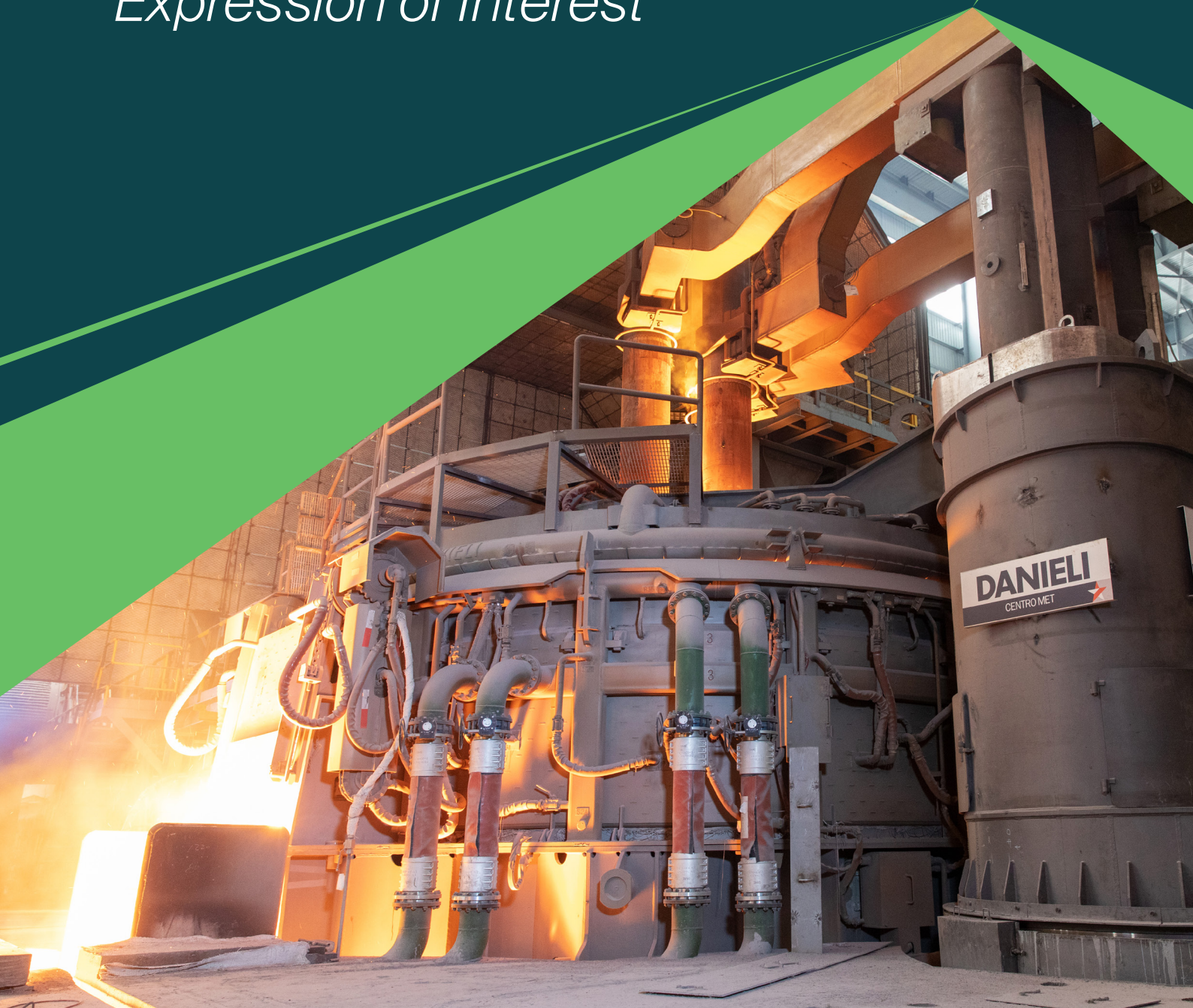




South Australia's Green Iron Opportunity

Expression of Interest





Green iron and steel will play a pivotal role in decarbonising the global economy, and in **South Australia** we have what the world needs to deliver on this

Tom Koutsantonis, Minister for Energy and Mining

Whyalla jetty
Credit: Isaac Forman

Foreword



Peter Malinauskas MP
Premier of South Australia

Steel is an indispensable part of the modern world, but iron and steelmaking together are responsible for 8% of global carbon emissions.

South Australia's Green Iron and Steel Strategy highlights an unparalleled opportunity to make green iron and steel a commercial reality for global steelmakers.



Tom Koutsantonis MP
Minister for Energy and Mining

In making this Expression of Interest call, we are seeking partners to jointly investigate development of a green iron industry in South Australia by 2030. Together we will plan actions to harness our rich iron ore and energy endowment, and our skilled workforce to produce a highly value-added export product for the world's steel industry that lowers carbon emissions by up to 85%.

As the birthplace of Australia's steel industry, we have the experience and the elements required. Our comparative advantage is:

abundant magnetite iron ore resources suited to direct-reduced iron processes

abundant renewable energy

global leadership in hydrogen energy, with our Hydrogen Jobs Plan building the world's first 250 MW green hydrogen power plant and partnering to stimulate green hydrogen production

established electricity networks and ports

a complementary regulatory framework to encourage investment in renewable energy and storage, hydrogen and mineral resource developments.

The technology exists today to produce green iron. This Expression of Interest (EOI) is open to multiple parties who are willing to commit to a collaborative and innovative project. From pit to ship, we are seeking solutions to the challenges and opportunities in every step of the supply chain to establish a thriving green iron industry by 2030.



It's time to express your interest in building a green iron supply chain in South Australia

The opportunities are set out in the State Prosperity Project and South Australia's Green Iron and Steel Strategy. These policy documents are supported by world-class regulatory frameworks such as the Mining Act, Hydrogen and Renewable Energy Act and Energy Resources Act. Together, these acts support the development of sustainable projects that provide the best outcomes for project developers, communities and Native Title holders.

As a government ambitious to find solutions to lower global carbon emissions, we stand ready to help industry de-risk green iron project development and attract new investment to our state.

With this EOI we welcome committed stakeholders to "come to the table" and join us as South Australia continues to lead the global energy transition.

Peter Malinauskas, MP
Premier of South Australia

Tom Koutsantonis, MP
Minister for Energy and Mining

In the drive to net zero, the demand for green iron is forecast to surge. South Australia has all the key elements needed to build a local green iron and steel industry and become a trusted supply partner to the world.

The goal is to de-risk private investment in the establishment of a new green iron plant in the Upper Spencer Gulf by 2030. Through this Expression of Interest (EOI) process, we seek to attract businesses to jointly investigate development of South Australia's green iron industry.

To achieve this, we need Australian and international businesses with capabilities spanning the entire value chain – from mining through to shipping operations – to come together to identify, evaluate and expedite solutions to complex challenges.

To inform joint investigations, we seek to collaborate with mining, renewable energy, hydrogen, green iron and steel production, infrastructure development, equipment and technology providers, engineering and research, transport logistics companies and more.

The EOI will inform co-ordination and de-risking activities that will determine project requirements, such as specialised industrial precincts, with supporting value chain and infrastructure planning.



What activities do we propose?

An inaugural Green Iron EOI Industry Forum to:

- outline South Australia's Green Iron Opportunity
- begin the process to determine the key priorities to address in developing a green iron plant and value chain.

This will be followed by more focused workshops to be held before the end of 2024.

Companies will have the opportunity to submit a response to the EOI – commercial in confidence – with information on projects being considered and what is needed to progress to a comparative assessment.

Why?

We want to gather critical information on the opportunities and risks to advancing a green iron industry in South Australia.

The forum and workshops provide a space for companies to build essential connections across the industry and supply chain. Collaboration will be crucial to developing solutions to complex challenges to create competitive products for world markets.

Engagement through the EOI process and subsequent de-risking phase will:

- provide industry partners, the value chain and all levels of government with a robust, well-informed pathway to advance projects
- inform de-risking activities and studies that will determine specialised precincts, with supporting value chain and infrastructure planning.

When?

- Industry Workshops from June to September 2024
- EOI submissions due 1 October 2024

How you can be involved

- Participate in the EOI Industry Forum and Workshops
- Engage with us to progress your project
- Prepare and submit a response to the EOI

This EOI process is designed for participation, giving companies the opportunity to:

identify or progress South Australian projects

initiate connections across the green iron value chain

exchange knowledge with potential supply chain partners to evaluate South Australia's comparative advantages

define critical success factors for production of globally competitive products

work closely with the government to jointly scope, de-risk and resolve uncertainties.

It will also:

enhance global understanding of South Australia's comparative advantages

enable government and industry to gauge interest in jointly investigating de-risking activities.

This EOI process will help determine how government and industry can take full advantage of opportunities available across the steelmaking chain, leveraging the co-location of South Australia's resources, renewable energy production and manufacturing capability.

A new era of low carbon steelmaking

Across the globe, innovators are making the shift to green steel, identifying new pathways, inputs and technologies to enable steelmakers to transition operations to a low carbon footing. This movement is being driven by socially conscious investors, customers and employees, as well as regulatory requirements to disclose climate-related financial risks and transition risks. From next year in Australia, organisations will have to report on their risks and transition plans.

Governments worldwide are putting in place strategies to make sure industries reduce their carbon footprint locally and offshore. A focus in Europe is to create a level playing field for local businesses that are working to reduce their carbon emissions. The European Union's Carbon Border Adjustment Mechanism is scheduled to come into effect by 2026, applying a charge to carbon emitted during the production of goods entering the European Union. Consequently, many global steel manufacturers are taking the first steps to reduce their carbon footprint while ensuring their businesses remain commercially viable. It is difficult to significantly reduce emissions from existing blast furnaces – they need to be phased out and replaced by different technology.

Supplying green iron from magnetite through green hydrogen reduction (H₂-DRI) is a promising low-carbon pathway.

Realising the high cost of transporting hydrogen, many steelmakers are contemplating placing their Direct Reduced Iron (DRI) plants close to ore deposits or stockpiles – and renewable energy sites – to then complete the final steelmaking steps close to domestic operations.

South Australia has all the right ingredients to realise this decarbonisation pathway.

The
21%
advantage

The Green Iron Supply Chain Study with the Port of Rotterdam in 2024 indicates a 21% cost advantage of green iron supplied from South Australia compared to green iron production in Germany, using South Australian hydrogen and magnetite. This joint pre-feasibility study, a collaboration with the Port of Rotterdam, Monash University and South Australia tested the commercial viability of green iron supply chain pathways between South Australia and Europe.

South Australia stands ready to be a partner of choice in reducing emissions across the world's steel industry.



A partner of choice to accelerate your pathways to green iron

We stand ready to help committed companies pioneer a green iron industry in South Australia, leveraging our natural advantage in renewable energy and superior quality magnetite.

Through this EOI, we will advance the pathway to develop a direct reduced iron plant and supporting value chain.

South Australia has the tools and resources to help de-risk the environment for commercial green iron projects to emerge.

As an agile government, we can assist in effectively speeding up your development pathway. For example, as projects start to take shape, we can actively case manage these with other parties such as the federal government.

Superior, abundant magnetite

7.4 billion tonnes of economically demonstrated iron ore across 3 iron ore provinces from a resource base of more than 18 billion tonnes of magnetite ore.

Low-impurity, coarser-grained and comparatively soft magnetite, readily beneficiated to greater than 67% iron.

Ideal feedstock for direct reduced green iron, enhancing productivity and efficiency.

Significant deposits within reach of established processing and supporting infrastructure.

Green hydrogen at scale, available early

Building a state-owned, world leading hydrogen power plant, commissioned in 2026.

Delivering 250 MWe electrolysers, 200 MW power generation and hydrogen storage, with scope to grow.

Hydrogen Jobs Plan will grow valuable expertise and make available the early supply of hydrogen and green-firmed power.

More than a dozen green hydrogen projects are at various stages of development, to supply a critical input for green iron and steel production.

Best-in-class regulation

One window to government approach.

World-first, dedicated hydrogen and renewables legislation – the *Hydrogen and Renewable Energy Act 2023* to coordinate developments, including competitive land release to support gigawatt scale renewable energy.

Coupled with the *Mining Act 1971*, a clear licencing framework is in place for the concurrent development of renewable energy, hydrogen, mining and green iron projects.

World's number 1 for renewable wind and solar

Recognised as the world's number 1 in integrating wind and solar energy, climbing from 1% to more than 74% in 17 years (exiting coal in 2016).

Brought forward target to achieve 100% net renewable energy by 2027.

Sustainable water supply

Advanced government and private sector investigations for sustainable water supply for industrial off-take.

Project to supply developers in South Australia's Far North and Upper Spencer Gulf region, known as the Northern Water project.

Scope for favourable-term, low-risk new DRI plant to secure water supply at scale.

Industry hubs open for business

Industrial hubs, skilled workforce, advanced industry.

Major Australian steelmaking hub, already moving to green steel.

Ports offering superior project economics.

Suitable land development

Government support for value-sharing and land access engagement with local and Aboriginal communities.

Designing green infrastructure corridors including common user infrastructure such as roads, pipelines and electricity transmission.

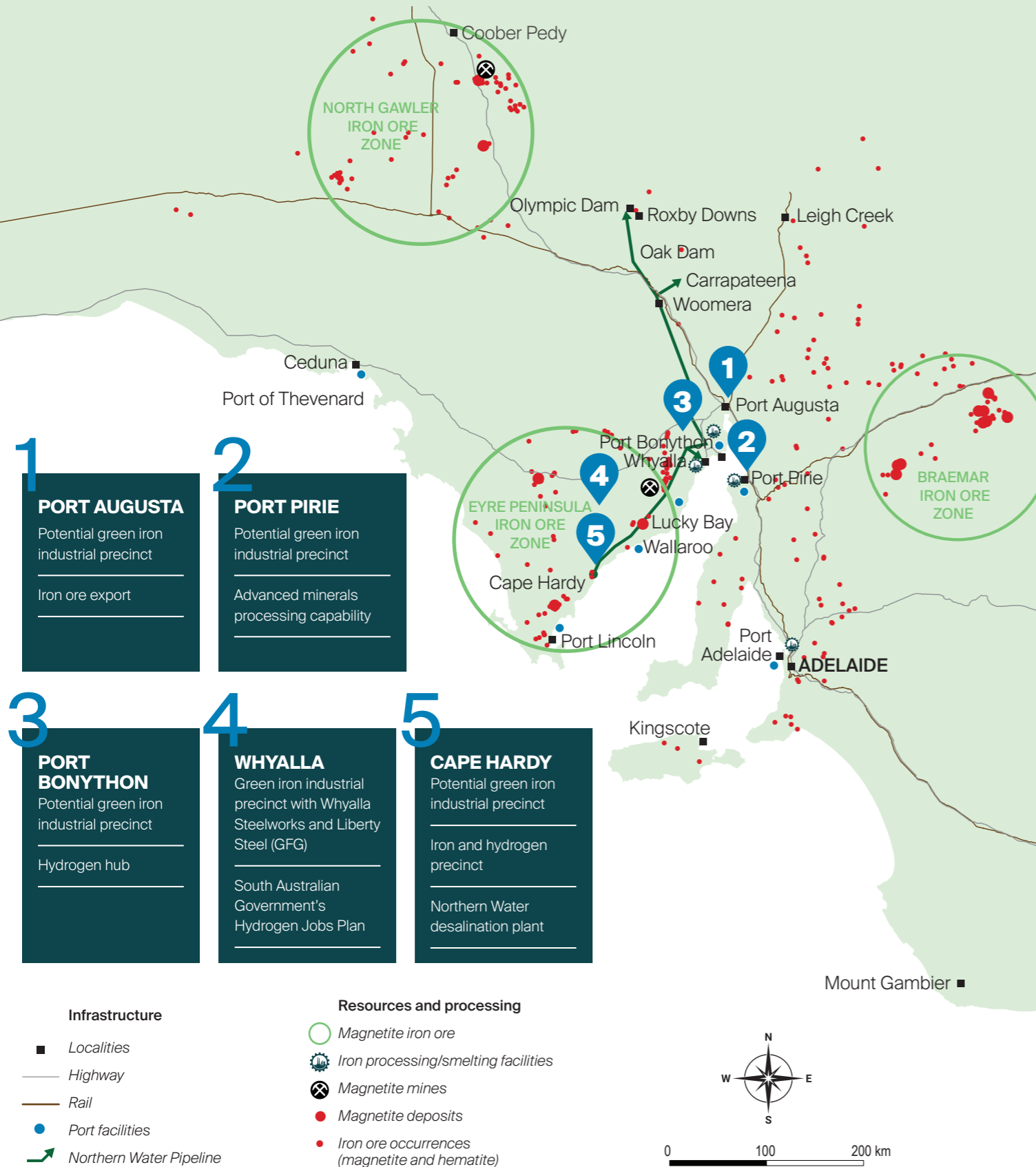
Bridging the technology gap

\$200m Heavy Industry Low-carbon Transition Cooperative Research Centre (HILT CRC).

Natural gas for a gradual transition to hydrogen.

Independent research confirms the competitive advantages and prospects of green iron in South Australia – a 21% cost advantage for European steelmakers who use South Australia's green iron.

South Australia's green iron and steel ecosystem



South Australia has **7.4 billion** tonnes of economically demonstrated iron ore

Iron ore miners already beneficiate our superior quality magnetite to achieve **greater than 67%** iron content

94% of South Australia's contained iron ore is in the form of magnetite

Magnetite 94%
Hematite 6%



Green iron and steel snapshot

Whyalla Steelworks green transformation

3,000
jobs
protected



1.5
mpta
green steel
production
per annum

New 2.5 mtpa DRI plant forecasts

2,500
jobs
construction



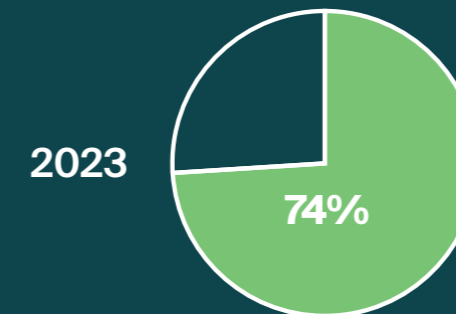
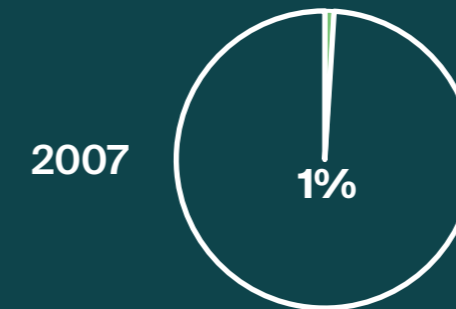
800
jobs
ongoing



We have a steel industry already making the transition to green iron

SA renewable electricity share

In 17 years, South Australia's share of electricity generation from renewables has risen from 1% to 74%. Engaged communities and a confident investment sector has made this possible.



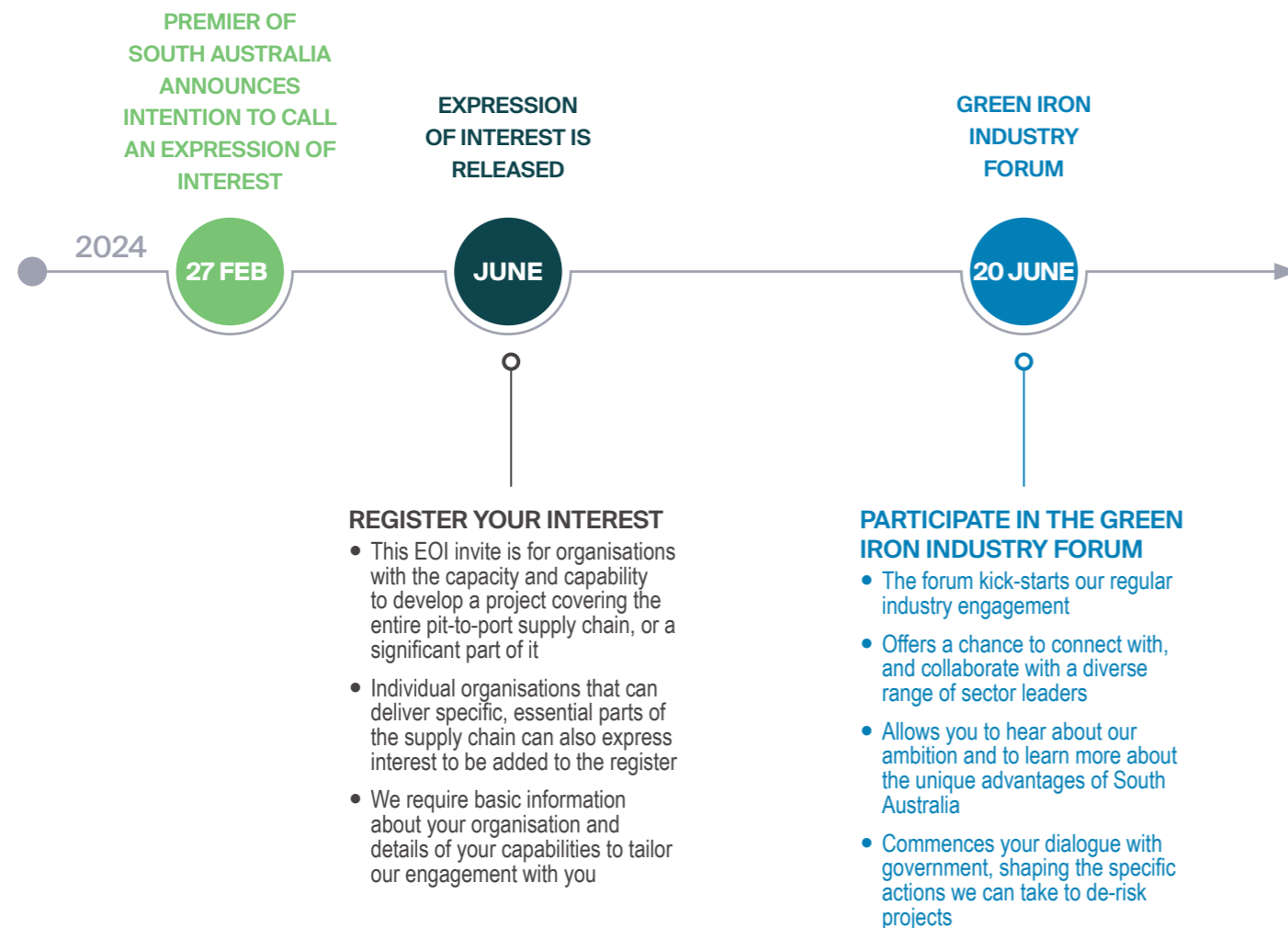
This Expression of Interest launches our dedicated and collaborative engagement with you

Through this EOI, we want to establish the parameters by which government and industry can maximise opportunities across the steelmaking value chain. We want to leverage existing and future resources, renewables and manufacturing capability to drive growth and achieve cost efficiencies for all.

From this expression of interest our goal is to:

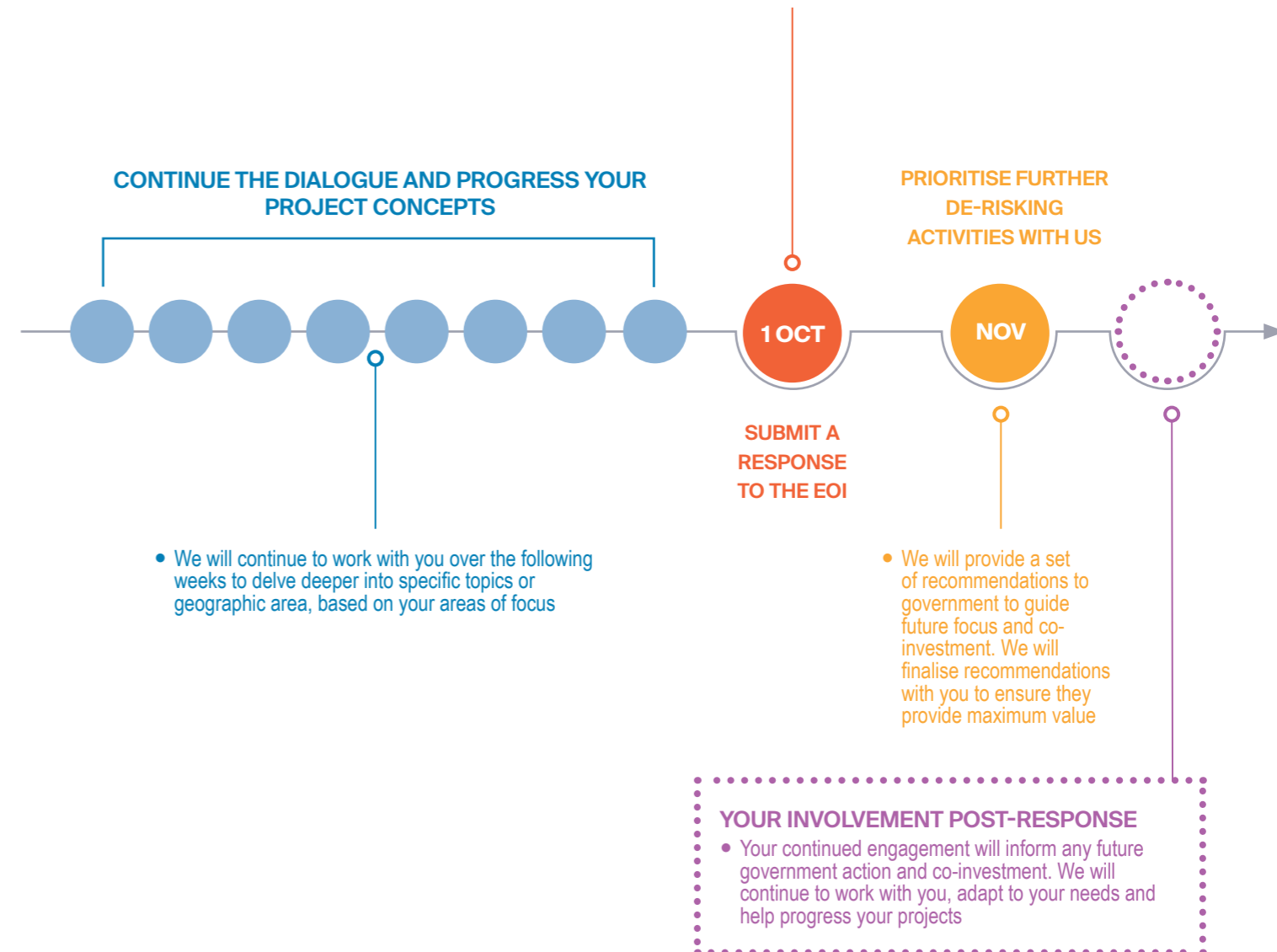
- gather important information from committed and credible parties to design ambitious projects that will develop green iron in South Australia

- identify the critical success factors in creating a competitive product for global markets
- initiate and foster collaboration across the value chain
- define the key areas where the government can help in de-risking projects going through concept and pre-feasibility stages
- progress the maturity of projects through co-design, networking and information-sharing
- establish ongoing dialogue with industry through a series of dynamic Green Iron Industry forums to build capability and knowledge.



We seek to work collaboratively with parties across the value chain to advance projects

- We ask you to submit a response (commercial in confidence) with information on any projects you are considering, and what you need to progress these further. This will allow us to gauge what areas have attracted most interest – for example what potential production volumes are being considered
- The format will be flexible, recognising that some parties may still be at very early stages. The response needs to include your company details, any other parties you propose to collaborate with such as magnetite miners and renewable energy developers. We also need information on the project(s) you are considering such as likely technologies to be used, storage needs, infrastructure needs and their location, production volumes
- We are especially interested in how we may help to de-risk your projects in line with the themes listed on pages 18-19



This EOI Process encourages industry to co-design viable projects in specific locations



These two hypothetical examples illustrate the type of pit-to-port projects the government would like to support.

Hypothetical Project 1

Characteristics:

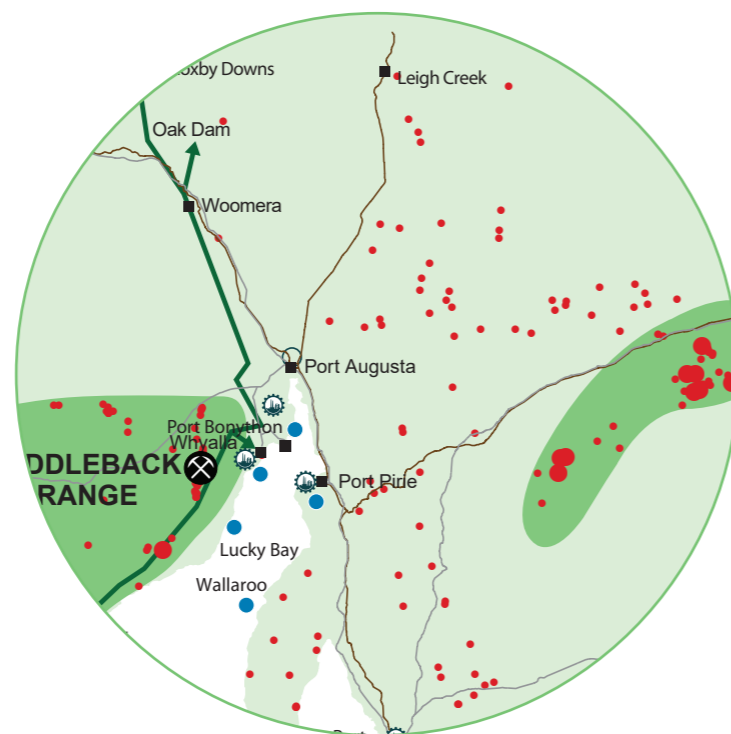
Net-zero mining and beneficiation in Braemar region with renewables from nearby, supplied through the grid

Zero-emissions transport of ores to Port Pirie

Zero-emissions hydrogen electrolysis with grid-supplied renewables

Zero emissions iron making at Port Pirie with grid-supplied renewables

Export of hot briquetted iron (HBI) by vessel from Port Pirie



Example of the challenges we could help alleviate:

Releasing areas for renewable generation

Defining transport corridor for iron ore

Determining efficient pathways to deliver renewable energy to sites

- Infrastructure**
- Localities
- Highway
- Rail
- Port facilities
- Northern Water Pipeline
- Resources and processing**
- Magnetite iron ore
- ⊗ Iron processing/smelting facilities
- ⊗ Magnetite mines
- Magnetite deposits
- Iron ore occurrences (magnetite and hematite)

Hypothetical Project 2

Characteristics:

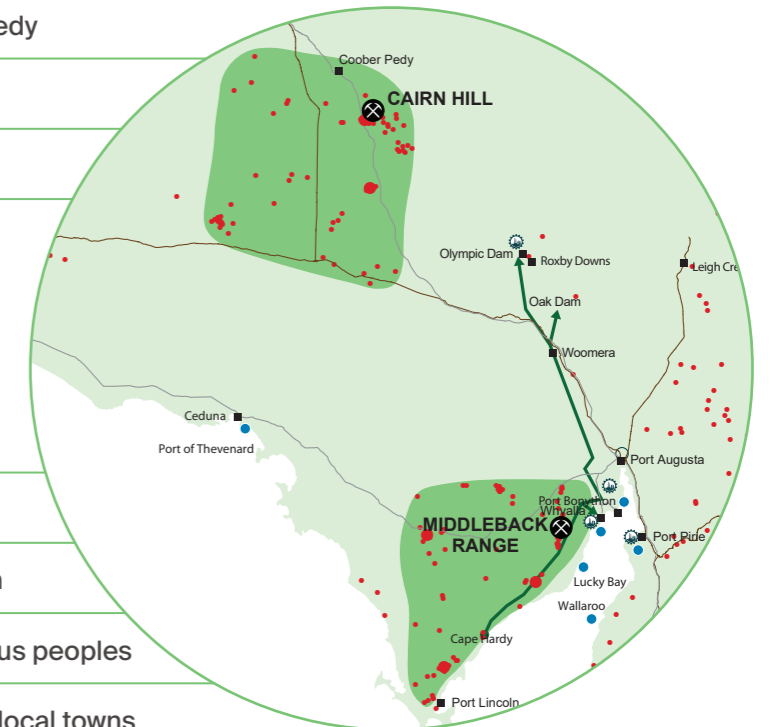
Net-zero mining and beneficiation in Coober Pedy with off-grid renewables

Hydrogen electrolysis nearby with off-grid renewables and desalinated water from the Northern Water Supply project

Zero-emissions ironmaking near Coober Pedy

Zero-emissions transport of HBI to Whyalla

Off-take to domestic steelmakers



Example of the challenges we could help alleviate:

Releasing areas for renewable generation

Options for access to water

Finding transport corridor for the green iron

Engagement with community and Indigenous peoples

Building supporting social infrastructure in local towns

Dozens of combinations are possible, and we'd like to explore these possibilities with you. As with any new endeavour, the process starts with ideas to be explored, information to be gathered, and projects to be defined.

Co-designing these elements with a large and diverse group of stakeholders is a proven method to improve and accelerate high-quality project concepts.

We will help to progress projects through in-person and online touch points, providing opportunities to connect with other players in the value chain and dive deeper into specific areas or topics.

This will enable us to build a clearer picture of where the most activity is likely to occur, the potential impacts we need to anticipate on infrastructure, the environment, population, community acceptance and other relevant factors.

We want to work with you to investigate challenges and risks that early-stage green iron projects will face, and which we can help alleviate.

Investing in shared infrastructure

- Design green corridors for shared infrastructure such as roads, pipelines and transmission. Design the models to enable shared investment and use.
- Conduct studies to fill information gaps - such as how to access water.
- Lower investment risk by bringing together credible counterparts.
- Invest in supporting regional social, medical, transport and infrastructure to make towns ready to host projects and facilities.

Creating a pit-to-port green iron supply chain

- Collaborate to design optimal solutions at a systems level: from mining to renewables and hydrogen development, to green steel production.
- Gather a register of value-adding suppliers to complement your needs in the development lifecycle.
- Gain access to land for mining, processing, iron-making and transport/storage to host projects and facilities.

Researching and innovating for continued cost reductions

- Engage our respected institutions such as the CSIRO and Cooperative Research Centres to research and develop continued cost reductions in ore processing, hydrogen and iron production.
- Promote increased adoption of zero emissions technologies in mining and transport, incorporating trials/pilots.

Accessing a skilled workforce

- Provide data on current skilled workforce.
- Determine skills most in need and mobilise training institutions to develop them ahead of time.
- Attract workers to where they are needed.

Attracting federal and international support

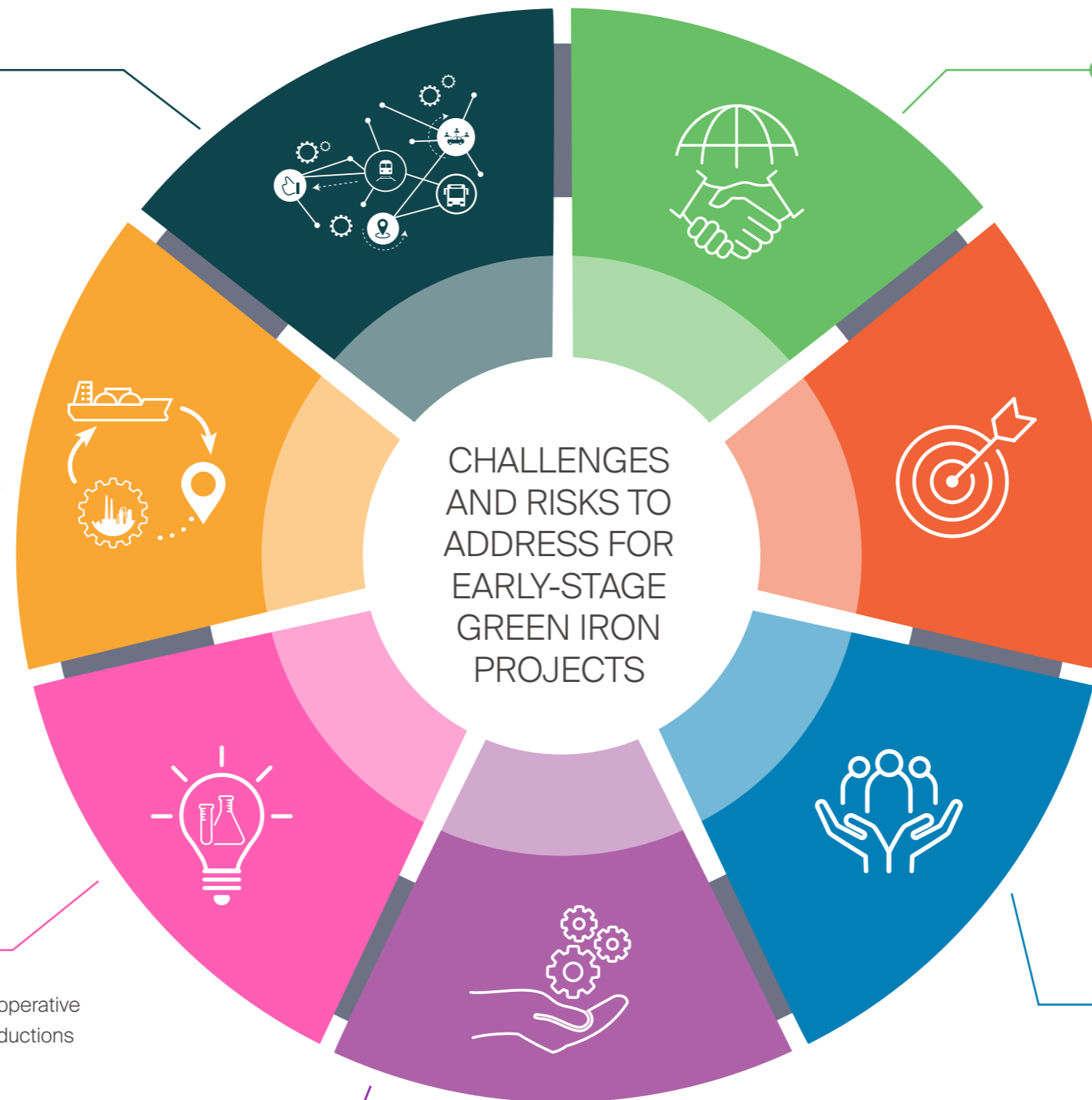
- Tap into nation-building initiatives from the federal government such as Rewiring the Nation, National Reconstruction Fund, Powering the Regions. Access funds from organisations such as ARENA, CEFC.
- Engage with overseas partners (countries, ports, businesses) to access markets and off-takers.

Achieving emissions targets

- Consider the need for transition fuels, and plan to phase them out to achieve green iron.
- Showcase and support zero emissions mining and transport.
- Develop high integrity offsets where needed.
- Define the standards for green iron, project boundaries and measurements.

Delivering equity and shared value for communities and Indigenous peoples

- Together create trusted relationships with community and facilitate early and respectful, exemplary engagement with Indigenous peoples.
- Design equitable ways to share benefits with custodians of the land.





Our ambition is to become a trusted green steel partner, demonstrating the commercial viability of decarbonised iron ore processing and steel making to the world.

In summary

What you need to do

Step 1 – participate in the Industry Forum

Step 2 – engage with us to progress your project concepts

Step 3 – prepare and submit a response to the EOI

Step 4 – help us prioritise further de-risking activities

Preparing your response

The response form will be made available at energymining.sa.gov.au/greeniron. Your EOI response will need to include the following.

Company information

The project(s) you are contemplating in South Australia

Details of each project, such as likely location, technologies selected, renewable energy required

A demonstration of your capability and capacity to develop the project(s), or any partnerships you are developing to cover the supply chain

Areas of concern or risk that are a high priority and indication if government may be able to assist in these

What will the EOI deliver

Your engagement through the EOI process and subsequent de-risking phase will deliver the following.

Give us a better idea of the role we can play to meet the ‘green iron by 2030’ challenge

Contribute financially to prioritising de-risking studies and activities

Resolve some risks or issues along the way

Give everyone a better understanding of the remaining risks to be mitigated

Provide options on the ways we can continue to de-risk projects with you

This EOI is to co-design, co-investigate with government the establishment of a green iron industry. This is not a lead-up to a procurement.

The government does not intend to invest in a green iron plant but seeks to de-risk private investment.

Disclaimer

This EOI does not create any representation, either express or implied, that:

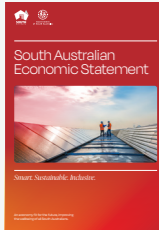
any invitation or procurement process will proceed; or

if an invitation or procurement process does proceed, that the participant’s response or other form of application (if any) will be given any preference or special consideration.

Participants are required to follow any future invitation or procurement process that may take place.

This EOI does not indicate a commitment by the South Australian Government to any particular course of action.

Supporting and enabling policies are in place, complemented by additional support from Federal Government initiatives.



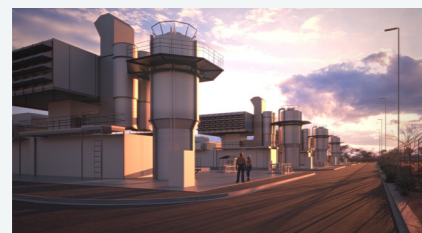
South Australia's Economic Statement envisions an economy that is fit for the future, improving the wellbeing of all South Australians. An economy that is smart, sustainable and inclusive.



The Green Iron and Steel Strategy envisions South Australia as the partner of choice for decarbonised steelmaking, with the aim to establish a Direct Reduction Iron (DRI) plant before the turn of the decade.



South Australia's Advanced Manufacturing Strategy guides future industry and government collaboration to grow manufacturing towards a knowledge-based, resilient and greener economy.



The Hydrogen Jobs Plan is building a world-leading hydrogen facility near Whyalla in the Upper Spencer Gulf, consisting of 250 MWe of electrolysers, 200 MW of power generation and a hydrogen storage facility – to be operational in 2026.



The Northern Water Supply Project aims to provide a new, climate independent water source for the Far North, Upper Spencer Gulf and Eastern Eyre Peninsula regions of South Australia, to enable the growth of industries crucial to achieving net-zero goals.

The federal government's National Reconstruction Fund is a \$15 billion investment fund ready to support value-adding in resources, transport and low emissions technologies.



South Australia has the tools and resources to help de-risk the environment for commercial green iron projects to emerge.



Further information

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Acknowledgement of Country

We acknowledge and respect Aboriginal peoples as the state's first peoples and nations, and recognise them as traditional owners and occupants of land and waters in South Australia. Further, we acknowledge that the spiritual, social, cultural and economic practices of Aboriginal peoples come from their traditional lands and waters, that they maintain their cultural and heritage beliefs, languages and laws which are of ongoing importance, and that they have made and continue to make a unique and irreplaceable contribution to the state.

We acknowledge that Aboriginal peoples have endured past injustice and dispossession of their traditional lands and waters.

Front cover image: Electric arc furnace.

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