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Decarbonising Global Steel Supply Chains

Tim Buckley, Director, CEF
tim@climateenergyfinance.org

Matt Pollard
Net Zero Transformation Analyst, CEF
matt@climateenergyfinance.org

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Decarbonising Global Steel Supply Chains Agenda

Decarbonising steel – An Australian Perspective

- **Australia – a massive economic threat, but also a massive strategic opportunity, if we can overcome key technology, price signal and value-add hurdles**
- **China's global Cleantech Leadership, yet to emerge in the Steel Sector**
- **Need for a clear embodied decarbonisation price signal in international trade, extending the EU ETS and CBAM with an Asian CBAM**
- **Meanwhile, need for Australian government support, e.g. via a CCTC**

https://climateenergyfinance.org/wp-content/uploads/2024/11/CEF_Green-Metal-Statecraft_FINAL.pdf

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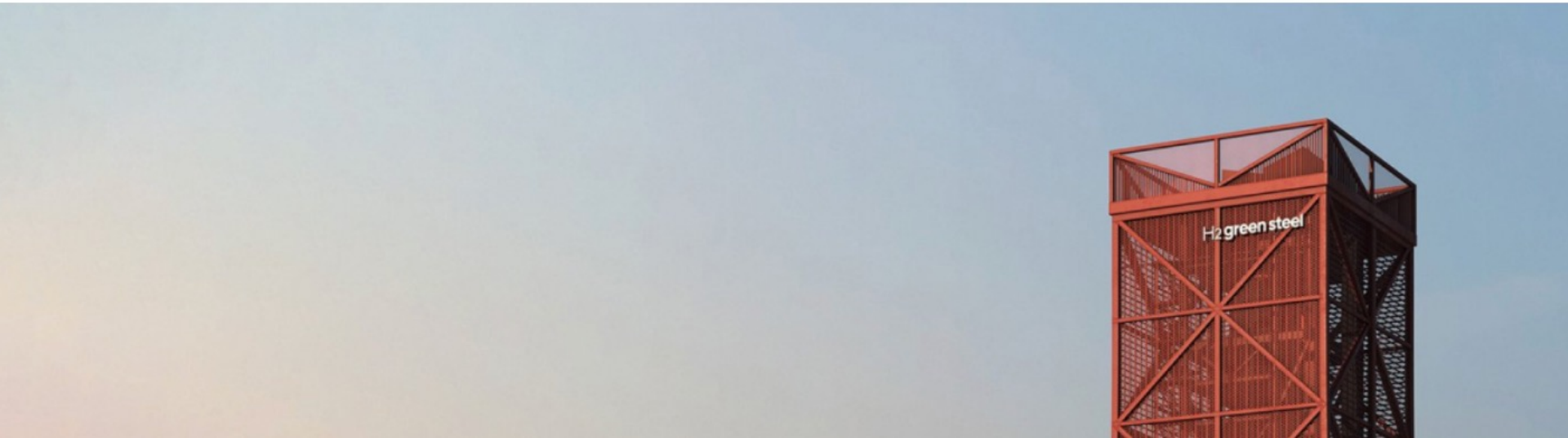
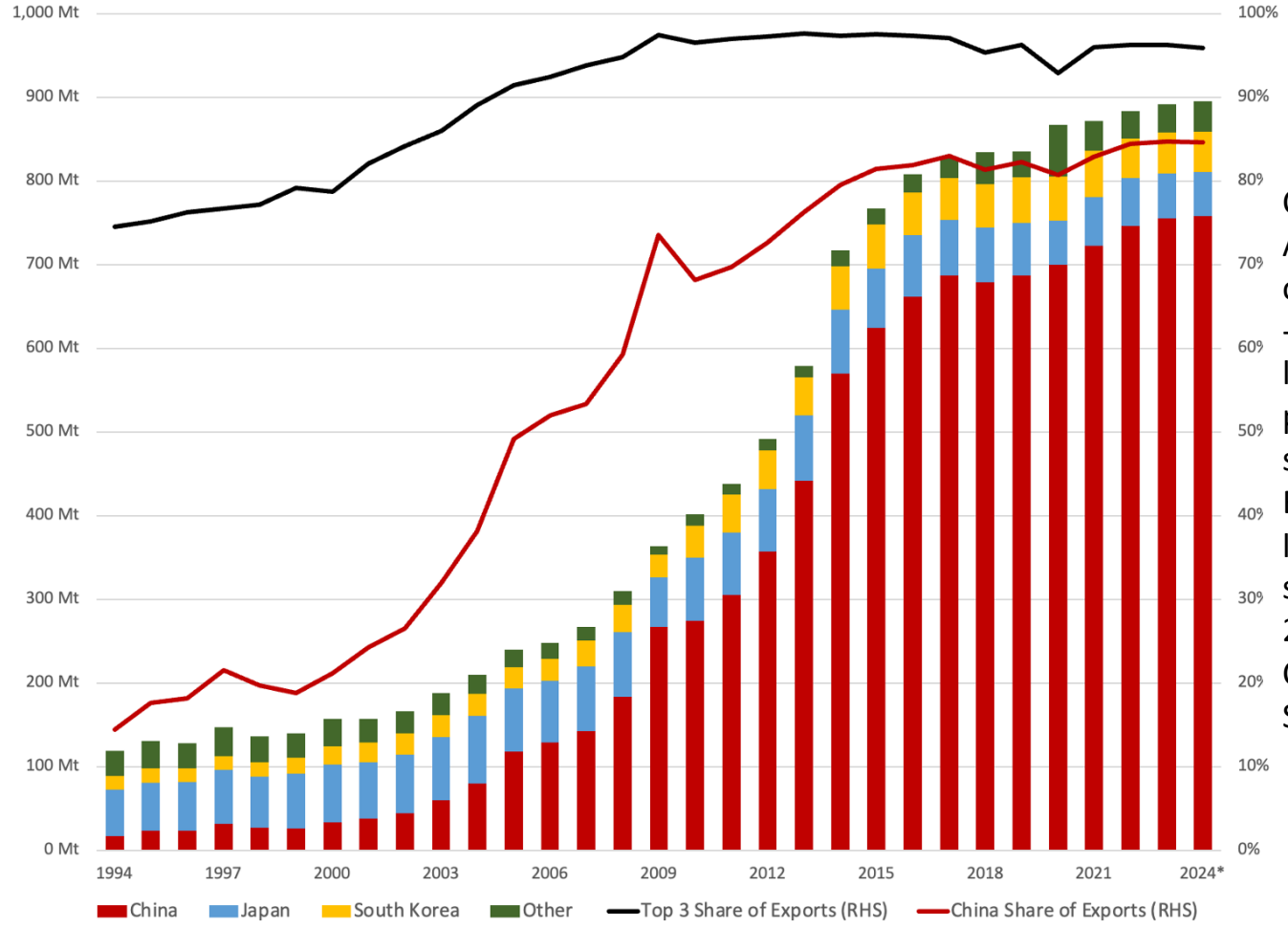
Green Metal Statecraft: Forging Australia's Green Iron Industry

Matt Pollard, Net Zero Transformation Analyst, CEF
Tim Buckley, Director, CEF



Australia – a massive economic threat, but also a massive strategic opportunity

Australia's Iron Ore Export Markets

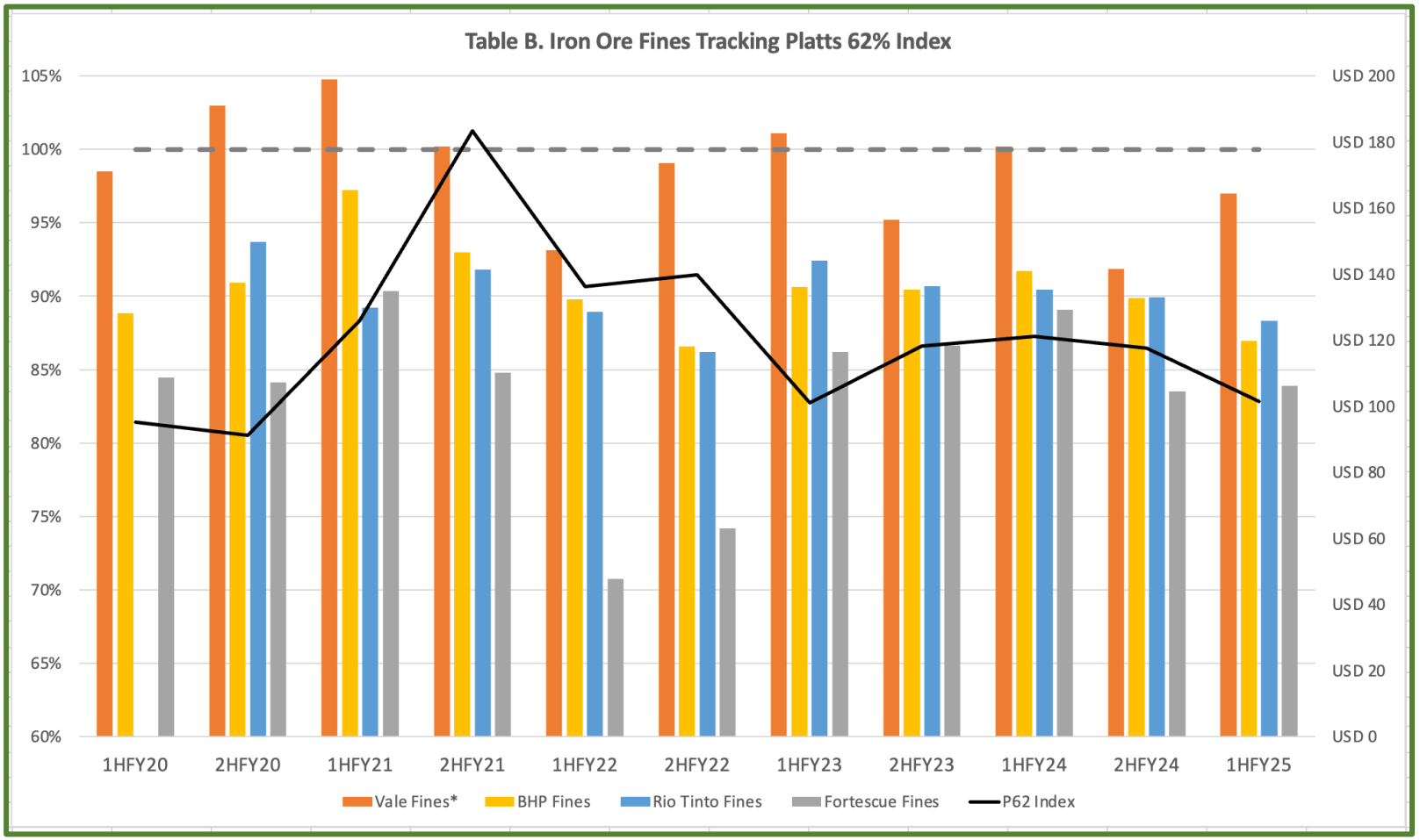


China accounted for 85% of Australia's A$138bn pa of iron ore exports, having delivered +6% CAGR in volume over the last decade. This has been a key partnership of profound strategic value for Australia. But Chinese steel production likely peaked in 2020 (China's steel output was -3% yoy in 2024), scrap use is rising, and China is diversifying into Simandou, Guinea (120Mtpa).

Source: Office of the Chief Economist
Note: 2024 is annualised from 1H2024

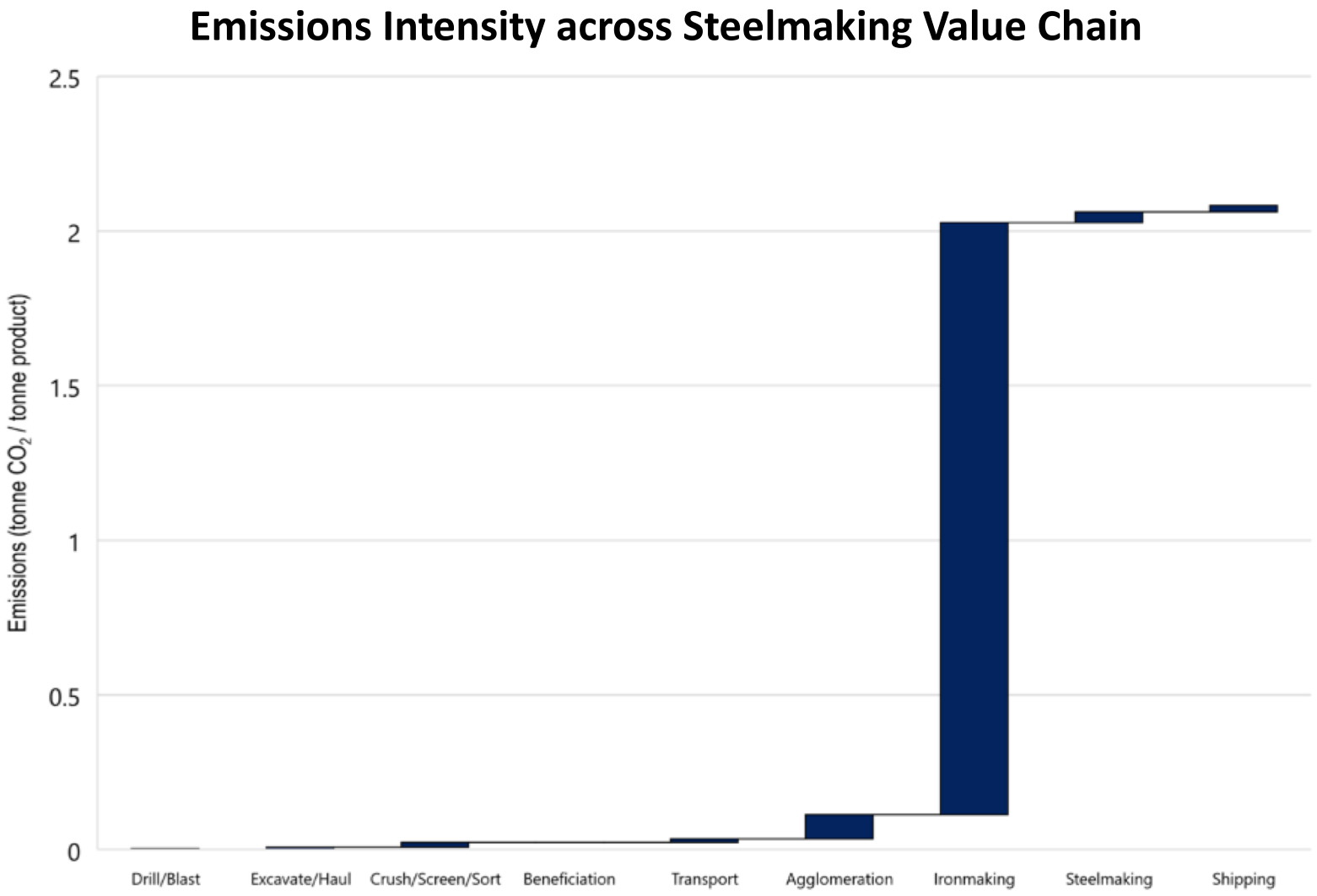
Australia – a massive economic threat, but also a massive strategic opportunity

Australia's iron ore exports are low iron content, high impurity: problematic if and when green iron, DRI and EAF take off



Source: Company announcements, CEF's Matt Pollard calculations, January 2025

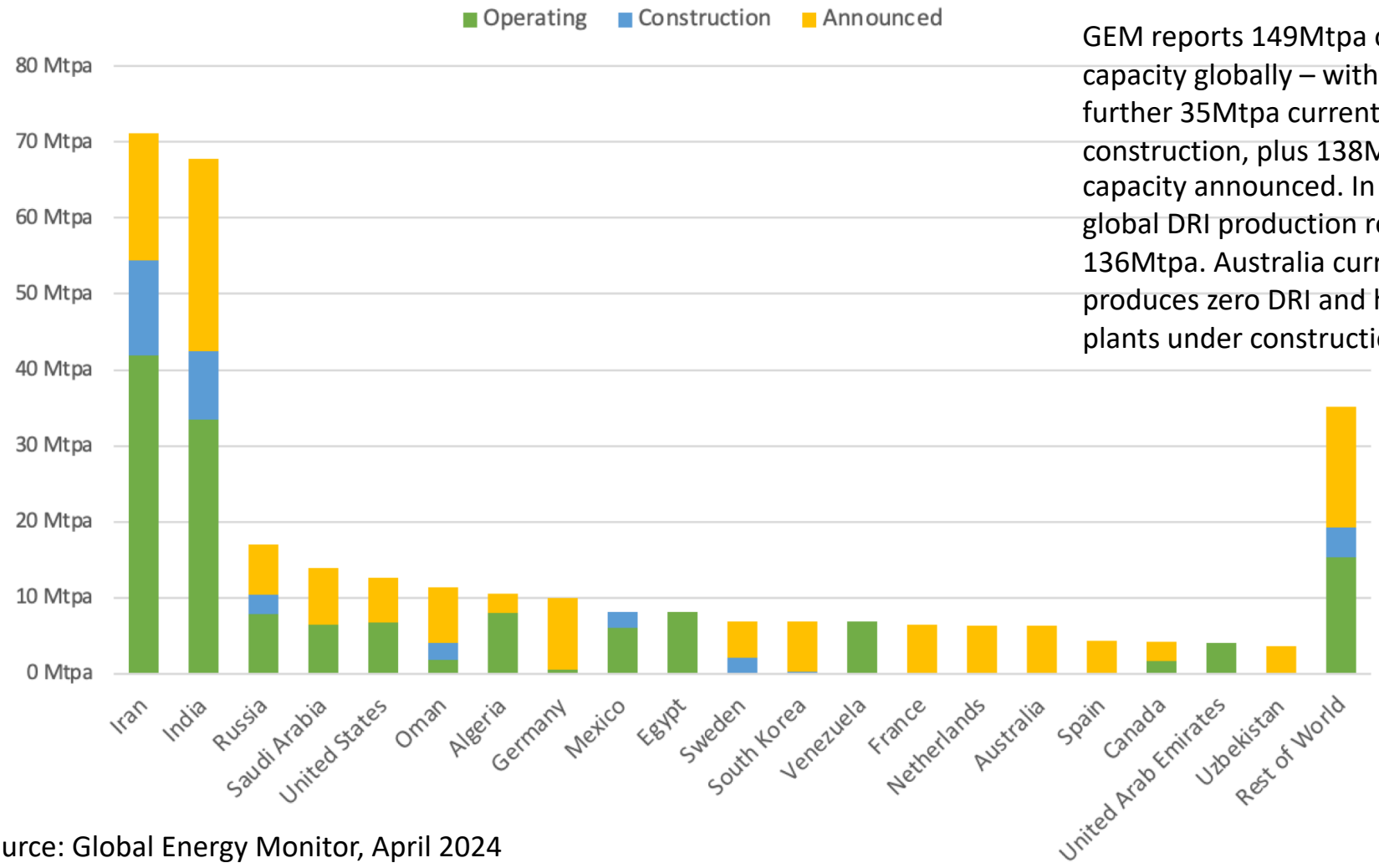
Australia – a massive economic threat, but also a massive strategic opportunity



Source: MRIWA, WA Green Steel Opportunity

Australia – a massive economic threat, but also a massive strategic opportunity

Global Direct Reduced Iron (DRI) Capacity Additions



GEM reports 149Mtpa of DRI capacity globally – with a further 35Mtpa currently under construction, plus 138Mtpa capacity announced. In 2023, global DRI production reached 136Mtpa. Australia currently produces zero DRI and has no plants under construction.

Source: Global Energy Monitor, April 2024
https://globalenergymonitor.org/projects/global-steel-plant-tracker/

Australia – a massive economic threat, but also a massive strategic opportunity

Iron is a A$250bn pa export opportunity for Australia

- In 2023/24 Australia exported A$138bn (US$85bn) iron ore & A$54bn met coal.
- The recent profitability of these exports is extreme, BHP booked a WA iron ore EBITDA margin of 74% in FY2024 (ROI 61%), and 32% for Qld coking coal.
- This means the iron ore and met coal exports from Australian mines in FY2024 generated gross profit of A$120bn from the Asian Steel Sector, plus A$10bn pa of royalties to each of WA and Queensland state governments.
- By comparison, the gross profit margin of Chinese steel sector over the decade to 2020 averaged 2-4% pa. Value-adding appears to be high risk, low return, absent a price on embodied carbon emissions.
- On current market prices, value-adding ~40% of Australia's iron ore exports could generate A$174bn in annual export revenues from green iron. Coupled with additional iron ore export revenues of A$77bn, this would translate to a doubling of iron export revenues to A$250bn.
- Failure to overcome the technical & economic challenges of green iron risks the reality that our exports halve, as traditional importers restructure & decarbonise supply chains, prioritising regions of high-quality iron ore & low-cost ironmaking.

China is Moving in Decarbonisation, Rapidly

China leads the world in firmed renewable energy globally, by far, with a staggering 375GW of zero emissions capacity additions in CY2024.

New Capacity Installed in China in Jan-Dec 2024

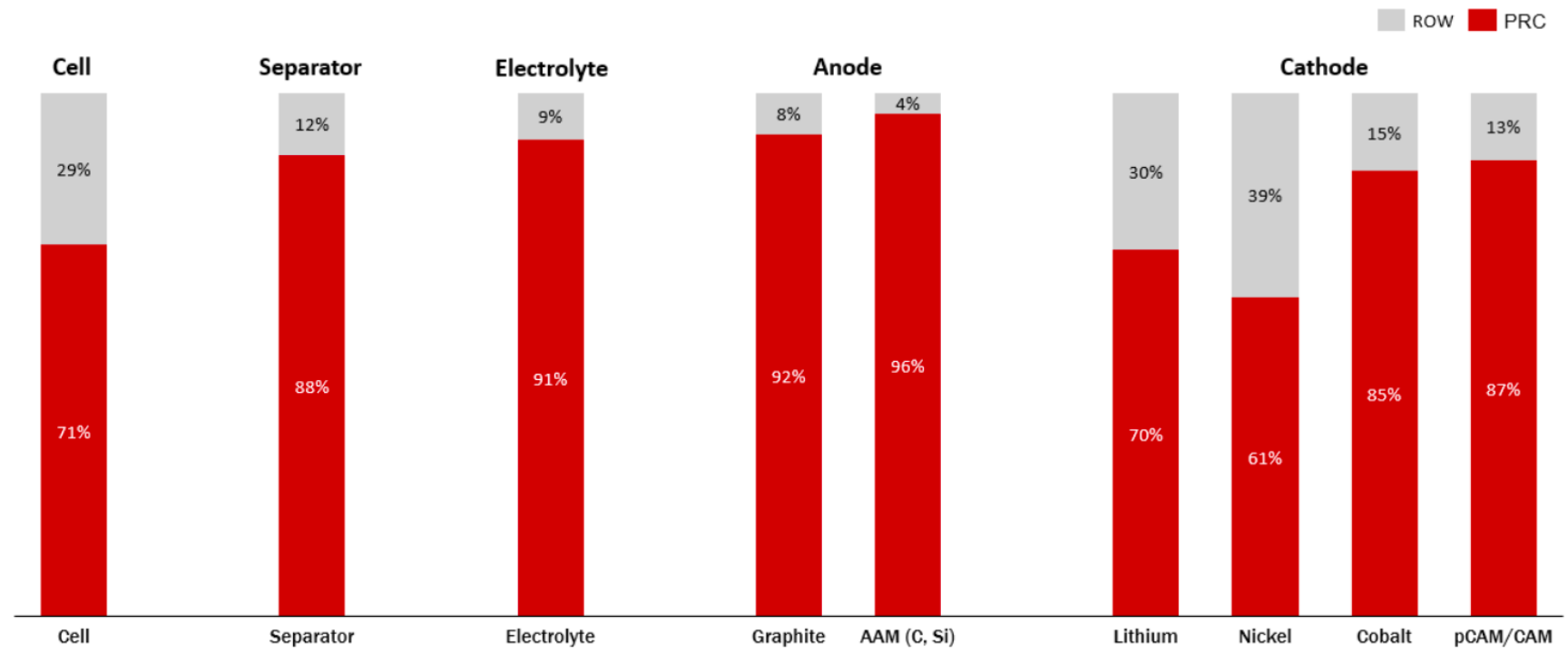
		Jan-Dec 2024	Share of new adds (%)	Change (yoy %)	Dec-24	Share of new adds (%)
Thermal Power	GW	54.1	13%	4%	6.7	6%
Hydropower	GW	14.4	3%	3%	4.4	4%
Nuclear Power	GW	3.9	1%	7%	2.7	2%
Wind Power	GW	79.3	18%	18%	27.6	25%
Solar Power	GW	277.2	65%	45%	70.9	64%
Total capacity added	**GW**	**429.0**	**100%**	**15%**	**112.3**	**100%**
Renewable Energy adds	GW	370.9	86%	25%	102.9	92%
Zero Emissions Capacity Adds	GW	374.8	87%	25%	105.6	94%
Investment in Completed Power Grid Project	1 billion yuan	608.3		15%	79.3	

Source: NBS, CEF Estimates

China is Moving in Decarbonisation, Rapidly

China leads the world in almost all zero emissions industries of the future, in terms of RD&D, manufacturing, domestic installs, exports and increasingly in OFDI.

China market share across the NMC battery supply chain, % of global production capacity, 2024E



Source: BloombergNEF, US DoE NREL, Identifying Risks in the Energy Industrial Base: Supply Chain Readiness Levels, January 2025
https://www.energy.gov/sites/default/files/2025-01/Identifying_Risks_in_the_Energy_Industrial_Base-Supply_Chain_Readiness_Levels_vFinalPublication.pdf

Australia's Green Iron Opportunity

SECURING AUSTRALIA'S GREEN IRON LEADERSHIP REQUIRES AMBITIOUS GREEN METAL STATECRAFT

1. A NATIONAL GREEN IRON AND STEEL STRATEGY WITH CLEAR, MEASURABLE TARGETS.

2. DEMAND-SIDE POLICIES AND INCENTIVES, including:

- Trilateral Clean Commodities Trading Company (Australia, South Korea & Japan).
- Australasian Green Iron Corporation JV between Australia & key trade partners.
- 'Contracts for difference' to bridge the gap between pricing & production costs.

3. SUPPLY-SIDE POLICIES AND INCENTIVES, including:

- $20bn Future Fund mandate for renewables-powered green metals processing.
- Production tax incentives for green metal refining.

4. POLICIES TO ADDRESS TECHNICAL CHALLENGES:

- $500m over 10-yrs to the CSIRO for RD&D into commercialisation of green iron tech.

5. FOREIGN POLICY & INTERNATIONAL COLLABORATION, including:

- DFAT & Austrade mandate to build collaboration on an Asian CBAM, creating a price signal for green iron.
- Australian/Asian steel supply chain decarbonisation collaboration pre-COP31.

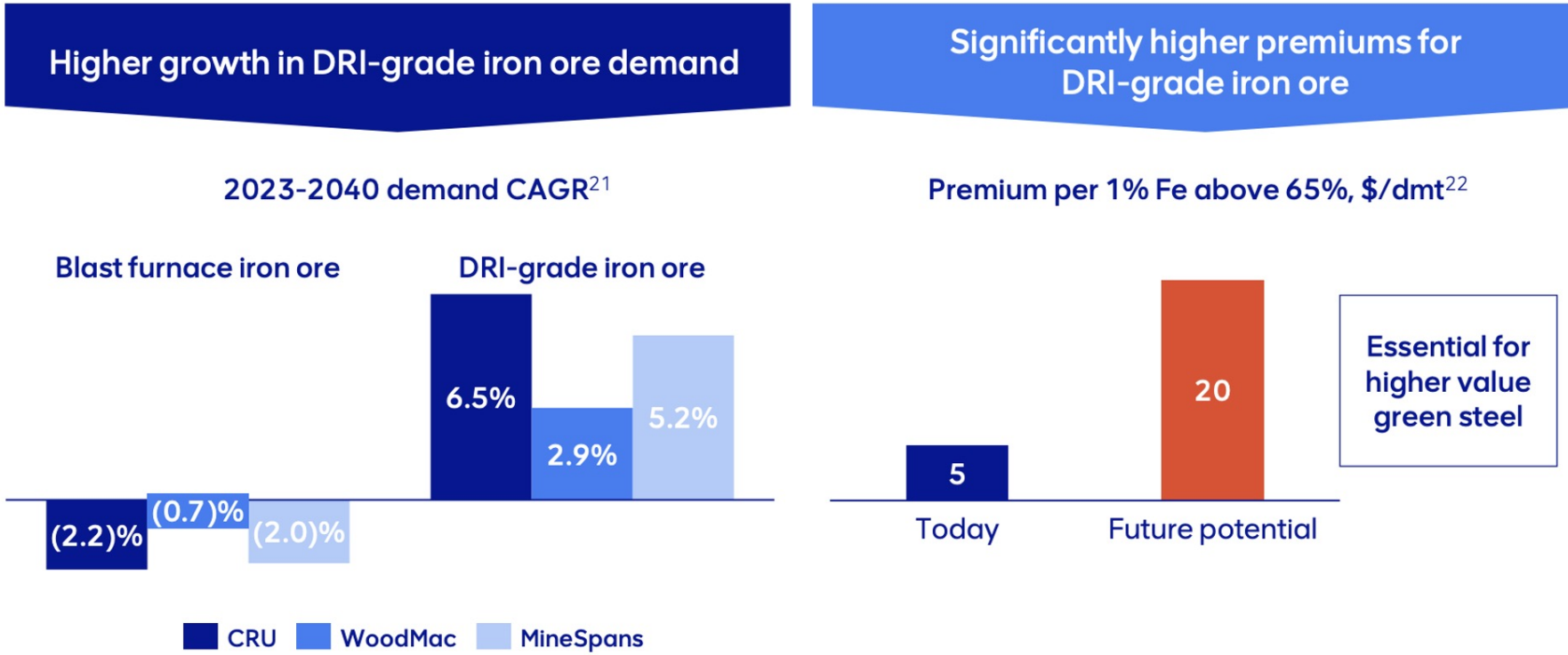
6. ACCELERATED RENEWABLES DEPLOYMENT, including:

- Overriding Public Interest Test to speed renewable energy project approvals.
- Renewables investment conditional on community benefit/First Nations benefit sharing.
- Accelerated development of Renewable Energy Industrial Precincts.
- Industrial demand response mechanisms to optimise renewables supply/demand.

Australia's Green Iron Challenge

Direct Reduced Iron and Low-Emission Steelmaking

Figure 8.2: Iron Ore Market Fundamentals



Source: Anglo American, May 2024

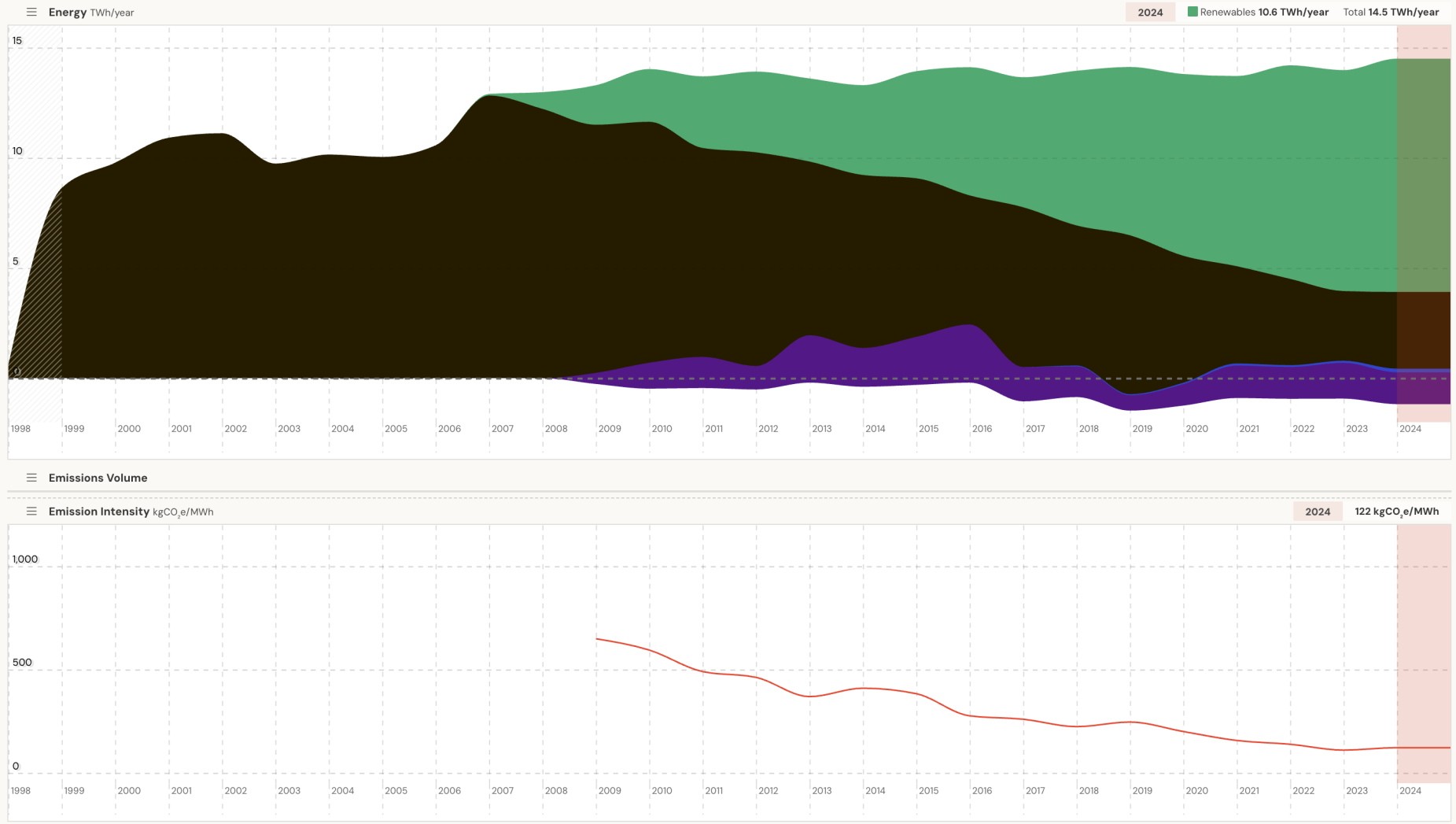
To overcome the technical barriers to commerciality, CEF recommends an **additional $500m over 10-years to the CSIRO** of strategic support for RD&D into the commercialisation of technologies to unlock Australia's green iron industry.

SA Green Iron Energy Requirements

SA produced 14.5 TWh (73% RE: 10.6 TWh) in 2024 at an emissions intensity of 122 $kgCO_2$-e/MWh

One green hydrogen DRI plant (2.5 Mtpa) would require 10-13 TWh of electricity

At current grid emissions intensity, this would generate 1.2-1.6 Mt CO_2-e pa.



Requirements for a Green Iron Industry

Energy and water requirements for green hydrogen-based iron industry
Context: NEM produced 214 TWh in 2024

Figure 8.8: Various Scenarios of Australia's Green Iron Opportunity

Scenario (Mtpa)	Energy (TWh)	Electrolyser (GW)	Water (GL)
1 - Baseline	4.1 - 5.3	0.5 - 0.7	1.4 - 1.9
2.5 - 1 Facility	10 - 13	1.2 - 1.7	3.4 - 4.8
10	41 - 53	5.0 - 7.0	14 - 19
50	204 - 266	25 - 35	68 - 95
100	407 - 531	50 - 70	135 - 190
110 - 10% Asian Pig Iron Production	448 - 584	55 - 77	148 - 209
258 - Sunshot	1,051 - 1,371	128 - 180	348 - 490
560 - TSI	2,282 - 2,975	278 - 391	756 - 1,064

Australia's Green Iron Challenge

The case for a 'Clean Commodities Trading Company' to advance Australia's green superpower ambitions

A Clean Commodities Trading Company classification would deliver massive and connected economic, environmental, and strategic gains.


OLIVER YATES

ELIZABETH THURBON

DECEMBER 4, 2024

Share

The CCTC as a model for sophisticated green energy statecraft. (Bruce Aspley/Adobe)

Australia is uniquely positioned to become a green superpower. We believe a Clean Commodities Trading Company (CCTC) — potentially jointly owned with trading partners such as Japan and South Korea — could be the next key to unlocking our green industrial potential. Working alongside a smart Production Tax Credit (PTC) scheme, a CCTC would derisk global supply and demand for nascent green industrial products like metals, hydrogen and fuels.

Australia is introducing value-add Production Incentive Credits as part of its wider Future Made in Australia (FMIA) strategy.

CEF is also advocating for the development of an Asian CBAM, to leverage and extend the EU CBAM, and China's national ETS in electricity, hopefully soon to also cover steel.

Source: The Mandarin, Dec'2024
https://www.themandarin.com.au/282814-clean-commodities-trading-company-australias-green-superpower-ambitions/