early action is essential to ensure future readiness and meet the growing global demand for greener steel feedstock.*

Introduction

Composed predominantly of lower-grade ores such as hematite and goethite, Australia's iron ore supply is not well-suited for a green steel transition based on the available technologies.

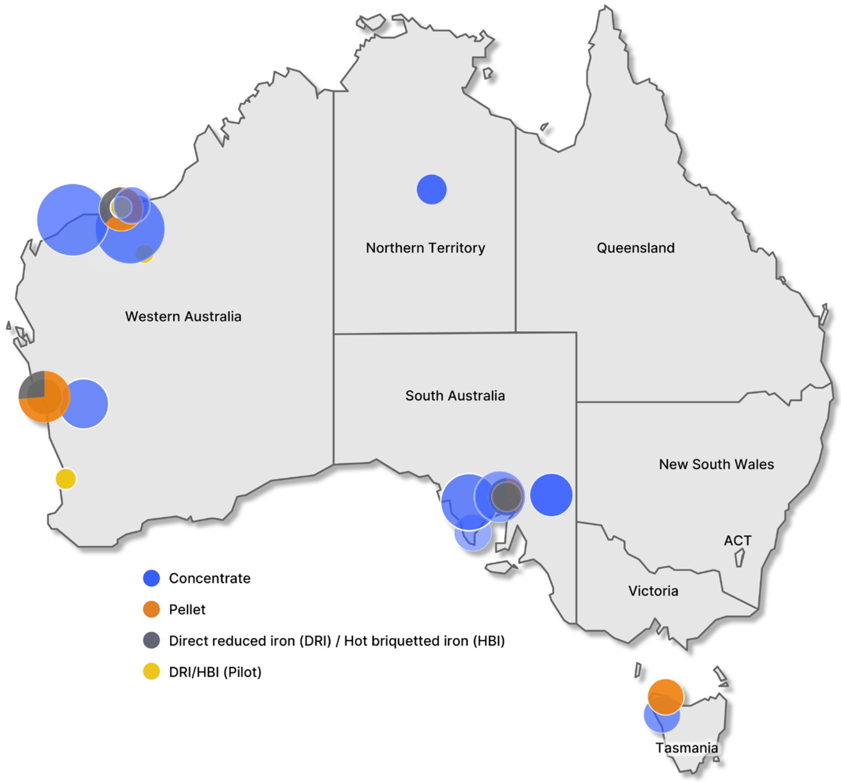
To remain competitive in this transition, Australia has two key options: to develop new magnetite mines capable of producing higher-grade (DR-grade) iron ore; or to deploy emerging technologies that enable use of the country's abundant low- to mid-grade ores.

While the first pathway has been commercially proven for decades in other regions, the second is still developing. As the world's largest iron ore exporter – the great majority of which is lower-grade ore for blast furnace-based steelmaking – Australia will likely need to pursue both approaches to stay relevant in the rapidly evolving green steel market.

The critical factor is time. Developing these pathways takes years. Even for the first option, where the technology already exists, developing new mines and constructing concentrate and pellet facilities can still take up to a decade.

Global competition is intensifying, and early movers have the opportunity to establish a strong foothold. For Australia, the clock is ticking. While speculation persists about Australia's role in green iron development, the current landscape of activity must evolve; otherwise, Australia risks missing out on this once-in-a-generation opportunity. Major miners must accelerate their efforts and adopt viable solutions quickly. This transition waits for no one.

Australia's iron value chain: Today and tomorrow



PRODUCT	STATUS	COMPANY	FACILITY	CAPACITY (Mtpa)
Concentrate	Operating	Northern Iron	Warrego Mine	1.2
Concentrate	Operating	Fortescue	Iron Bridge	22
Concentrate	Operating	CITIC Pacific Mining	Sino Iron	24
Concentrate	Operating	Karara Mining	Karara	8
Concentrate	Operating	SIMEC Mining	Middleback Ranges	2.2
Concentrate	Operating	Grange Resources	Savage River Concentration	2.85
Pellet	Operating	Grange Resources	Savage River Pelletising	2.6
Pellet	Operating	GFG Alliance (under administration)	Whyalla Pelletising	1.3
Concentrate	Proposed	Magnetite Mines	Razorback	5
Concentrate	Proposed	Lincoln Minerals	Fusion Project	3
Concentrate	Proposed	Iron Road	Central Eyre Iron Project (CEIP)	12
Concentrate	Proposed	Atlas Iron (Part of Hancock Prospecting)	Ridley Magnetite Project	3
Concentrate	Proposed	SIMEC Mining	Middleback Ranges (expansion)	7
Pellet	Proposed	POSCO (Port Hedland Iron)	PHI Pelletising	3.5
Pellet	Proposed	Progressive Green Solutions (PGS)	Mid-West Green Pellets & Green Iron Pelletising	7
DRI/HBI	Proposed	POSCO (Port Hedland Iron)	PHI HBI	2
DRI/HBI	Proposed	GFG Alliance	Whyalla Steelworks	1.8
DRI/HBI	Proposed	Green Steel WA	Mid-West DRI	2.5
DRI/HBI	Proposed	Progressive Green Solutions (PGS)	Mid-West Green Pellets & Green Iron HBI	2.5
DRI/HBI	Proposed	Greensteel Australia	South Australia Project	1.2
DRI/HBI (Pilot)	Proposed	Calix	Zesty Green Iron	0.03
DRI/HBI (Pilot)	Proposed	Fortescue	Green Metal Project	0.0015
DRI/HBI (Pilot)	Proposed	BlueScope, BHP and Rio Tinto	NeoSmelt	0.04
DRI/HBI (Pilot)	Proposed	Rio Tinto	BioIron	0.008

The DRI-EAF pathway

The direct reduced iron-electric arc furnace (DRI-EAF) route is considered the most promising pathway for decarbonising primary steel production. As the second most widely used ore-based steelmaking technology after the blast furnace-basic oxygen furnace (BF-BOF) process, it has already been deployed for many years across various regions, including the US, India and the Middle East & North Africa (MENA).

Compared to the BF route, DRI technology relies on high-grade iron ore, which could be sourced from magnetite deposits when premium-grade hematite – such as that supplied from Brazil – isn't available. Magnetite ore generally has a lower initial iron content – often below 30% – but its magnetic properties allow iron to be separated from unwanted materials, producing a high-grade iron ore concentrate through processing. Conventional DRI technologies rely on iron ore pellets made from this high-grade concentrate. Iron ore concentrate must be formed into marble-shaped pellets to ensure proper permeability and usability in DR shafts. As a result, the mining and processing set-up for DRI is more complex than for BFs, which are more flexible in using a wider range of iron ores with higher impurities.

Nations aiming to secure a larger share in the green iron market must focus on building capabilities across the entire value chain. With abundant high-grade iron ore resources, countries like Brazil, Canada and Sweden are better positioned for this transition, while Australia faces a bumpier road. Competing in the DR market requires a different set of competencies, and Australia must invest in developing them if it wants to remain competitive.

Australia's high-grade iron ore landscape

Green iron production using DR technology requires higher-grade ore, which could be sourced from Australia's magnetite reserves. Australia's magnetite iron ore sector has evolved over the past two decades, with several large-scale concentrate plants launched to supply high-grade feedstock (not specifically for DRI production). However, despite the scale of investment, many projects have been plagued by delays, budget blowouts and operational setbacks.

This section explores the history of large-scale magnetite concentrate and pellet facilities in Australia. It aims to provide a clearer understanding of the timelines involved in developing similar projects at scale, and to galvanise swifter action from investors and government in developing new mines.

Iron Bridge

Iron Bridge is Australia's newest large-scale magnetite iron ore concentrate plant, with a designed annual capacity of 22 million tonnes (Mt). Commissioned in May 2023, the plant has struggled to reach its nominal output, with the ramp-up timeline remaining uncertain nearly two years later. Fortescue's FY2025 guidance anticipates production of 5-9Mt. The project was delivered a full year behind schedule and exceeded its original US$2.6 billion budget by an additional US$1.3 billion. More investment is needed to resolve unexpected challenges such as pipeline leakage before nominal capacity can be reached, assuming that target is even realistically achievable.

Fortescue founder Andrew Forrest highlighted Iron Bridge's long journey to production, saying it had taken 20 years and 20 million work hours to get the plant into operation, on tenements the company had acquired for less than $50,000 in 2003.

Sino Iron

CITIC Pacific Mining's Sino Iron project, commissioned in 2013, remains the largest magnetite concentrate operation in Australia, with a nameplate capacity of 24Mt per year. Despite its impressive scale, the project was delivered four years behind schedule with its original budget of US$2.5 billion blowing out to US$12 billion. Originally acquired in 2006 for just US$415 million, Sino Iron has struggled with persistent ramp-up delays and ongoing operational challenges.

Most recently, output is projected to decline sharply from over 21 million wet metric tonnes (wmt) in 2023 to around 14 million wmt in 2024 due to space constraints at the site, raising fresh concerns about the project's long-term production stability. The company is also grappling with AU$941.5 million in unpaid royalties claimed by Australian billionaire Clive Palmer, who had granted land on tenements held by his private company, Mineralogy, to CITIC for mining.

Karara

Karara, which shipped its first magnetite concentrate in 2013, reached stable production levels by 2016-17. With a current capacity of 8Mt per year, the project has experienced its own challenges, similar to other magnetite operations in the country. While Karara Mining Limited has announced plans to expand capacity to 37Mt, it remains unclear whether this ambitious target is actively being pursued or remains aspirational.

SIMEC Mining

Since 2007, SIMEC Mining – now part of the Liberty Steel Group – has been mining 2.2Mt of magnetite annually, transporting it via slurry pipelines to Whyalla Steelworks to produce 1.3Mt of pellets for steel production. The company had previously outlined a vision to expand production to 15Mt of DR-grade concentrate; however, this plan is now uncertain since Whyalla Steelworks has entered administration.

Savage River

Grange Resources' Savage River plant holds the distinction of being the oldest operating concentrate facility in Australia. With a capacity of up to 2.85Mt annually, it supplies a captive pelletising plant with a capacity of 2.6Mt. The company has proposed the North Pit Underground (NPUG) project, aimed at expanding capacity and significantly lowering production costs, positioning Savage River for a more competitive, sustainable future. The company reported 2024 cash costs of AU$146 per tonne and aims to reduce NPUG cash costs to below AU$100 per tonne.

Other processing facilities

In recent years, a few small-scale facilities have processed low-grade iron ore stockpiles as part of mine rehabilitation efforts. The two main projects are Warrego and Peko, both located in the Northern Territory. Warrego successfully shipped its first cargo to the Asian market in January, while operations at the Peko mine ceased following the operator's voluntary administration in February 2024.

Roy Hill's Wet High Intensity Magnetic Separation (WHIMS) plant in the Pilbara also utilises magnetic separator technology for hematite ores. It was specifically deployed to recover an additional 4Mt of iron ore from the tailings of the existing processing facility at Roy Hill.

Pellet production

While Australia has large-scale facilities producing iron ore concentrate, pelletising has not been a major focus. Currently, there are only two small-scale operations. The first one is Grange Resources in Tasmania with a capacity of 2.6Mt; the other is at Whyalla Steelworks and uses magnetite ore from the Middleback Ranges to produce 1.3Mt pellets. Both facilities produce BF-grade pellets with an iron content below 65%. Liberty Steel Group tested its magnetite pellet in the DR process in 2024 using two different conventional gas-based technologies. The results were promising, exceeding both quality and performance expectations.

Table 1: Australia's current magnetite iron ore concentrate and pellet producers

	Company	Facility	Nominal capacity	Region	Commencement year	Construction time	Ramp-up period	Production
Concentrate	Northern Iron	Warrego Mine	1.2Mtpa	Northern Territory	2024	—	<1 year	—
Concentrate	Fortescue	Iron Bridge	22Mtpa	Pilbara	2023	5 years (2019-2023)	On a learning curve	2025 target = 5-9Mt
Concentrate	CITIC Pacific Mining	Sino Iron	24Mtpa	Pilbara	2013	~9 years (2006-16)*	Almost 9 years (2013-22)	21Mt in 2023
Concentrate	Karara Mining	Karara	8Mtpa	Mid West	2013	~4 years (2009-13)	6 years	7.5Mt in 2022
Concentrate	GFG Alliance (SIMEC Mining)	Middleback Ranges	2.2Mtpa concentrate (1.3Mtpa pelletised)	South Australia	2007	—	—	2.2Mt
Concentrate	Grange Resources	Savage River	2.85Mtpa concentrate	Tasmania	1967	—	—	>2.5Mt in 2024
Pellet			2.6Mtpa pellet			—	—	2.4Mt in 2024
Pellet	GFG Alliance (under administration)	Whyalla Pelletising	1.3Mtpa	South Australia	1968	—	—	—

Source: IEEFA; Companies' reports.
*Note: *Commencement of the first CITIC plants occurred in 2013. The last two processing plants were commissioned in 2016.*

Racing against time, from drill to delivery

The history of similar projects shows that developing a new facility for iron ore concentrate and pellet production and achieving stable operations can take up to a decade. This is especially true in Australia, where obtaining the necessary approvals to launch a project can be a lengthy process. This means that even if some of the new magnetite projects were to start today, they wouldn't be ready for DRI production until the mid-2030s. It is clear that if Australian iron ore miners want to seize this opportunity, they must accelerate the development of major magnetite projects around Australia.

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After Hancock Prospecting deferred its investment in the Ridley magnetite mine, the company's chief executive officer projects, Sanjiv Manchanda, said: "We must control the things we can control and reduce uncertainty and unnecessary delays and costs imposed by an onerous approvals system to ensure that West Australian projects can be developed."

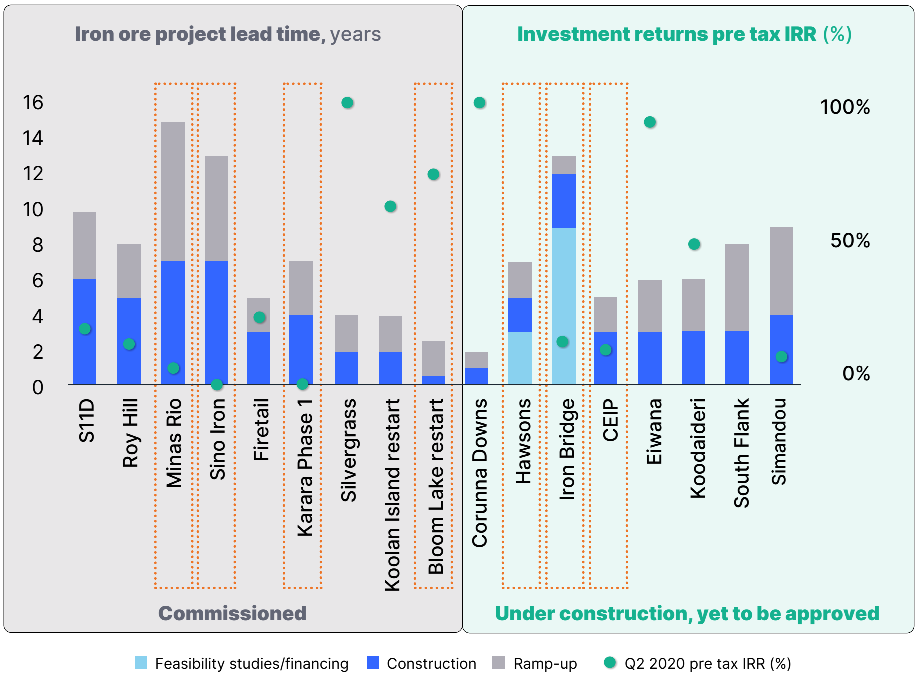
Tim Dobson the CEO of Magnetite Mines said that while meeting emissions-reduction targets created some urgency for Australia to transition to the green steel, a more pressing factor was the race to stake its claim as an iron-producing nation. Dobson added: "And unfortunately whilst Australia wants to be a leader, and has comparative advantages, we're actually behind the eight ball already because other jurisdictions are well ahead in terms of government support, and I'd point to Canada as a great example."

Dobson also noted that other regions such as the Middle East could move more quickly from a regulatory and capital perspective.

Market fluctuations can also postpone the final investment decision (FID) in such projects. The journey of Grange Resources' Southdown Magnetite Project in Western Australia is a clear example of the lengthy, complex process involved in developing a new mine. Initially referred to Environment Protection Australia (EPA) in 2009, the project was first shelved in 2012 due to escalating development costs. Two years ago, the company – which operates an iron ore concentrate and pelletising plant in Tasmania – resubmitted the project to the EPA with plans to commence development in 2024-25. However, it later withdrew the submission after the release of an updated pre-feasibility study, which estimated development costs at AU$2.34 billion.

The lead time for iron ore mining is lengthy, involving exploration studies, construction, and a ramp-up period following commissioning, particularly if it is a pellet feed production project. According to S&P, it takes an average of 15.7 years for precious and base metal mines to progress from discovery to commercial production and iron ore mining is not an exception. This lead time is increasing for new projects.

Figure1: Iron ore projects lead time



Source: Wood Mackenzie. Orange boxes indicate iron ore pellet feed projects.

While developing new capacities may take years to come to fruition, Australia should recognise the value of its existing capacities, as they provide a strong foundation for developing a domestic green iron value chain. Karara has signed an offtake memorandum of understanding (MoU) to supply iron ore concentrate to Progressive Green Solutions (PGS), which plans to produce pellets and DRI in Western Australia. In the Emissions Assessment study, POSCO's proposed hot briquetted iron (HBI) plant in Port Hedland is also assumed to source iron ore concentrate from Iron Bridge or Ridley.

Australia has sufficient iron ore concentrate to begin its journey towards producing green pellets and, subsequently, green iron. However, additional supply will be needed, and this is currently under development.

Major magnetite mine projects in the pipeline

While Australia produces iron ore concentrate in some major plants, pellet production is only limited to two small facilities. Nonetheless, some Australian iron ore miners have already conducted initial exploration studies in magnetite mines with high iron ore reserves, which makes it possible to focus on developing iron ore concentration and pelletising facilities to supply the raw material for future DR facilities within Australia for domestic use or export.

There are several other projects in the pipeline focused on magnetite processing, most of which are at various stages of preliminary and feasibility studies. While each project holds significant potential, most still face a long path ahead before reaching a FID and commencing operations. The leading ones include Mount Beven, two Havilah Resources projects, the Commonwealth Hill Magnetite Project, the Yogi Magnetite mine, the Southdown Magnetite Project, the Lake Giles Iron Project and the Hawsons Iron Project.

Table 2: Australia's prospective magnetite iron ore concentrate projects

Company	Facility	Nominal Capacity	Region	Commencement year	Note
Magnetite Mines	Razorback	**Phase1→**5Mtpa Concentrate **Phase2→**10Mtpa	South Australia	Working on FID	6 billion tonnes (Bt) in resources DR-grade: >68.5% Fe, low impurities
Lincoln Minerals	Fusion Project	**Phase1→** Aspirational target of 3Mtpa **Phase2→** 6Mtpa **Carrow Deposit→** 3Mtpa	South Australia (Eyre Peninsula)	–	A >69% Fe, DR-grade concentrate can be produced without flotation
Iron Road	Central Eyre Iron Project (CEIP)	12Mtpa (optimised scenario)	South Australia (Eyre Peninsula)	–	Ore reserve: 3.7Bt @ 15% Fe, generating 589Mt @ ~67% Fe
Atlas Iron (Part of Hancock Prospecting)	Ridley Magnetite Project	16.5Mtpa **Phase 1→**3Mtpa	Pilbara	FID has been deferred	Probable ore reserve of 970Mt @ 36.0% Fe. Concentrate 68.3% Fe and 3.8% SiO2
GFG Alliance (SIMEC Mining)	Middleback Ranges (expansion)	Currently operating→ 2.5Mt **Phase 1→**7Mt **Phase 2→**15Mt	South Australia	First phase 2028	611Mt @ ~33% Fe

Source: Companies' reports. Note: Fe = iron content; SiO_2 = silicon dioxide or silica content.

Magnetite Mines, likely one of the most advanced projects currently in the pipeline, completed its drilling and resource evaluation between 2010 and 2012, with the Pre-Feasibility Study (PFS) delivered in 2013. Although the project has progressed in recent years, including the submission of a Mining Lease Proposal (MLP) for the Razorback site in March 2025, it has yet to reach a FID.

Other projects have followed a similar path. Iron Road completed its Definitive Feasibility Study (DFS) in 2014 after years of exploration studies. More than a decade later, the company still hasn't reached FID.

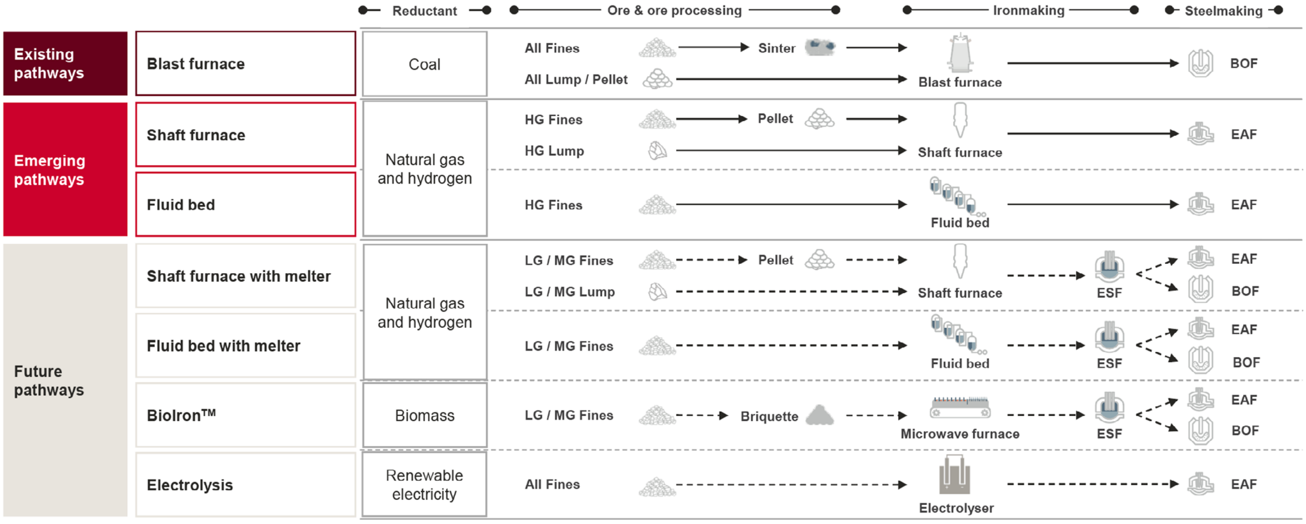
These projects, along with earlier concentrate plant developments, may serve as a useful proxy for understanding the lead times and timelines required to develop large-scale mining facilities that can support the iron and steel transition.

Waiting on technology

Australia's current iron ore, primarily sourced from the Pilbara region, is not readily suitable for producing DR-grade iron ore concentrate or pellets. The main challenge lies in its lower total iron (Fe) content and higher levels of impurities. To align with a low-emissions configuration, an additional processing step – the electric smelting furnace (ESF) – is required to remove iron ore's impurities before sending it to steelmaking plants, whether using an EAF or BOF to produce steel.

However, even with smelters, iron ore processing remains essential, and it's important to remember that most of these new pathways still rely heavily on the fundamental step of processing iron ore into concentrate, fines, pellets or briquette. The inclusion of an ESF in the value chain represents a configuration change – not an entirely new technology development from scratch for the whole value chain. While these new approaches enable the use of lower-grade iron ore in ironmaking, they still require conventional technologies – such as shaft furnaces or fluidised bed systems – to reduce iron ore to metallic iron, with fines and pellets continuing to serve as the primary feedstocks (Figure 2).

Figure 2: Green iron and steel pathways



Source: Rio Tinto, Singapore Green Steel Forum 2024.

Some of the most prominent technology developers in the steel sector are actively working on smelter technologies. SMS group is developing a smelter integrated with BOF technology for ThyssenKrupp, which is transitioning to a DR pathway. Meanwhile, Primetals is advancing its HYFOR technology and is currently focused on building an industrial-scale prototype plant. Other technology providers such as Metso and Tenova also working on this technology.

Australian steelmakers and iron ore miners are exploring this pathway at the pilot scale, with NeoSmelt emerging as one of the most prominent initiatives. BHP, Rio Tinto and BlueScope have joined forces to develop a new pilot plant in Australia.

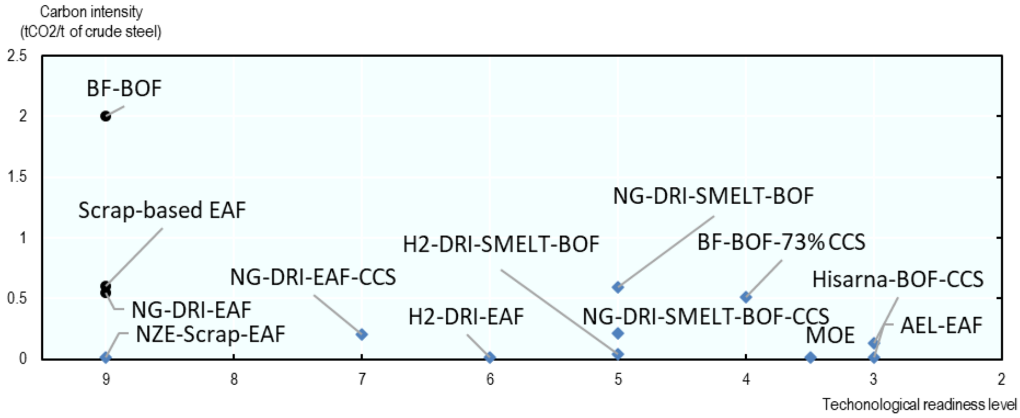
The key question is how close we are to deploying these technologies at scale. To establish a robust industry value chain, solutions with a Technology Readiness Level (TRL) of 8 or 9 are required. TRL is a system used to assess the maturity of a technology or product on a scale from 1 to 9.

However, most of the projects currently in Australia's pipeline, particularly those led by major iron ore miners, are at the pilot plant scale with a TRL of 4 or 5 (Figure 3). It is uncertain how long it will take to reach TRL 8 or 9, or whether these pilot technologies will be competitive with other emerging technologies in the future.

Dino Otranto, Fortescue's chief executive, emphasised that the company is still in the early stages of its decarbonisation journey, including the development of a green iron pilot plant at Christmas Creek based on hydrogen-DRI-ESF technology. He noted: "We're way too early for exporting boats out of Port Hedland on it [green iron]."

There are technological pathways available that could be deployed while pilot projects continue to ascend the TRL ladder. Relying solely on these new advancements, however, risks Australia falling behind competitors who are rapidly advancing in the green iron market based on high-grade iron ore.

Figure 3: Steel decarbonisation solutions and Technological Readiness Level



Source: OECD.
Note: Estimates are ranked from the highest technological readiness to the lowest level. OECD calculations are based on: Agora Industry and Wuppertal Institute (2023); Shahabuddin, Brooks and Rhamdhani (2023).

HYFOR is among the most advanced technologies in this space. It builds on earlier developments such as the FINMET – first introduced by Primetals Technologies in Australia (BHP Port Hedland) in the late 1990s – and FINEX processes. Initial lab-scale investigations for HYFOR began in 2016, followed by pilot plant testing that has been ongoing since 2021. The next step is the construction of the first industrial-scale prototype, designed for continuous operation, which is planned for completion by mid-2027.

Scaling new ironmaking technologies remains a significant challenge in an industry driven by efficiency and practicality. It also needs decades to reach commercial scale from the initial concept. Iron is still produced dominantly through BF and DR methods; while alternative commercial-scale technologies like FINEX and COREX exist, they remain far less widely adopted. Even in Australia, previous attempts to deploy alternative ironmaking technologies capable of using lower-grade ores – such as Rio Tinto's HIsmelt and BHP's FINMET – ultimately failed, despite years of development and operation.

DRI-smelter combinations offer potential – particularly in reducing the reliance on DR-grade ore – but they are not a substitute for the conventional DRI-EAF route. Achieving net-zero targets will require continued investment in deploying current technologies, as emerging solutions may face limitations in scalability and deployment in the developing stages.

Table 3 outlines the most advanced low-emissions iron projects currently in the pipeline involving Australian partners. Nearly all of these initiatives are focused on developing small-scale pilot or demonstration plants, with capacities typically below 40,000 tonnes of iron per year.

Table 3: Australia's prospective iron projects based on direct reduction technology

Company	Project	Technology pathway	Nominal capacity	Estimated commissioning	Development stage
Calix	Zesty Green Iron	New hydrogen-DRI technology	30,000 tonnes/year	2027-28	TRL 5-6 Demonstration
Fortescue	Green Metal Project	Hydrogen-DRI + smelter	1,500 tonnes/year	2025	Pilot Plant
BlueScope, BHP and Rio Tinto	NeoSmelt	Natural gas/hydrogen-DRI + smelter	30,000-40,000 tonnes/year	2028	Pilot plant
Rio Tinto	BioIron	Biomass and microwave energy	~8,000 tonnes/year (1 tonne/hour)	2026	Pilot plant
Primetals, Mitsubishi, voestalpine and Rio Tinto*	HYFOR	Fluidised bed + smelter	~24,000 tonnes/ year (3 tonnes/ hour)	Mid-2027	Industrial-scale prototype

Source: Companies' reports
*Note: *HYFOR technology is highlighted here, with Rio Tinto playing a key role as one of its main development partners.*

Other emerging technologies such as direct electrolysis methods (like Fortescue's Low-Energy Direct Electrochemical Reduction (LEDER) process), sodium-based iron ore reduction, Electra, Boston Metal and Element Zero are being pursued by various companies in Australia, though they remain at very early stages of development with small-scale tests. Most of these technologies currently have a TRL below 4 and will require several more years of development before they are viable for reliable, large-scale production. Any new concept in steelmaking technology, if it is to reach a high TRL, needs years of development and millions of dollars of investment. Nonetheless, the urgency to transition to green iron continues to grow.

Advancing decarbonisation via existing mature technology

Despite the challenges, a handful of initiatives are moving forward with conventional DRI technologies that will use high-grade iron ore – most notably POSCO's Port Hedland project, currently the most advanced, and more recently, Greensteel Australia. While none of these projects have reached FID and may still be several years from production, they stand as early pioneers of Australia's green iron push, relying on available technologies and existing domestic feedstock.

Table 4: Commercial-scale green iron initiatives in Australia

Company	Facility	Nominal capacity	Region	Commencement year	Note
POSCO	Port Hedland Iron	12Mtpa DRI/HBI Phase 1→ 3-3.5Mtpa Pellet + 2Mtpa HBI	Pilbara	2031	Construction is scheduled to start in Q1 2027
GFG Alliance	Whyalla Steelworks	1.8Mtpa DRI	South Australia	—	Whyalla Steelworks was placed under administration on 19 February 2025.
Green Steel WA	Mid-West DRI	2.5Mtpa DRI	Mid-West	2028-29	The company is focusing on a scrap-based facility in Collie, with a capacity of 0.4Mtpa.
Progressive Green Solutions (PGS)	Mid-West Green Pellets & Green Iron (HBI) project	**Phase1→**7Mtpa Green Pellet + 2.5Mtpa DRI/HBI. Q2, 2029 **Phase2→** 25Mtpa Green Pellet + 7.5Mtpa DRI/HBI. Q2, 2030 **Phase3→** 18Mtpa Green Pellet. Q2, 2032	Mid-West	2029	An MoU was signed to supply concentrate from Karara mine.
Greensteel Australia	South Australia Project	1.2Mtpa DRI	South Australia	2027	Greensteel Australia has placed an AU$1.6 billion order with Danieli Group

Source: Companies' reports. Note: PGS data was presented at the Australian Green Iron and Steel Forum 2025.

Notably, none of the major iron ore miners are involved in these commercial-scale DRI production efforts. Among the three big iron ore miners in Australia, Rio Tinto benefits from access to high-grade iron ore through its operations in Canada at IOC and the upcoming Simandou project in Guinea. This gives the company a strategic advantage in the evolving green iron market. Rio Tinto is active outside Australia in supplying high-grade iron ore and even low-emissions iron marketing, collaborating with some of Europe's most advanced green iron producers, including Stegra and GravitHy.

In contrast, BHP may need to invest more effort to strengthen its position and remain competitive as the industry shifts toward low-emissions production. BHP has outlined relatively modest plans for reducing carbon emissions in the steel value chain through green iron production, with few projects in the pipeline. The company continues to back the long-term role of BF technology through 2050 and has yet to present any significant strategy within Australia to upgrade its operations for high-grade iron ore or to transition toward green iron.

As with its two peer competitors in Australia, Fortescue – which had envisioned exporting 100Mt of green iron to China – also put all its efforts into finding a solution for its current BF-grade hematite iron ores, even though it has some of the largest magnetite iron ore concentrate production capacity within Australia. This capacity could partially be directed into lower-emissions pathways such as iron ore pellet and DRI. The company is focused on two main categories: using smelters in DR pathways consuming its lower-grade ores; and direct electrolysis technology to produce green iron in the future.

Other investors in Australia, such as POSCO, are adopting a strategy aligned with the current state of technological development. POSCO plans to begin with a 2Mt HBI plant using existing, commercially available MIDREX DRI technology, supported by a 3.5Mt pelletising facility and sourcing iron ore concentrate already available on the market.

While Australia is still waiting for its first commercial-scale DRI facility, other countries are moving ahead with green iron steel projects at various scales – such as the Stegra project in Sweden under development – and innovative new processes like Oshivela's HyIron in Namibia, which are already operational. Around the world, nations and regions are actively developing capabilities and refining technologies to prepare for the green iron transition. Australia must act swiftly to remain competitive. Green iron is more critical to Australia than to any other country, given that iron ore is its leading export and the country is the world's largest iron ore exporter.

The development of new technologies that can use Australia's lower-grade iron ores in DRI-based iron and steelmaking are clearly important. However, Australia has existing high-grade iron ore mines in operation, and more under development, which can enable low-carbon iron and steelmaking using existing, commercial-scale technology now.

There's no time – and no need – for waiting.

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