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Lachlan Wright || Energy Finance Analyst, Global Steel

Any takers for Australia's green iron?

Supply crunch could open US$2bn/year opportunity for local producers

- *With many corporate emissions or green purchasing targets specific to steel setting a 2030 deadline, Australian green iron developers will need to move quickly to take advantage of this opportunity.*
- *Corporate emissions reduction targets in key sectors such as automotive, wind, shipping and data centres could be an important demand driver for Australian green iron.*
- *Steel producers, particularly in Japan and South Korea, may struggle to secure sufficient renewable power to meet this demand, opening an opportunity for Australia to supply up to 5.5MTPA of green iron, worth an estimated USD2 billion (AUD2.8bn) a year.*
- *Projected green steel demand to 2030 exceeds supply but there is significant uncertainty on both demand (due to policy, market shifts and varying corporate targets) and supply (as producers using a fossil-hydrogen mix transition).*

Australia aims to kick-start a green iron industry, building on the country's strength in iron ore exports and renewable resource availability. A green iron industry represents a significant economic opportunity for Australia to offset expected declines in fossil fuel and iron ore export volumes. At the same time, expansion of green iron exports would support global emissions reductions in the steel sector, which is responsible for about 9% of all emissions.

Australia has long sought to leverage its position as a commodity exporter to move further downstream into industrial production, primarily driven by the potential economic opportunities. For example, in response to Western Australia's targets for downstream processing, BHP agreed in the 1990s to implement a direct-reduced iron (DRI) plant in Port Hedland. This initial effort in downstream integration in the iron and steel sector failed due to gas and commodity market fluctuations and construction cost overruns.

However, potential declines in Australia's fossil fuel exports, together with the country's excellent renewable resources, have prompted a fresh look at these downstream processing technologies — this time powered with renewable energy. Despite a push for steel sector emissions reductions from Australia's major trading partners (China, Japan and South Korea collectively produce about 60% of global steel output), there have been no investments or offtakes focused on green iron imports.

Overseas examples of downstream integration have often combined a protected local market (providing some guarantee of demand/revenue) with export requirements (which pushed steelmakers to internationally competitive productivity levels). However, with a limited domestic market (Australia consumes less than 0.3% of global steel output, whereas its iron ore exports represent about 38% of global production), Australia will need to find suitable export markets to kick-start a domestic green iron industry.

This note considers which markets could fulfill this role, and finds:

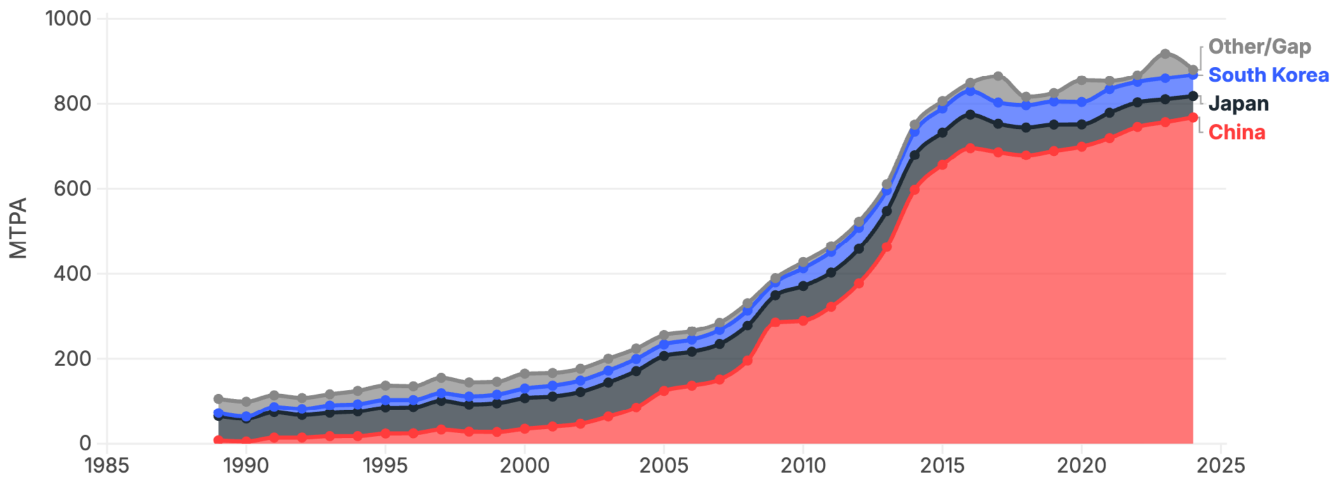
- China, Japan and South Korea — as the dominant buyers of Australian iron ore (and to a lesser extent metallurgical coal) — are a key opportunity for green iron exports.
- Steelmakers' climate commitments in those countries are unlikely to directly result in green iron demand as the targets are focused on incremental changes.
- Policy settings in China, Japan and South Korea designed to push domestic steel industry emissions reductions are not stringent enough to support green iron.
- Incremental costs of green iron are small for downstream industries that use steel; as a result, corporate targets in these sectors could drive demand for green iron supplied from Australia.

Based on these findings, this note analyses four of these downstream sectors — automotive, wind, shipping and data centres — to estimate the potential green iron demand opportunities to 2030 driven by corporate commitments.

Existing iron ore markets

An obvious starting point in finding potential partners for green iron from Australia is among its existing iron ore importers. These are dominated by China, which purchased about 85% of Australia's iron ore exports in 2024; however, substantial volumes (~50 million tonnes a year each/MTPA) are also exported to Japan and South Korea (Table 1). Each of these countries also imports metallurgical coal from Australia (albeit in significantly smaller quantities and with more diversified supply) and so could swap (at a higher price) imports of these two bulk commodities for green iron.

Figure 1: Australian iron ore export destinations (MTPA)



Source: UN Comtrade

The direct purchasers of Australian iron ore are integrated steel mill operators (via a central buyer in China), which (absent a clear carbon constraint) are unlikely to pay the premium associated with green iron. While many of these companies have voluntary climate commitments, these are primarily for net-zero by 2050. Any near-term targets (e.g. 2030) are based on increasing scrap consumption and improving energy efficiency rather than technology changes or green iron imports that would underpin deep (>80%) emissions reductions.

Table 1: Steel producer climate targets

Company	Emissions target	Near-term strategies
Baowu	Carbon neutral by 2050 and **30% reduction** (vs 2020) in emissions by 2035	H2 injection BF, COG DRI, energy efficiency
Ansteel	Carbon neutral by 2050, emissions peak in 2025 and **4.5% reduction** from peak by **2030**	Energy efficiency, COG DRI, RE purchasing
Nippon	Carbon neutral by 2030 and **30% reduction** in emissions by **2030** (vs. 2013)	H2 injection BF, increased scrap, energy efficiency
POSCO	Net-zero by 2050 with interim reduction goals of 10% by 2030, **30% by 2035** and 50% by 2040 (vs 2017-19)	H2 injection BF, increasing scrap, adding EAFs
HBIS	Carbon neutral by 2050, emissions reductions of 10% by 2025 and **30% by 2030** (vs 2019 emissions peak)	Efficiency and process optimization, COG DRI
JFE Steel	Carbon neutral by 2050, reductions of 24% by 2027 and **30% by 2030** (vs 2013)	Energy efficiency, increasing scrap, testing BF CCUS
Hyundai Steel	Net-zero by 2050, **12% reduction by 2030** (vs 2018)	Increasing scrap use, adding EAFs
Jianlong Group	Carbon neutral by 2060, peak emissions by 2025 and **20% reduction** (from peak) by 2033	Energy efficiency, increase scrap, add EAFs

Sources: Company reports. Note: H2 = hydrogen; BF = blast furnace; EAF = electric arc furnace; COG = coke oven gas; CCUS = carbon capture, utilisation and storage.

A decarbonisation strategy based on green iron imports would also require these integrated mill operators to make significant capital investments to shut down existing blast furnaces. These would either be replaced with electric melting furnaces (which then feed existing steelmaking equipment) or with scrap-based electric arc furnaces (EAFs) (with the scrap feed blended with green iron to meet quality requirements). Nippon Steel and POSCO have recently invested in EAFs, which they plan to feed with locally sourced scrap but which could also process high-grade green iron from Australia.

In Japan (via a tax) and South Korea (via an emissions trading scheme/ETS), steelmakers are subject to carbon pricing. However, prices are too low and free allowances too high to provide any effective incentive to decarbonise.[1] Japan plans to make its voluntary emissions trading scheme mandatory this year; however rules on free allocation and price ceilings are still being drafted.

Similarly, China has recently expanded its ETS to include steel, but prices remain too low to provide any meaningful carbon constraint. China also has dual carbon goals for emissions reductions in the country. In particular, the 2030 peaking goal, which is being implemented through permits in the steel sector, is driving an increase in EAF deployments and initial projects to produce DRI. Again, these EAFs will be fed with scrap initially but could become buyers of Australian green iron.

That said, given the cost of green iron, lack of strict carbon constraints and competitiveness concerns, it is unlikely the region's major steelmakers will be looking to establish the long-term offtakes green iron producers in Australia would need to move forward with investments. In fact, given the premium on green iron and the cost of material inputs in steelmaking, it is likely any offtake would need to come instead from existing customers. This was the case for the world's first green steel facility in Sweden. This raises the question: Where does all the steel produced with Australian iron ore end up?

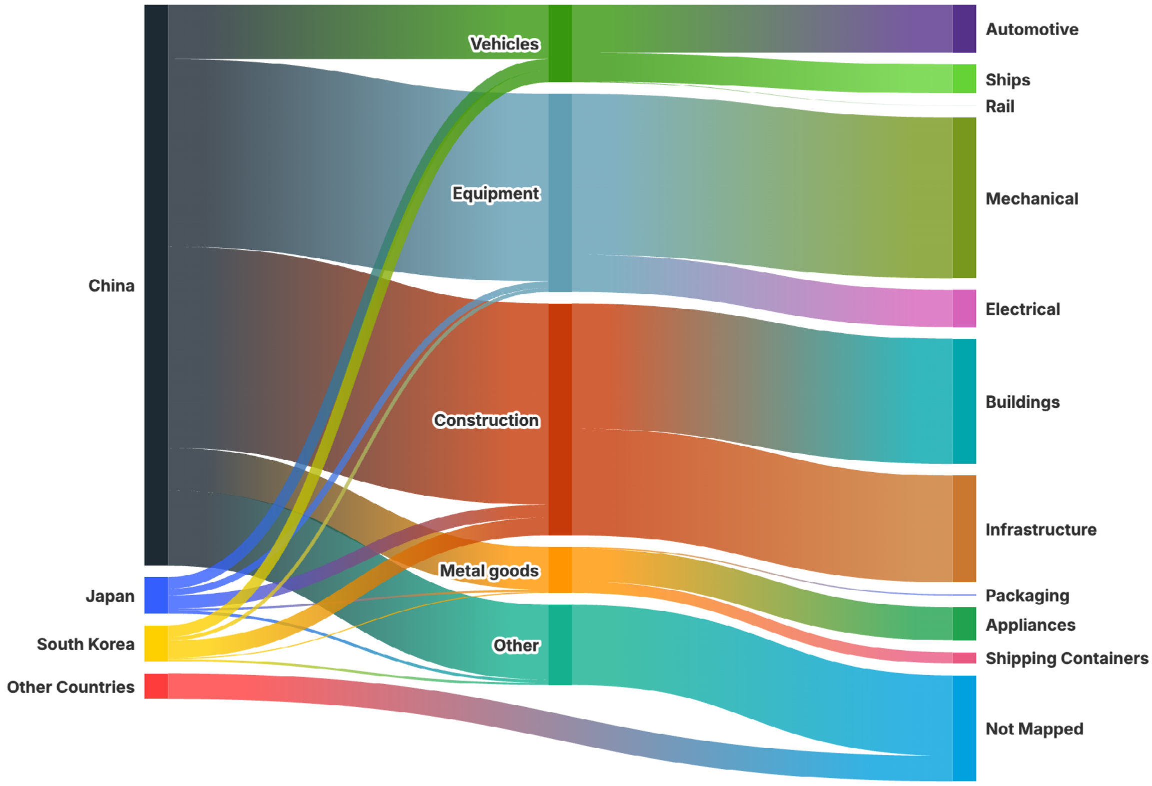
Australia's iron ore connection to steel end-use markets

Globally, steel use is roughly split between construction and manufactured goods (including equipment, vehicles and other metal goods). When considered collectively, this relative use is similar in China, Japan and South Korea, although with a slightly higher skew (~60%) towards manufacturing. However, at the country level there are significant differences (Figure 2).

In 2020, about a third of steel used in China was for construction. However, following the property crash in 2021, steel use for buildings dropped significantly to only account for about 20% today. This is likely to continue with expectations of a prolonged downturn in the property sector. Despite this drop, total steel production has remained flat with exports, infrastructure and manufacturing all rising to fill the gap. However, with an already large export surplus and increasing tariffs from trade partners, combined with a potential weakening in infrastructure investment, there are concerns about future steel demand.

1 The carbon tax in Japan is set at JPY289/tCO_2 (~USD1.85), and a recent auction (2024) in South Korea was priced at KRW10,355/tCO2 (~USD7.60), both well below the ~USD100/tCO_2 price for green steel to breakeven.

Figure 2: Australia's iron flow to steel end use



Sources: China NBS, Japan METI, Korea SIS, UN Comtrade

Despite this turbulence, there are sectors where green iron demand could emerge in China. While auto manufacturing accounts for a slightly lower share of steel use in China than globally, it is still significant at about 55MTPA and a potential driver of green growth given most of the sector's expansion is in electric vehicles (EVs) . China also accounts for a higher share of global output in mechanical equipment manufacturing, and within this broad sector there are pockets, such as wind manufacturing, that may be particularly amenable to green steel purchases.

The steel sector outlook is also uncertain in Japan and South Korea as local producers struggle with the surge in Chinese steel exports and as tariffs and demand from export-focused sectors (e.g. automakers) remain uncertain. However, as with China, end-use sectors could contribute to green growth, particularly where Japan and South Korea have manufacturing strength but are connected to global customer bases such as shipbuilding and data centre construction.

In each of these steel-use sectors, green demand will likely not (in the near term) come from direct carbon constraints/pricing (as these are not typically applied to supply-chain emissions) but instead from a combination of voluntary corporate targets, investor pressure, consumer pull and transition planning disclosure requirements.

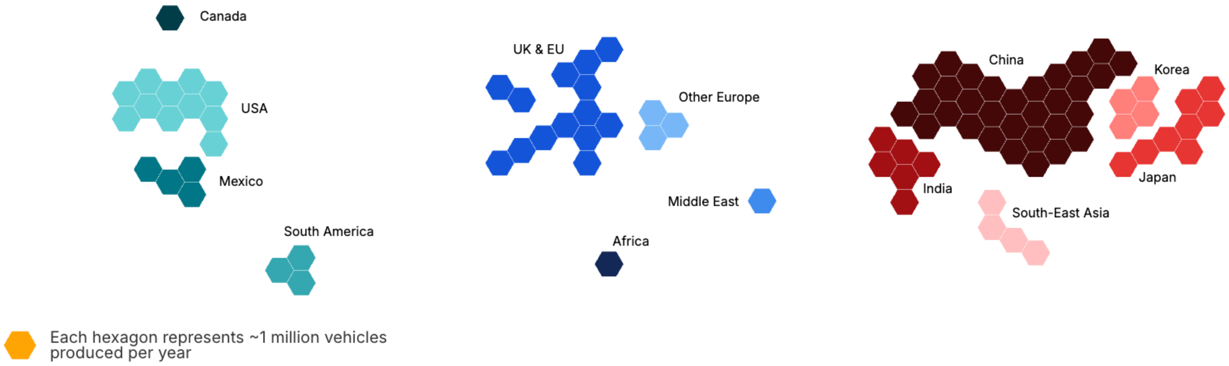
Automotive

The automotive sector is often highlighted as the most likely initial purchaser of green iron and steel. As consumer-facing brands, automotive manufacturers are well placed to capitalise on consumer preferences for clean supply chains. At the same time, auto manufacturers consume large amounts of higher specification (i.e. primary) steel.

Australia's trading partners are powerhouses of auto manufacturing. China, Japan and South Korea are home to six of the top ten automakers and are responsible for nearly half the global supply of motor vehicles.

Figure 3: Vehicle production by country and manufacturer

North and South America	Europe, Middle East and Africa	Asia
21% of global production	21% of global production	58% of global production



Global top 10 companies

North and South America	Europe, Middle East and Africa	Asia
#4 General Motors #6 Ford	#2 Volkswagen #5 Stellantis	#1 Toyota #3 Hyundai #7 BYD #8 Honda #9 Suzuki #10 Nissan

Sources: International Organization of Motor Vehicle Manufacturers, F&I Tools

However, most automakers in the region, particularly those in Japan, have consistently ranked lowest in evaluations of voluntary climate targets. While all automakers in the region have a general commitment to net-zero by 2050, none have a low-emissions steel purchasing target. Only Toyota and Hyundai have any lifecycle emissions targets; however, these only cover downstream (use-phase) emissions, and so provide no impetus for green iron and steel purchasing.

Table 2: Auto manufacturer climate targets

Company and location (HQ/Regional JV)	Overall target	Steel target
Toyota	Net-zero by **2050**, 30% (vs 2019) lifecycle reduction (use-phase only) by 2030, **no upstream supply chain target**	None
Hyundai	Carbon neutral by **2045**, reduce direct and electricity emissions by 60% by 2035 (vs 2023), **no upstream supply chain target**	None
Honda	Carbon neutral by **2050**, no interim targets disclosed, **no upstream supply chain target**	None
BMW	Net-zero by **2050**, interim 2030 (vs 2019) targets of 46.3% for direct and electricity, **27.5% supply chain** (use-phase and upstream)	Offtake with Stegra
Volkswagen	Net carbon neutral by **2050**, by 2030 (vs 2018) 50.4% reduction on direct and electricity emissions, 30% reduction use-phase	MoU (Vulcan), Stegra Offtake (Porsche)
General Motors	Net-zero by **2050**, by 2035 (vs 2018) 72% reduction in direct and electricity emissions, 51% reduction in use-phase emissions	10% near-zero steel by 2030 (FMC)
Volvo	Net-zero by **2040**, by 2030 (vs 2018) 65% use-phase reduction and **30% reduction in upstream supply chain**	50% low 2030 & 100% zero by 2050 (SteelZero)
BYD	Carbon neutral by **2045**, 50% reduction (vs 2023) in direct and electricity emissions by 2030, **no supply chain targets**	None

Sources: Company reports

The biggest recent shift for the region's auto sector has been the rise of China's local EV-focused brands. Like most others, automakers such as BYD and Geely, have committed to general net-zero targets by 2045–50 but with no specifics on steel. That may change given these companies have a natural connection with more climate-conscious consumers.

These targets compare unfavourably with automakers' commitments in the US (where Ford and GM have pledged to buy 10% near-zero emissions steel by 2030) and the EU (where Mercedes, BMW and Volvo have all signed binding offtakes for green hydrogen-based steel). As most of these automakers have operations in Asia through joint ventures or other brands, these emissions targets could translate into green iron demand from Australia's key trading partners. Already, BMW has agreed with HBIS to purchase lower-emissions steel (produced via DRI using coke oven gas), highlighting how these targets can translate into green iron demand.

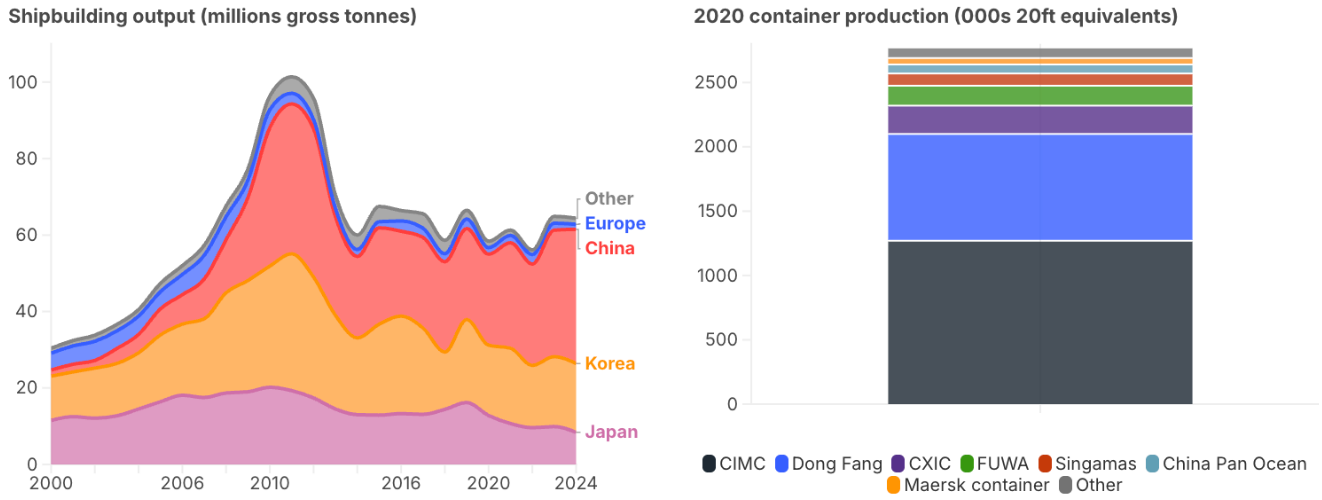
Policy could also have a significant impact on green steel demand within the auto sector. Japan has recently updated its clean energy vehicle (CEV) subsidy to include a JPY50,000 (~USD320) per vehicle bonus for the use of steel that contributes to the sector's green transformation. However, the potential green iron demand flowing from this subsidy is negated by Japan's use of mass balance offset definitions, which allow high-emissions blast furnace (BF)-produced steel to count towards green transformation in the sector. However, the subsidy is sufficient to cover the entire premium for green iron/steel (produced via renewable hydrogen) used in a typical vehicle. As a result, if Japan were to change the definitions to focus CEV qualification towards the use of green iron, it could create about 2.5MTPA of additional demand by 2030.

Changes in vehicle export markets may also flow through to green steel in the region. For example, the EU, where Japan and South Korea supply about 25% of vehicle imports, is introducing mandatory lifecycle assessments for vehicles, and has extended the Carbon Border Adjustment Mechanism to include car parts and commercial vehicles. The EU also recently allowed green steel to count towards automakers' fleet emissions targets, although this only applies to domestic production.

Shipbuilding

China, Japan and South Korea are even more dominant in shipbuilding than automotive manufacturing. Together, these countries accounted for more than 95% of all shipbuilding output in 2024. Similarly, China alone produces more than 95% of all shipping containers. In aggregate, across the three countries, about 20Mt of steel is used in shipbuilding and a further 10–15Mt for containers each year.

Figure 4: Ship production vs container production



China, Japan and Korea together manufacture **90%** of the world's **shipping fleet**	China produces **>95% of containers** with 3 large companies dominating at ~85% market share

Sources: Clarksons, Drewry

Most of the sector's greenhouse gas mitigation focus has been on the use-phase (i.e. fuel consumption) as this is responsible for about 95% of shipping emissions. However, there are efforts to include upstream steel emissions in the industry's reduction frameworks.

Two-thirds of major shipbuilding companies have set net-zero targets but, as with the automotive sector, these are focused on direct and use-phase emissions. None of the companies have set specific targets on steel purchasing. Even with targets, it is unlikely any green demand would come directly from shipbuilders as steel is a high fraction of the total cost base of ships. As a result, it would not be possible for a shipbuilder to absorb the green steel premium. For example, Hyundai Heavy Industries spends about USD2 billion a year on steel (~10–20% of the company's total sales). If the company were to pay the typical green steel premium on that amount, it would wipe out half of the company's already low operating margins.

Instead, the green demand is likely to emerge further downstream, starting with shipowners. Many of these companies have set net-zero or International Maritime Organisation-aligned targets (Table 3). Again, these are mostly focused on direct and use-phase emissions but importantly some leading companies in the sector, such as Maersk and CIMC, have set green steel-specific purchasing targets.

This could be accelerated with a push from companies even further downstream. Close to 40% of global container movement is for consumer goods. The major retailers (e.g. Amazon, Alibaba, Target) and brands (Procter & Gamble, Nestlé, Unilever) driving this movement have climate targets. However, these targets focus on material and fuel use in the supply chain. Extending these targets to include steel use throughout operations (including shipping, other logistics and warehousing) could provide a significant global emissions reduction with a very small impact on company balance sheets. Any green iron growth from this sector would likely come from environmental attribute purchases (similar to the approach for lower-carbon maritime fuels) given the intermediaries between these companies and the site of steel production.

Table 3: Shipowner climate targets

Company	Overall target	Steel target
A.P. Moller Maersk	Net-zero by 2040, **35% reduction in direct shipping** and 22% reduction in supply chain emissions by **2030**	50% low 2030 & 100% net-zero by 2040
MSC	Net-zero by 2050, for **direct shipping emissions**, reductions of **9% by 2030** and 68% by 2040	Extending container life to reduce demand
CMA CGM	Net-zero by 2050, for **direct shipping emissions reductions** of **30% by 2030** and 80% by 2040	None
Hapag-Lloyd	Net-zero by 2045, **30% by 2030** reduction in **direct maritime emissions**	None
Evergreen Marine	Net-zero by 2050, **70% by 2030** reduction in **fleet direct emissions intensity**	None
HMM	Net-zero by 2045, **26% direct emissions reduction for the container fleet by 2030 (70% reduction in intensity)**	None
Nippon Yusen Kaisha	Net-zero by 2050, **45% reduction in direct and electricity** emissions by **2030**	None
Mitsui OSK Lines	Net-zero by 2050, 23% reduction in own operations and **45% reduction in maritime intensity by 2030**	None

Sources: Company reports

Wind turbines

Mechanical equipment manufacturing is also concentrated in the region. China, Japan and South Korea are responsible for close to half of the world's mechanical equipment output. This sector has a wide range of outputs and customers. The wind industry is relevant to green iron growth due to its high steel intensity and natural link to emissions reductions, which has led to a raft of strong climate commitments across the industry (Table 4). This includes direct steel purchasing commitments from developers including Engie, Iberdrola, Ørsted and Invenergy as well as component manufacturers such as Vestas and Siemens Gamesa.

Beyond targets, there is also consideration of using lifecycle assessments as part of the criteria for government auctions, particularly for offshore wind projects. In response, industry coalitions have formed to standardise the lifecycle reporting process. If these criteria are included in auctions, it would provide a direct business case for wind developers to utilise green iron and steel to maintain market access.

The industry is also growing quickly, opening an opportunity for green iron as new supply chains are developed. Globally, 122 gigawatts (GW, of which 12GW was offshore) of wind capacity was installed in 2024. The industry consumed about 10Mt of steel that year — enough demand to support the output of four to five green iron facilities.

China plays a key role in both supply and demand. It is home to six of the top ten turbine manufacturers as well as two-thirds of global deployment. Beyond China, the region is a key centre of the global wind supply chain with both Vestas and Siemens Gamesa having manufacturing hubs in region.

Table 4: Wind industry climate targets

Company	Overall target	Steel target
Engie	Net-zero by 2045, by **2030 a 55% reduction** (vs 2017) across all scopes	10% near-zero volume by 2030 (FMC)
Iberdrola	Net-zero (all scopes) by 2040 and **carbon neutral in electricity generation** by **2030**	10% near-zero volume by 2030 (FMC)
Ørsted	Net-zero by 2040, **77% reduction** (vs 2018) by **2030** across all scopes	10% near-zero volume by 2030 (FMC)
ReNew Power	Net-zero by 2040, 100% sourcing of clean electricity by 2030 and **29% reduction** (including supply chain) by **2027**	10% near-zero volume by 2030 (FMC)
Mainstream Renewable	SBTi commitment for 1.5°C targets, parent company net-zero by 2050 and 50% (direct and electricity) by 2030	10% near-zero volume by 2030 (FMC)
GE Vernova	Net-zero by 2050 (including supply chain), carbon neutrality for direct and electricity emissions by 2030	10% near-zero volume by 2030 (FMC)
Vestas	Carbon neutral for direct and electricity emissions by 2030 and **45% reduction** (vs 2019) in supply chain by **2030**	10% near-zero volume by 2030 (FMC)
Siemens Gamesa	Net-zero by 2050, 60% reduction in operations and **30% in supply chain by 2030**	50% low 2030 and 100% zero by 2040 (SteelZero)

Sources: Company reports

Data centres

From a steel perspective, data centres are at the intersection of the construction and manufacturing sectors. Requiring both a significant and specialised building envelope — filled with computing, power and cooling equipment — a data centre is a steel-intensive endeavour.

Most interest in the sector is in its explosive growth story. Increasing data centre build-out predates the recent AI-focused surge in capital expenditures from the largest US tech companies. Despite concerns about an AI bubble, with 12GW of capacity under construction and further 66GW in the pipeline globally, it is clear a significant amount of data centres will be built in coming years.

Most of the investment is in the US but up to 40% is likely to be deployed in the Asia-Pacific region. Much of this is forecast to be in China but there are significant growth hubs in Singapore and Johor (southern Malaysia) as well as in Japan. The major technology companies are also deploying across South-east Asia, such as Microsoft's recent investments in Indonesia.

Overall, this growth will require about 2Mt of steel in the region for 2026, with about 80% used in the building envelopes and the remaining for computer, cooling and power equipment. Much of this growth is tied to the capital investment of the major US technology companies, including Google, Amazon, Microsoft and Meta. This is important from a green iron perspective as most of these companies have set clear and ambitious 2030 targets inclusive of supply-chain emissions Table 5).

Table 5: Technology company climate targets

Sources: Company reports

Company	Emissions target	Current emissions
Microsoft	**Carbon negative** by **2030** including 50% reduction in supply chain emissions	+26% vs 2020 baseline
Google	**50% reduction** across direct operations, electricity and supply chain emissions by **2030**	+54% vs 2019 baseline
Meta	**Net-zero** by **2030** including reduction (vs 2021) in absolute supply chain emissions by 2030	+60% vs 2021 baseline
Amazon	**Net-zero** across global operations by **2040**	+33% vs 2019 baseline
Oracle	**50% reduction** by **2030** across both direct operations, electricity and supply chain emissions	+438% vs 2020 baseline
Alibaba	**Net-zero** (for direct operations, electricity and supply chain) emissions by **2030**	+29% vs 2020 baseline
Tencent	**Net-zero** (for direct operations, electricity and supply chain) emissions by **2030**	+3% vs 2021 baseline

Largely due to the growth in the data centre footprint, these companies' emissions are moving in the wrong direction. As a result, there has been a flurry of activity with tech companies collaborating to bring new green steel projects to market, committing to long-term offtakes for commercial-scale projects as well as providing offtakes and equity investments for novel ironmaking technology pilots. Beyond the US firms, Chinese cloud providers such as Alibaba (which has a three-year USD53bn AI investment plan) have also set supply-chain emissions targets that could also contribute to green iron demand in the region over the medium term.

Public procurement and policy impacts

More broadly, building construction has potential to stimulate new demand as voluntary building standards such as Leadership in Energy and Environmental Design (LEED) push towards reducing embodied carbon, of which steel use comprises a significant portion. With China being the largest LEED market outside the US, this could be an important demand driver in the region. Similarly, in Japan, the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) certification is increasingly used for buildings, and considers embodied carbon, potentially prompting builders to consider lower-emissions steel. Municipalities are increasingly requiring and rewarding the use of these standards, adding to green steel demand. Green public procurement mechanisms could also pull through green iron for other large public infrastructure projects such as bridges, railways and electrical grids. For example, Japan has already committed to green public procurement through the United Nations Industrial Deep Decarbonisation Initiative.

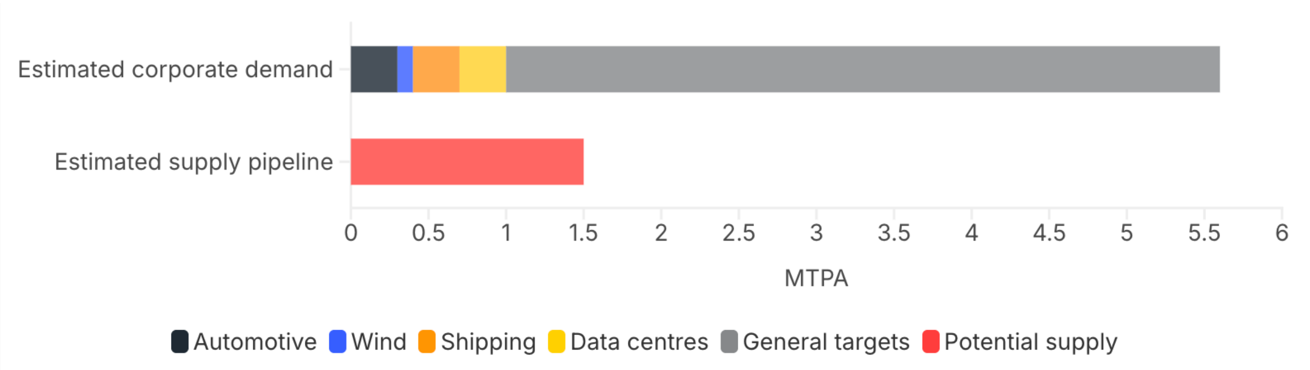
Policy may also accelerate the demand pull from the sectors outlined above. As noted, if Japan were to link its CEV steel subsidy explicitly to the need to utilise green iron, this alone would add about 2.5MTPA to automotive green steel demand in 2030. Similarly, requiring 10% of steel to be sourced via green iron for public wind auctions across the region would add about 1MTPA by 2030.

Supply and demand balance

Even in the absence of further policies or public procurement, corporate commitments will drive an estimated 5.5MTPA of green steel demand across the region by 2030. Based on a underlying price of USD300 per tonne for iron, plus a 20% premium for near-zero emissions production, this demand would be worth about USD2bn per year. Of this, about 20% is based on steel-specific commitments across the critical sectors of automotive, wind, shipping and data centres. The rest is estimated based general corporate net-zero or supply-chain (Scope 3) targets.[2] The degree to which this demand flows through to green iron is more uncertain as these companies may choose to focus on other areas for emissions reductions or use green steel definitions that do not encourage the use of green iron.

Figure 5: Estimated green steel supply and demand in 2030

Sources: IEEFA estimates based on company reports, LeadIT and Net-Zero Tracker



Of this demand, around half is projected to be in China. It is possible that EAFs in the country import green iron from Australia to satisfy this demand but at the same time China is developing its own DRI projects, testing hydrogen-based steel production technology, and rapidly deploying clean energy, in some cases coupled with hydrogen projection. As a result, China may leapfrog competitors to provide its own green iron if potential suppliers do not act quickly.

Based on these commitments, there is a significant gap with the estimated supply pipeline.[3] However, many of the region's potential supply projects are new DRI furnaces planned to operate on a mix of coke oven gas (HBIS, Baowu) or gas (Meranti), together with electrolytic hydrogen. This strategy could allow these projects to make the full switch to green hydrogen more quickly (via additional investments in renewable energy and electrolysers) to meet this demand. POSCO is also developing a separate hydrogen-based iron production technology; however commercial-scale deployment is not planned until post-2030.

This gap between supply and demand implies the market is positioned to support the required premium providing that green iron producers can successfully engage key corporate customers. This depends on the willingness of these corporate customers to pay the premium to meet climate targets, as has been the case in other early green iron projects.

Seizing the opportunity

2 Based on steel use by sector for China, Japan and South Korea as well as the coverage of net-zero targets for the Forbes Global 2000 companies (via the Net-Zero Tracker) operating in the region in those sectors.
3 Based on LeadIT tracker of announced projects in the region together with an estimate of the green fraction (where the project is planning to use a mix of fossil and electrolytic hydrogen) and an estimate of the likelihood of the project to proceed.

In the near term, domestic constraints on clean electricity supply could drive imports of green iron. For example, the South Korean government recently committed to phasing out coal-fired electricity by 2040 — replacing it with solar would require a tripling of the current (3–4GW a year) rate of solar deployment, and maintaining that level of investment for each of the next 15 years. Adding the electricity demand associated with switching just one steel site — POSCO's massive Pohang steel complex — would require that rate to quadruple. This significant step-up is before considering potential growth in electricity demand from data centres and semiconductor manufacturing. As a result, the drive to import green iron may become a strategy for steelmakers in the region simply due to a lack of access to clean electricity. Already, Glencore and other traders have established offtake agreements for hot briquetted iron (HBI), seemingly in anticipation of this trend.

From this perspective, the development speed of green iron projects (and associated renewables and electrolysers) in Australia will be key to capture the opportunity presented by corporate emission targets. Potential green iron project developers in Australia will need to engage directly with these buyers. In particular, non-traditional steel buyers further downstream in high-growth and climate-committed sectors, such as automotive, wind, shipping and data centres, are most likely to pay the required initial premium.

This also highlights the importance for Australia of focusing projects on hydrogen-based iron, where the market is willing to provide a green premium (unlike for gas-based iron), creating an opportunity to establish these long-term, forward-looking offtakes.

Buyer engagement will likely only be successful when project developers have sufficient clarity on technology/equipment selection and environmental permits, as well as the project's access to renewable power (to produce hydrogen) and iron ore. This is needed to ensure corporate buyers can be confident enough of the project's likelihood to deliver at the negotiated price to enter into an offtake agreement.

Executing offtake agreements with downstream buyers will likely require the use of environmental attributes and/or the development of a tri-party arrangement with steelmakers that will process the Australian green iron into a finished steel product. This more complicated commercial structure will likely be required (at least initially) to connect supply with the consumer-facing demand pull. Fortunately, models exist from other sectors (shipping, aviation, etc.), and voluntary standards, certification and contractual models are already emerging in steel to support these transactions.

Near-term corporate targets combined with constraints for Australia's trading partners in deploying renewable energy provide a window of opportunity for green iron exports. Taking advantage of this opportunity will require Australian project developers and governments to move quickly to lock in offtake agreements and provide clear signals about the most viable projects and locations. This will give buyers the certainty needed to commit and help launch this new industry.

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About the Author

Lachlan Wright

Lachlan Wright is an Energy Finance Analyst examining the transition in the iron and steel sector. Lachlan's focus is on the emerging green iron market, particularly on the economic feasibility, policy mechanisms and demand-side interventions. Before joining IEEFA, Lachlan led an initiative to reduce corporate emissions through new green commodity markets at the Rocky Mountain Institute in the US. This built on his experience in executing early-stage feasibility studies for base and battery metal projects in Australia. Lachlan has a first-class honours degree in chemical engineering from the University of Queensland. lwright@ieefa.org