WWF

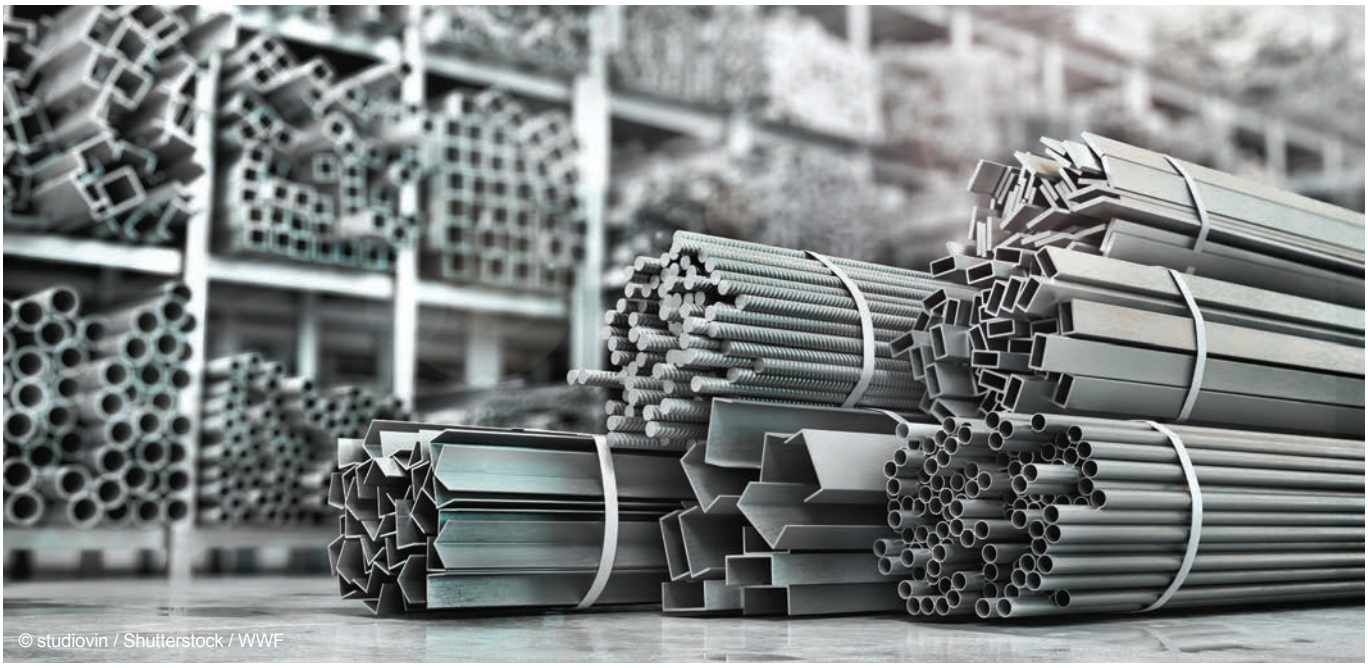
AUSTRALIA

HIGHLIGHTS

AUSTRALIA'S GREEN IRON KEY

UNLOCKING ASIAN STEEL DECARBONISATION, SECURING AUSTRALIA'S ECONOMIC FUTURE

GREEN IRON – TURNING THE RENEWABLE ENERGY TRANSITION INTO AN INDUSTRIAL TRANSFORMATION



Reducing the greenhouse gas (GHG) emissions from iron and steel production is vital to limiting global warming to 1.5°C in line with the Paris Agreement. The steel sector alone is responsible for up to 9 per cent of global greenhouse gas emissions[1]. As a leading supplier of iron ore, coal and fossil gas for the industry, Australia must play an active, responsible, and collaborative role in decarbonising the sector.

Greening[2] the steel industry presents Australia with both challenges and opportunities. Iron ore is Australia's most valuable export commodity. This market, currently dominated by bulk shipments of largely unprocessed hematite ore, will change markedly in response to the demand for greener iron and steel. This will trigger a restructure of steel-making, as high-emission iron-making blast furnaces are phased out and replaced with technologies powered by renewable energy. Energy-intensive iron-making will need to be located closer to iron ore, renewable energy, and renewable hydrogen supplies.

Methods for producing green iron and steel exist and continue to improve, but investment and policy support are required to encourage use of these and put the industry on track to reach net-zero emissions before 2050. Major Asian steel producers are researching green iron and steel value chains involving Australia, but they are also looking at other locations. Australia's iron ore industry and Asia's steel industry have great potential to work together to reduce emissions. To work together for success, countries must closely coordinate their plans and policies.

Australia remains well-placed to become a major green iron producer. Australia could forge a 'green iron key' to help our trading partners decarbonise their steel supply chain through the joint planning of a new low-emission industry, including producing green iron in Australia.

INFORMATION BOX 1

WHAT ARE GREEN IRON AND GREEN STEEL

Steel-making is a two-step process. First, oxygen is removed from raw materials (reduction) to make iron in liquid or solid form, then this iron is melted and refined to make steel products. High CO_2 emissions result from traditional iron-making mostly due to the use of fossil coal and fossil gas for heating, stability, and reduction in blast furnaces. Green iron is iron produced without the use of fossil fuels. Only power from renewable energy is used, and renewable hydrogen (hydrogen made from water by electrolysis) is used where reduction is needed. The small amount of carbon needed to make steel is also replaced with carbon that is not sourced from fossil fuels. Green also means that low-emission industries prioritise avoidance of other adverse environmental, biodiversity and community impacts. The carbon intensity of the entire steel production value chain needs to be known to ensure processes are low-emission.

There are no global definitions for green steel, near-zero-emissions steel, or low-emissions steel, or global method for assessing lifecycle GHG emissions embedded in steel products.

The World Trade Organisation notes that the lack of accepted definitions and assessment methods are barriers to encouraging low-emission iron and steel trade. Efforts to develop common understandings are under way. An International Energy Agency (IEA) communique issued ahead of the G7 Climate, Energy and Environment Ministers Meeting in May 2022 defined 'near-zero-emission steel' as a 'steel product produced by generating less than 400 kilograms of CO_2 equivalent (total GHG emissions) per tonne of steel'[3].

Steel made using the conventional blast furnace plus basic oxygen furnace method generates more than 2 tonnes of CO_2 emissions per tonne of crude steel on average (excluding emissions relating to raw material extraction). Industry members and other stakeholders agreed to support the IEA's approach when adopting a broader set of Steel Standards Principles at the COP28 UN Climate Change Conference in December 2023[4].

BENEFITS FOR AUSTRALIA'S TRADING PARTNERS

Moving iron-making to Australia will help Asia-based steel producers achieve their decarbonisation goals, as iron-making accounts for 90 per cent of steel-making's Scope 1 and Scope 2 emissions. Importing cost-competitive green iron would also help safeguard steel-making jobs as demand side expectations increase for greener products. An estimated 90 per cent of jobs in the iron and steel value chain are in steel-making and finishing.[5]

One reason for the relatively slow pace of Asia's steel decarbonisation, particularly in northeast Asia, is the challenge of accessing cost-competitive renewable hydrogen. The national hydrogen strategies of Japan and Korea see their countries as becoming significant renewable hydrogen producers and importers, including for industrial use. Yet both countries may be better served importing more affordable/easily transported green iron from countries such as Australia. Japan's Renewable Energy Institute notes Japan sourcing green iron imports could also 'avoid the excessive infrastructure investment required to import large amounts of hydrogen'[6].

BENEFITS FOR AUSTRALIA

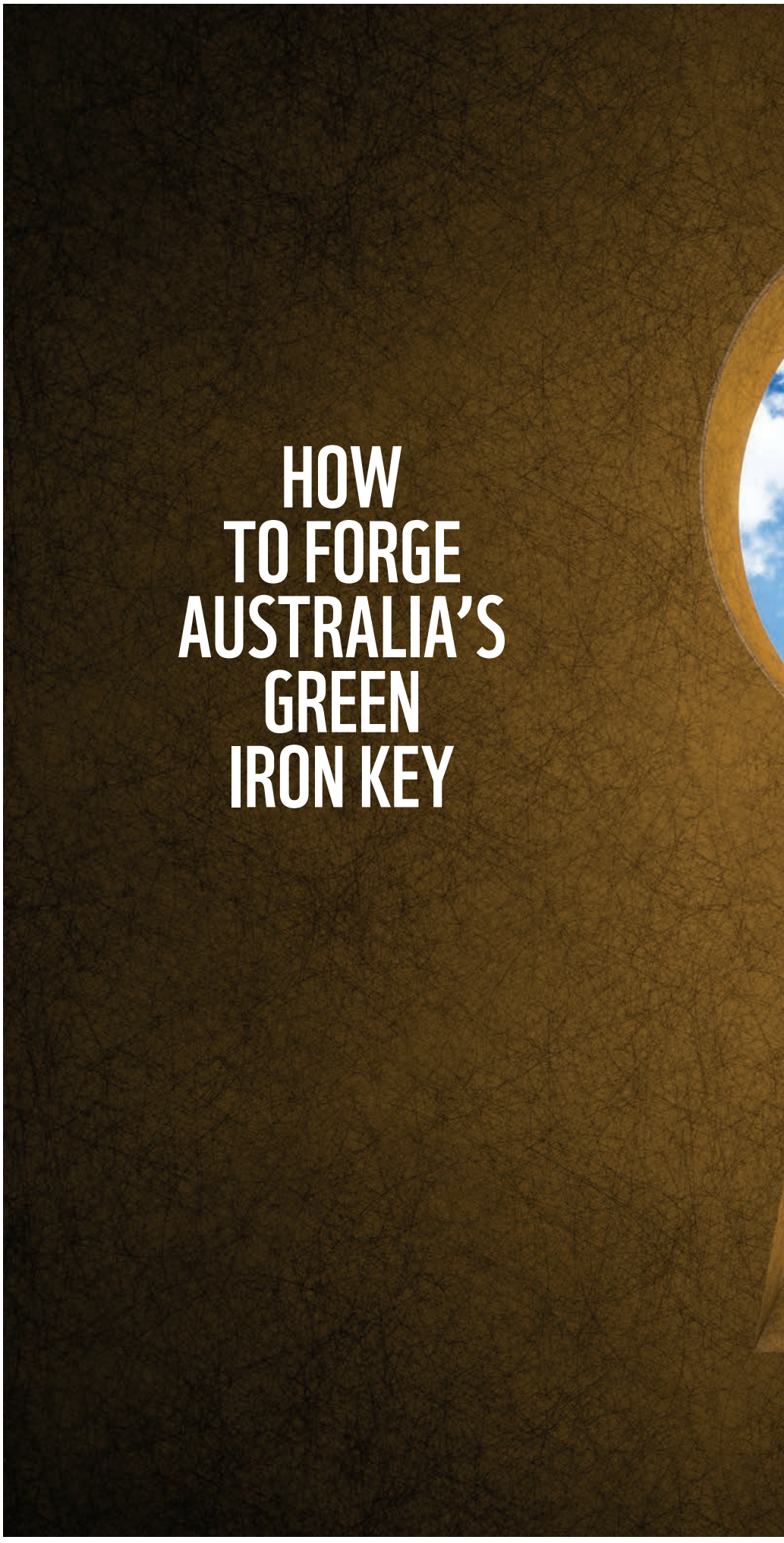
Australia could gain significant economic benefit from moving further down the steel value chain. Modelling by the Western Australian Government estimated that building just one green iron plant (one 4.8 million tonnes per annum capacity direct-reduction plant producing a reduced iron product and potentially generating less than 3 per cent of the emissions that result from conventional steel production) would add $85 billion to Australia's gross domestic product (GDP), create 1,540 full-time equivalent (FTE) jobs, and generate $31.7 billion in Commonwealth and state taxation benefits[7].

Modelling released in 2023 by Sunshot[8], an alliance of business, union and conservation organisations including WWF-Australia, identified five growth opportunities for clean energy exports from Australia that could generate an estimated $314 billion per annum by 2040. This includes a potential $96 billion for green iron and steel revenue. Other investigations have placed green iron and steel at or near the top of Australia's green export development priorities and asked for significantly increased governmental support[9].

MUTUAL BENEFITS

Strong integration with Asia to meet the demand of Asian businesses has been critical to Australia's past resources industry successes, including attracting the investments and offtake agreements that underpinned development of new sectors. Effective collaboration between Australian public and private interests and Asian counterparts in the steel sector could again ensure all countries retain their economic competitiveness during decarbonisation.

The value chains of renewable energy technologies are typically more complex and globally interconnected than fossil fuels. Consequently, more proactive, sophisticated, and geopolitically aware strategies are required. The 'green statecraft'[10] required for the energy transition is more complex than simply changing exported commodities to renewables. It requires a deep understanding of the national objectives (security, economic and geopolitical) of each of our trading partners[11]. Australia must show by communication and targeted actions that we understand the future needs of our trading partners and that Australia can continue to be a strategic partner of choice.



POLICY RECOMMENDATIONS

Developing a green iron and steel industry needs:

- an adequate renewable energy supply
- renewable consumables, including renewable hydrogen
- the right iron ore available at a globally competitive price and location
- infrastructure for heavy industry and export
- governance that creates certainty of future industry regulation
- financial and non-financial enablers that help and protect emerging low-emissions industries; and,
- most important of all, the political courage and policy foresight to deliver a new Australian trading identity at a time of global industrial change.

Federal and state governments must coordinate to:

A Establish an at least $10 billion domestic support package to decarbonise the existing iron ore and steel industry and prioritise the development of export-focused green iron projects.

- Align government programs such as Powering the Regions, the National Reconstruction Fund, Hydrogen Headstart and new initiatives to meet the industry's significant need for affordable renewable power and renewable hydrogen. Policies should also create demand for renewable energy.

- Align Australia's emissions reduction targets with global leadership and expectations if we are to be the low-emission investment destination of choice. This provides investors with clarity, certainty, and confidence. Investors already know that Australia must improve emission reduction timelines, community consultation, biodiversity protection and management of other environmental impacts. Attracting new green iron and steel investments is also far more likely with clear and future-proof climate and environmental protection regulations, not less regulation.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- Create and follow clear sector-specific emissions reduction pathways with measurable timelines, science-based targets, and auditable, consistent and transparent data disclosure requirements. These must include clear deadlines for phasing out transition consumables, including fossil gas and fossil gas-hydrogen (fossil or renewable) gas blends[12]. Emission-tracking schemes, such as the Guarantee of Origin, must be expanded to all industries.
- Facilitate development of common user infrastructure in renewable energy industrial areas in appropriate locations to ensure that the vast scale of investment required is efficiently delivered and used by all industries.
- Develop a skilled workforce and technological capabilities.
- Task agencies such as the Clean Energy Finance Corporation, the Australian Renewable Energy Agency and Northern Australia Infrastructure Facility with de-risking industry investments by making renewable energy and consumables competitive with fossil fuels.
- Redistribute current financial support and subsidies for the fossil fuel industry to fund renewable energy and renewable hydrogen infrastructure, which, unlike investments in fossil gas, will future-proof regional economies.
- Respond to significant carbon market instruments like the Carbon Border Adjustment Mechanism (CBAM of the European Union), which will be a reality of the green economy. Australia should develop equivalent measures if deemed necessary to protect domestic decarbonisation.

B Revitalise and expand green iron and steel international strategic partnerships.

- Agreements should identify and help the creation of value chains involving Australia as a green iron maker, and countries like Japan and Korea as green steel producers. For example, the Australia–Japan Partnership on Decarbonisation through Technology and the Australia–Republic of Korea Low and Zero Emissions Technology Partnership could be aligned with national green iron and steel ambitions and strategies.
- Elevate ties with emerging steel-making giant India to position Australia as a key partner in its low-emissions steel-making future.
- Investigate options for other green iron and steel international partnerships, including pragmatic ties with industry-dominating China and emerging Southeast Asian economies.
- Resource Australia's internationally engaged agencies—including Austrade; Export Finance Australia; CSIRO; Department of Foreign Affairs and Trade; and Department of Climate Change, Energy, the Environment and Water—with supporting partnerships via business facilitation, finance, research and development, standard setting and policy formation.

C Pursue international green iron and steel leadership.

- Advocate for Australia's prospective position as Asia's 'green iron key' in dedicated iron and steel decarbonisation groups, such as the Leadership Group for Industry Transition (LeadIT).
- Make iron and steel decarbonisation a focus of any revision of existing and or negotiation of new trade deals and engagement with global and Asian institutions and groups.
- Make iron and steel decarbonisation a focus of a prospective Australia/Pacific-hosted Conference of the Parties (COP).
- Pivot international public finance towards facilitating green iron and steel trade and investment, in line with Australia's decision to end international fossil fuel finance at COP28.
- Establish a globally significant green iron and steel centre of excellence to advance research and development, and policy formation.

D Better coordination of domestic and international, and Commonwealth, state, and territory efforts.

- Prioritise green iron and steel as a key sector in any forthcoming renewable energy superpower master plan.
- Establish dedicated responsible (federal and state) agencies with the appropriate skills, financing, and policy and fiscal implements to match the scale of the challenge and opportunities. A highly coordinated and accountable approach that does not split responsibilities across multiple ministerial portfolios will be critical for success.
- Establish a national green iron and steel strategy[13]. Australia needs a well-designed strategy with measurable targets, delivered by bold and deliberate statecraft, to secure a leading position in the green industrial revolution this sector is experiencing. An executable strategy must coordinate and best communicate Australia's domestic and international intentions, priorities and commitments.
- Keep all domestic scrap metal onshore to integrate into Australia's value chain.

OUR VISION

WWF-Australia has a vision of Australia as a renewable energy superpower and has been an active leader, in the region and globally, on a transition to a thriving and resilient decarbonised world[14]. An economy driven by petroleum and raw material export alone will not allow us to realise this vision to transition to a regenerative economy where people live in harmony with nature. To be a renewable energy superpower and achieve our climate goals, the transition must be:

1. A **fast** transition meets agreed-upon international targets for emissions reduction and positions Australia and our regional partners for a prosperous future in the net-zero economy[15].

2. A **best** transition protects our planet's life support systems – we must deploy joint solutions to solve the energy, nature and climate crises[16].

3. A **just** transition incorporates equity for all people (including First Nations and benefit sharing for communities throughout and after the transition. Undertaking a 'just transition' of systemic change at scale "...depends on environmental and social policies being mutually reinforcing, not contradictory"[17].

FULL REPORT

This document is based on the report **Australia's Green Iron Key – Unlocking Asian Steel Decarbonisation, Securing Australia's Economic Future**. This report contains a detailed discussion of Australia's role in regional steel decarbonisation supply chain, including domestic and international priorities.

The full report is available here.

ACKNOWLEDGEMENTS

WWF-Australia acknowledges the Traditional Owners of the land on which we work and their continuing connection to their lands, waters and culture. We pay our respects to Elders, past and present, and their emerging leaders. WWF is one of the world's largest and most experienced independent conservation organisations, with over five million supporters and a global network active in more than 100 countries. WWF's mission is to stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature by conserving the world's biological diversity, ensuring that the use of renewable natural resources is sustainable, and promoting the reduction of pollution and wasteful consumption.

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