

Superpower Transformation & Innovation

SOUTH AUSTRALIAN BUSINESS CHAMBER

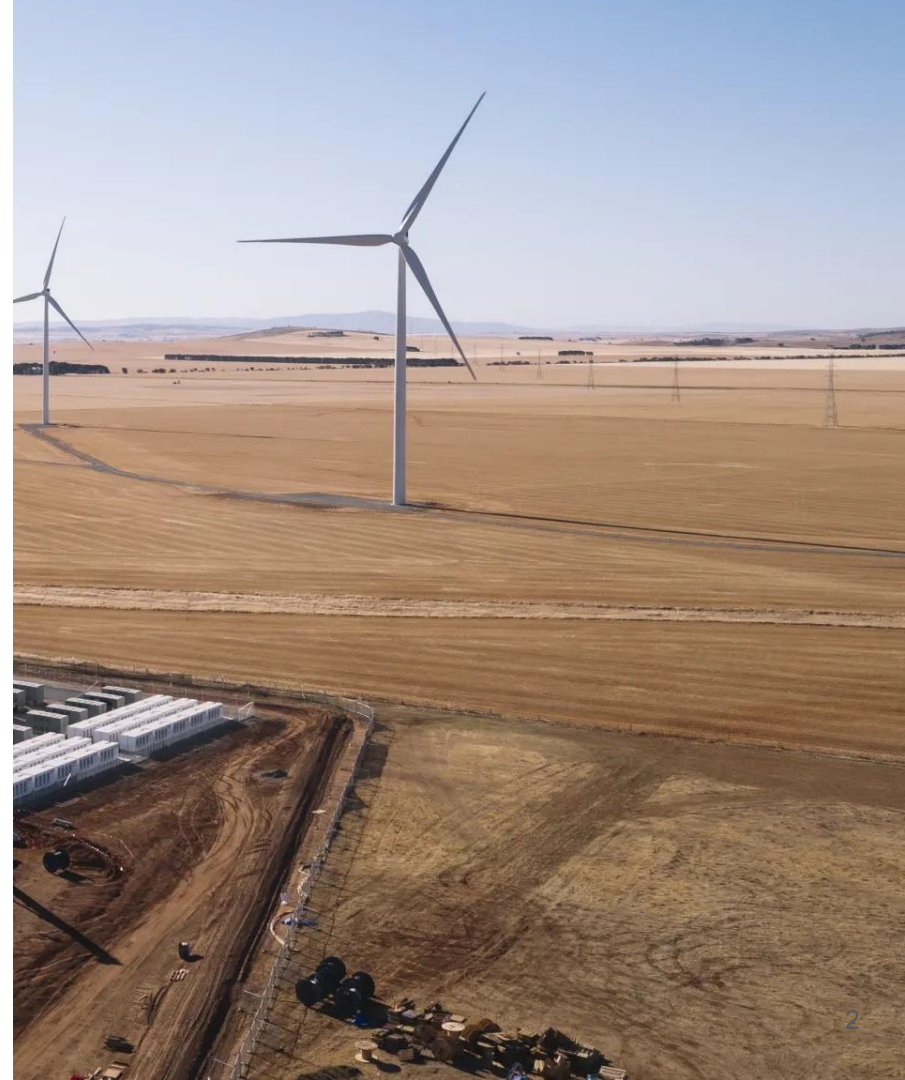
Ross Garnaut AC
6 August, 2024



South Australia leading the green export transformation

Global Challenges and the South Australian Opportunity

- Australia would be the biggest loser amongst developed countries if the world failed to bring warming to a halt by reducing net emissions of greenhouse gases to zero by mid-century.
- At the same time we have the best resources in the world for producing energy and goods with net-zero emissions.
- As a result Australia would be the biggest winner economically of the world achieves net zero soon, and we use our economic opportunities well.
- South Australia is well positioned to play a leadership position in the low carbon economy



South Australia leading the
green export transformation

South Australia's Leading Position

South Australia has six Australian advantages in the emissions economy to an exceptional degree:

1. Superior combinations of wind & solar resources
2. The second largest endowments in Australia (after Western Australia) of mineral ores requiring green hydrogen or green energy for processing
3. Australia's richest endowments of the economically most important of the energy transition minerals- copper, and large endowments of others
4. One of Australia's most advanced industrial regions in the Upper Spencer Gulf, with experience and infrastructure for power generation, mining and metallurgy, and located near excellent renewable resources
5. More than its population share of opportunities to grow and harvest biomass sustainably and to sequester carbon in the landscape
6. Broadly based support in the community and in political leadership over more than one and a half decades for sustainable development, encouragement of renewable energy, prudent management of waste and promotion of zero carbon industry

ADVANTAGE 1.

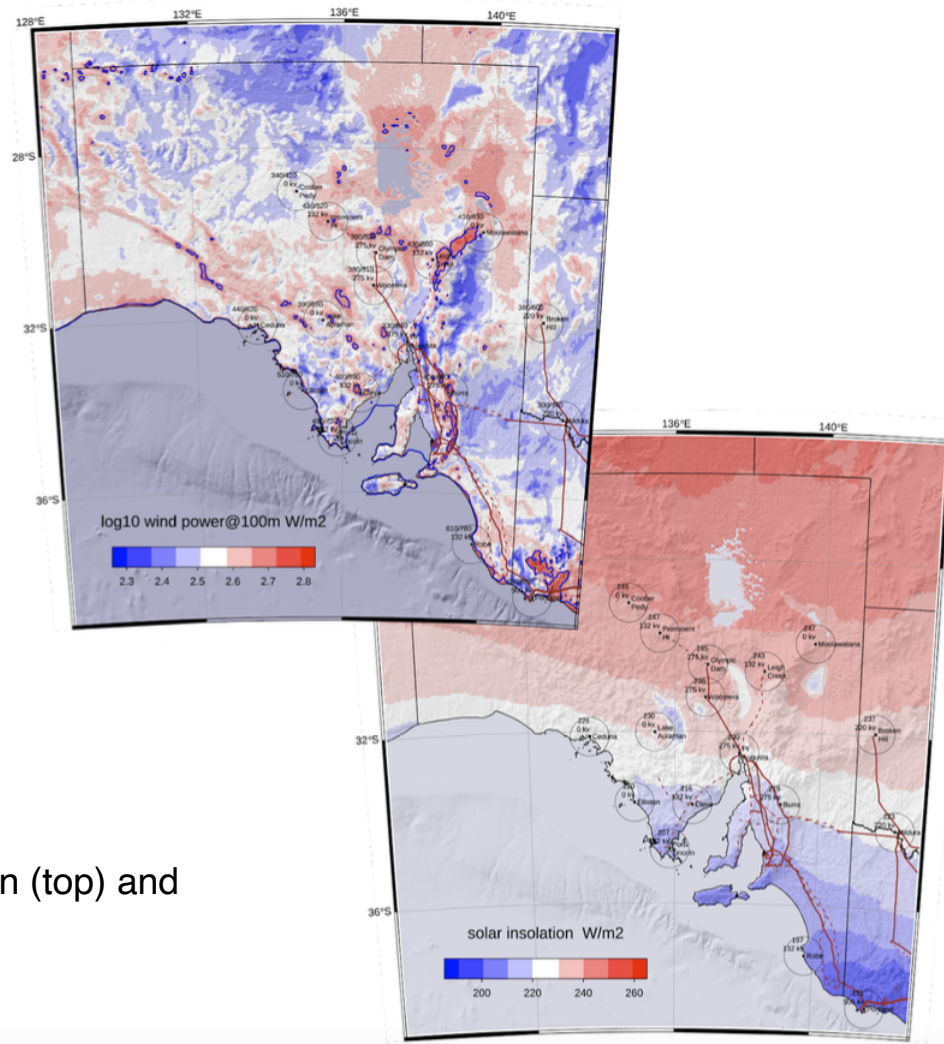
Superior renewable energy resources

By both national and global standards South Australia has high-quality wind and solar resources:

- South Australia's high-quality wind resources are widely distributed across almost all coastal regions, in the uplands of the Flinders and Mount Lofty Ranges, and in sparsely populated belt extending from the Gawler Ranges, through the copper belt around Olympic Dam to the deserts further northeast
- A distinctive feature of the South Australian wind and solar resources is their complementary generation profiles over the daily cycle

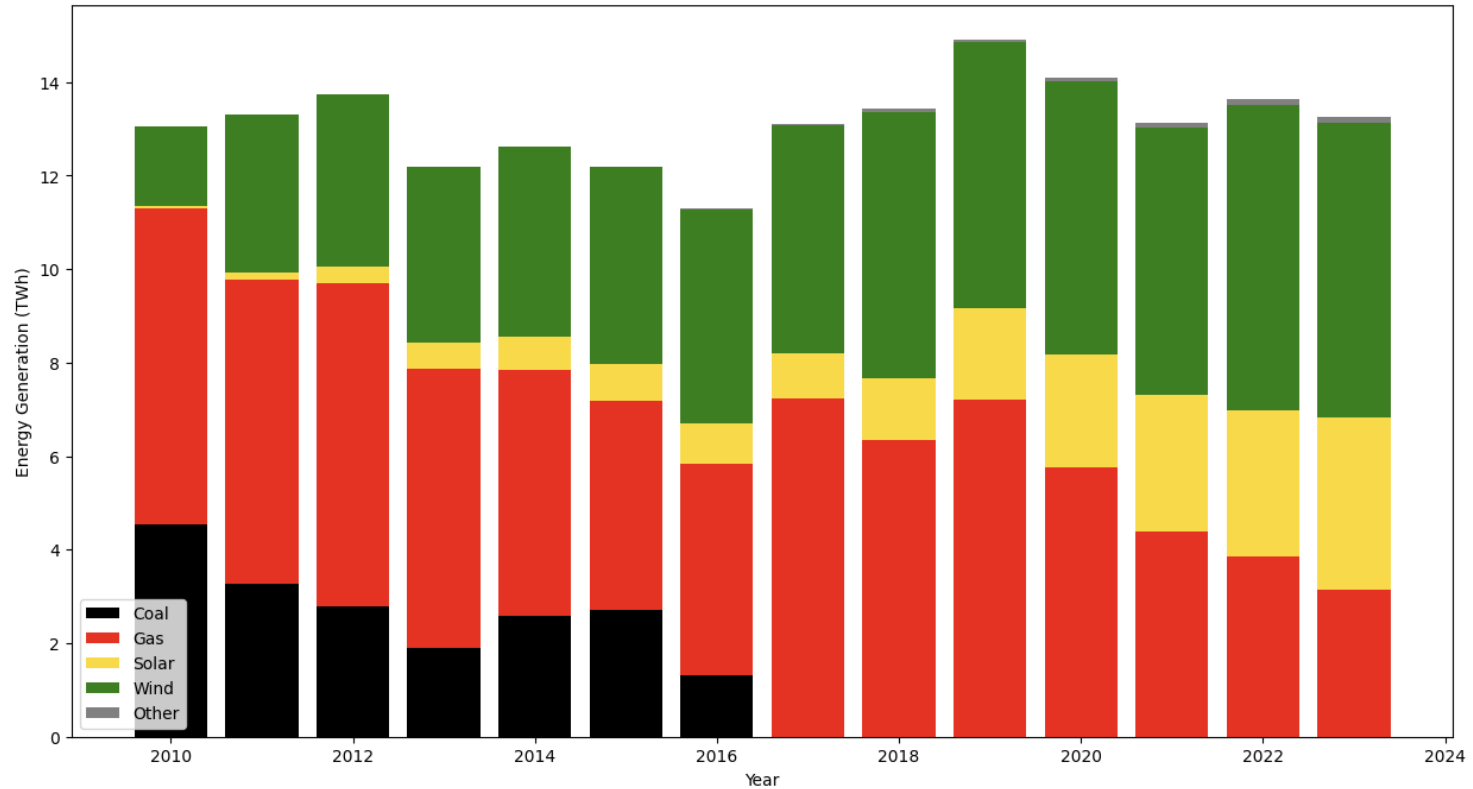


1. Superior renewable
energy resources

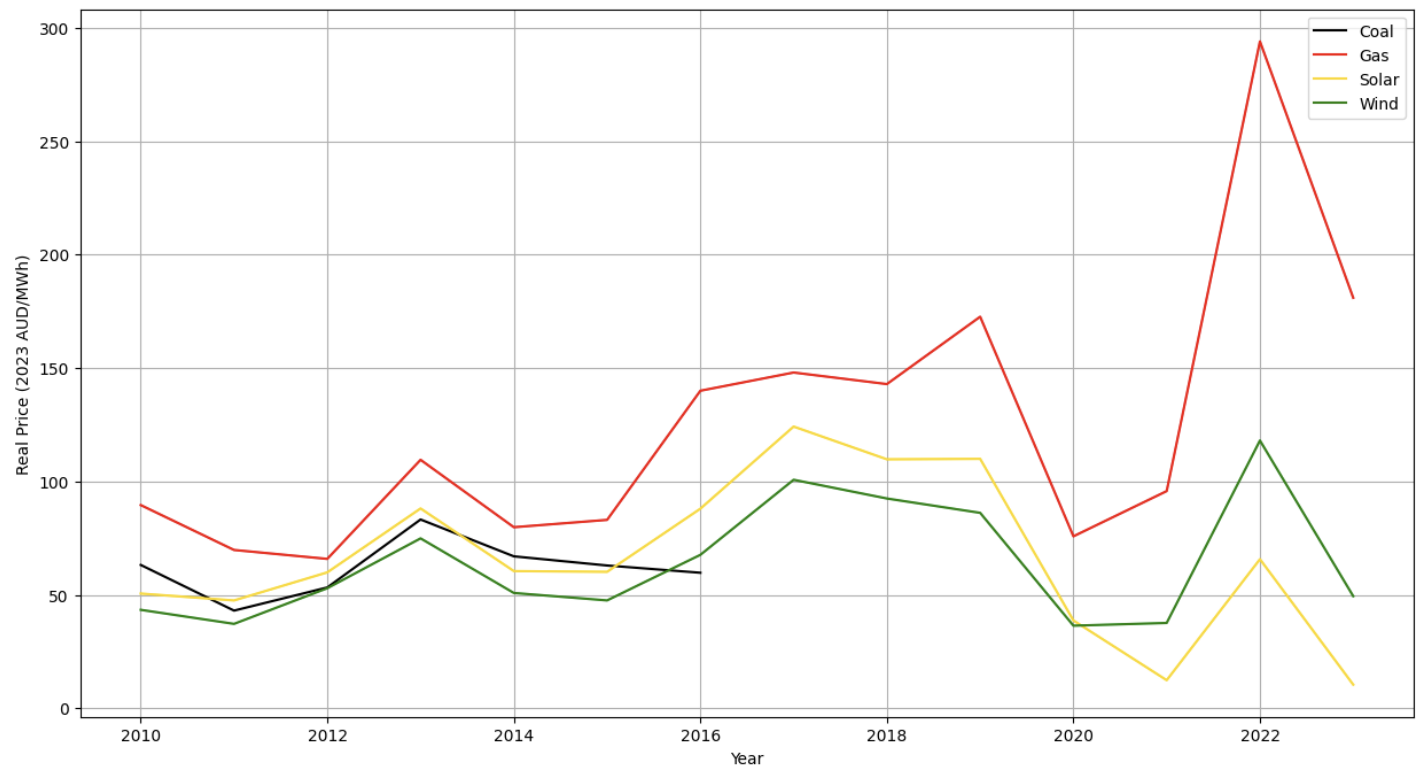


South Australia wind power distribution (top) and
solar insolation (bottom right)

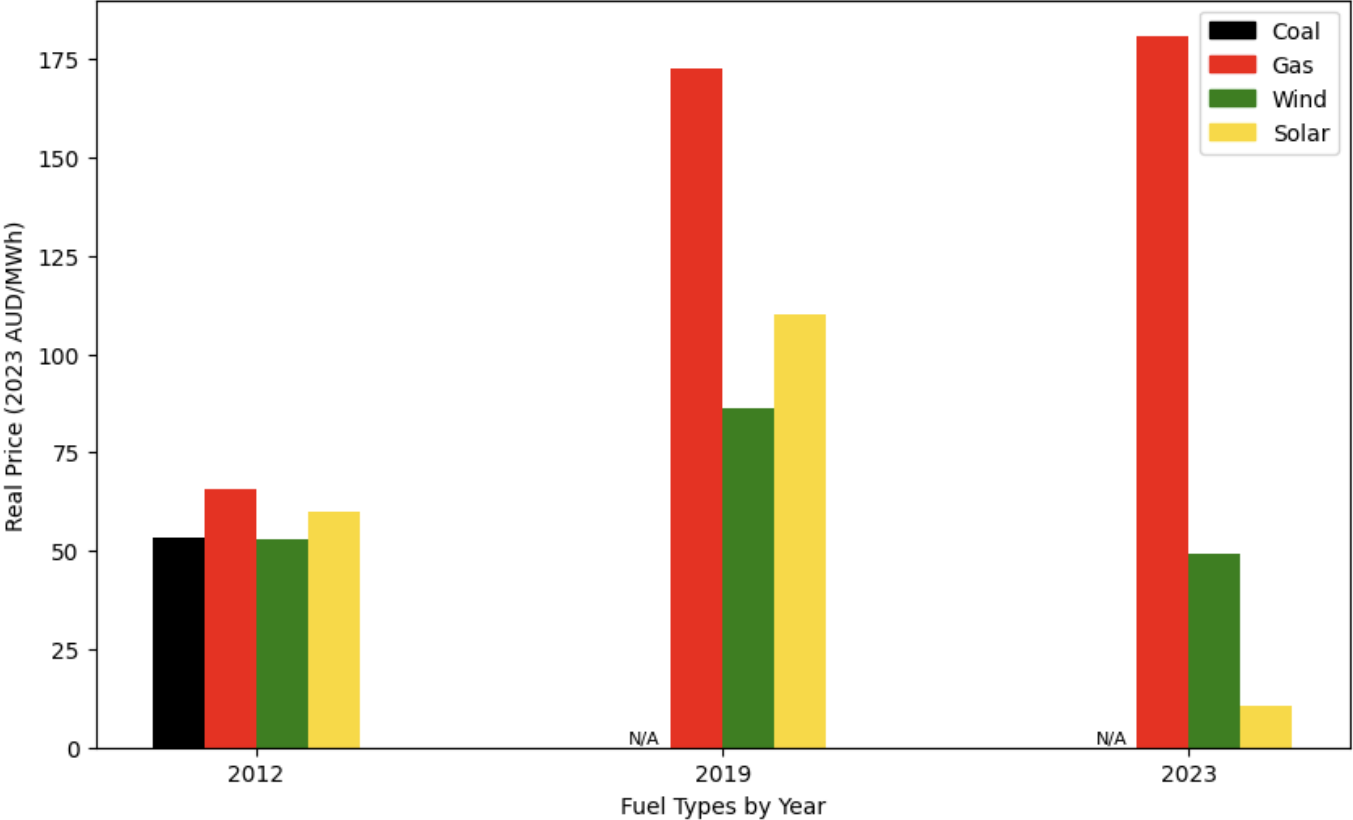
Total Energy Generation by Source per year (SA)



Price per MWh for Each Fuel Type Over Time (SA)



Price per MWh for Each Fuel Type by Year (SA)



Why Superior Resources and High Renewables Shares don't yet mean Low Retail Prices

Established regulatory arrangements and market structures have created an unnecessarily high cost base for electricity that currently outweigh the benefit of the low RE wholesales prices.

These problems can removed by policy reform readily undertaken as a part of the Superpower transformation.

- Transmission
- Optimisation with industry demand

ADVANTAGE 2.

Mineral Resources Requiring Energy for Processing

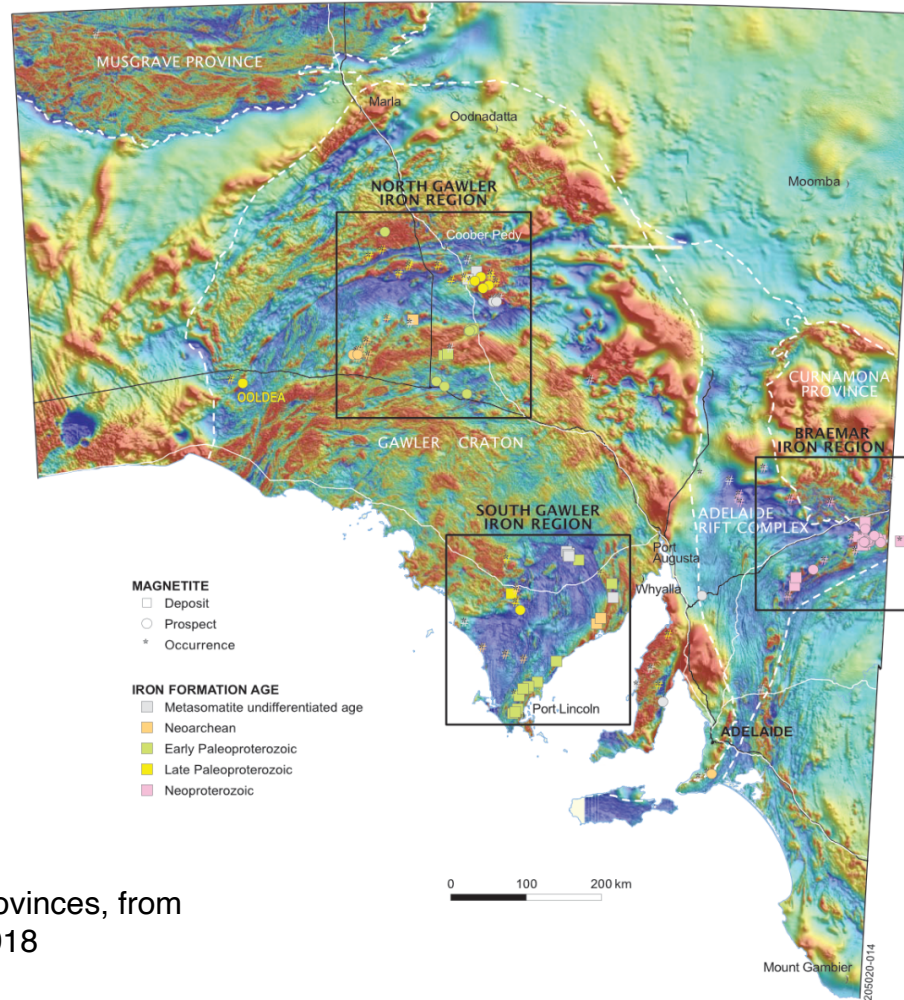
Iron processing is by far the world's largest industrial source of emissions, and South Australia is exceptionally well placed to contribute to reduction of global emissions by expanding its own processing.

- SA contains ~11% of Australia's iron ore resources - second to Western Australia
- SA has the highest volume of magnetite iron ore - the form most economically concentrated into high metallic content for direct reduction into metal using hydrogen
- SA has 44% the national magnetite resource
- Hematite as well as magnetite resources are present in South Australia - and both are of high grade



2. Mineral Resources Requiring
Energy for Processing

1. North Gawler Region
2. South Gawler Region
3. Braemar Iron Region



South Australia's principal magnetite provinces, from
Davies & Twining, MESA Journal 86, 2018

ADVANTAGE 3.

Energy Transition Minerals for Mining & Processing

A global transformation towards net-zero requires efficient delivery to market of a range of energy transition minerals.

- The most important economically of the energy transition minerals is copper
- Other energy transition minerals include, lithium, silicon. Uranium, cobalt, nickel, graphite and the rare-earth elements
- These 'critical minerals' are essential for the 'electrification of everything'
- The IEA estimates a 7-fold increase in demand of these minerals in the first decade on the path to net-zero
- The green energy transformation therefore presents a great opportunity for South Australia, where rich energy transition metals resource endowments are co-located with abundant accessible renewable energy resources.



ADVANTAGE 4.

Established Industrial Skills, Culture & Infrastructure

The iron triangle in the Upper Spencer Gulf contains industrial communities and culture, human skills and capacities and social and physical infrastructure that can support early increases in industrial activity, and can be greatly expanded at low cost with local community support.

There are four industrial centres in the Upper Spencer Gulf. All four will gain from each other prosperity and growth.

- Whyalla
- Port Augusta
- Port Pirie
- Port Bonython



ADVANTAGE 5.

Land for Carbon Capture & Biomass Resource for Industry

South Australia has many times its population share of woodlands and other land suitable for:

- Carbon sequestration in plants and soils
- Sustainably growing and harvesting plants as sources of biomass for zero emissions chemical industry
- Opportunities for marine sequestration in the gulfs

There will be immense demand for sustainably grown and harvested biomass in the zero emissions world economy, to replace coal, oil and gas in chemical processes in which it is impossible to remove the use of carbon and hydrocarbon. These include:

- Urea (fertiliser)
- Methanol
- Long haul fuel, such as aviation fuel



ADVANTAGE 6.

Commitment & Achievement in the zero carbon Economy

South Australia, when compared to other countries and Australia states, has played a leadership role in decarbonising its electricity supply.

- Broadly based support in the community
- Political leadership over more than one and a half decades for sustainable development encouragement of renewable energy and movement towards zero emissions, prudent management of waste and promotion of zero carbon energy
- 75% renewables in 2023
- Target of 100% renewables by 2030 now brought forward to 2027



The Australian Newspaper, Cameron England, 25 June 2024

“The South Australian government this week released a green iron & steel strategy...

Given the nation’s ambitious hydrogen plan, and a growing realisation that exporting hydrogen as an compressed gas is unlikely to be viable, the ability to use hydrogen produced from renewable energy to produce iron will enable manufacturers to produce low-carbon product in great demand globally...”

“Swedish start-up GreenIron in April received environmental approval in Sandviken, to construct what is claimed to be the first green iron furnace of its type using green hydrogen to metalliferous inputs into green iron...”

“SA is home to the Whyalla steel mill, which has its own DRI plans...industry believe there is opportunity for more than one DRI operation to produce green iron for the global steel sector...”

Note that Port Pirie is well located in relation to iron ore, electricity transmission, wind and solar resources and port and industrial infrastructure.