

South Australia - Demonstrating Green Hydrogen Production at Scale

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Agenda

- ✓ South Australia: a world leader in renewable energy
- ✓ Our hydrogen journey
- ✓ Hydrogen Export Hub developments



South Australia: a world leader in renewable energy generation



South Australia:

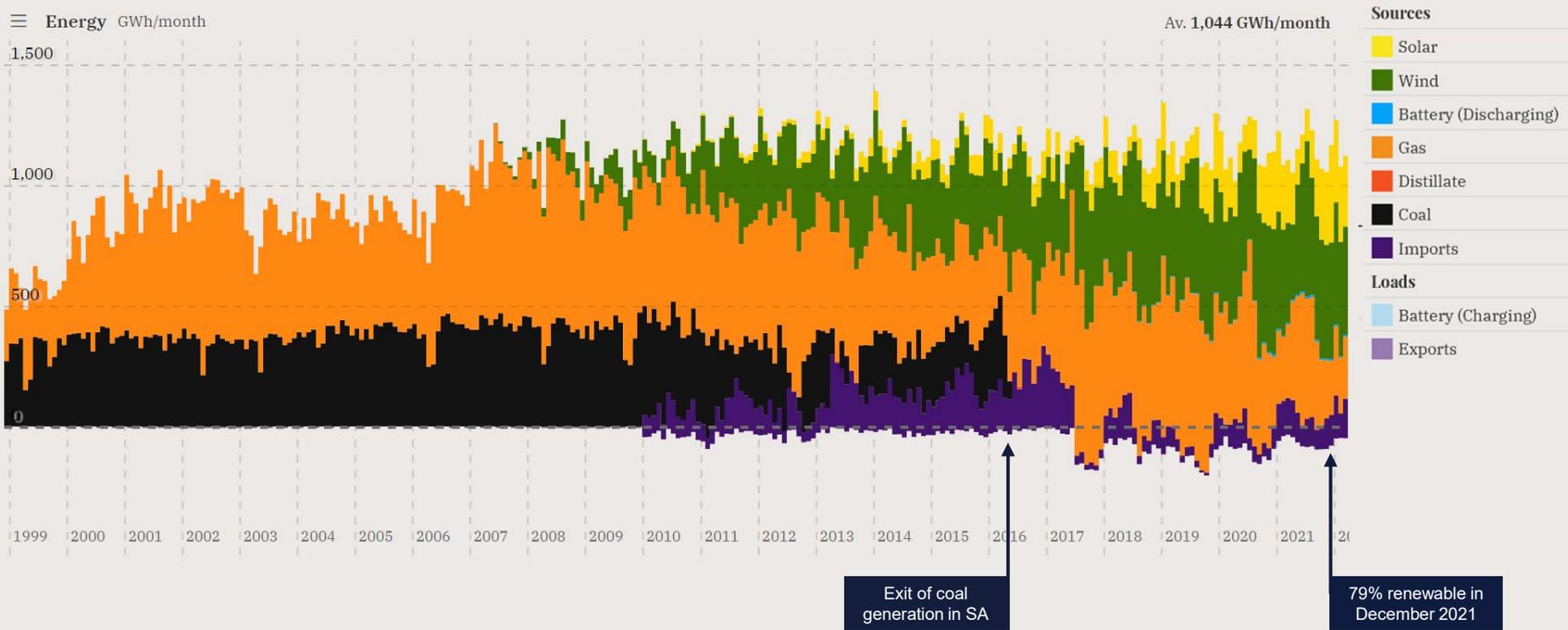
A global leader in renewable energy

- **68%** electricity from renewable energy
- **22** wind farms
- **3** solar farms
- World's highest rooftop uptake per capita
- **4** grid scale batteries
- Australia's largest hydrogen electrolyser



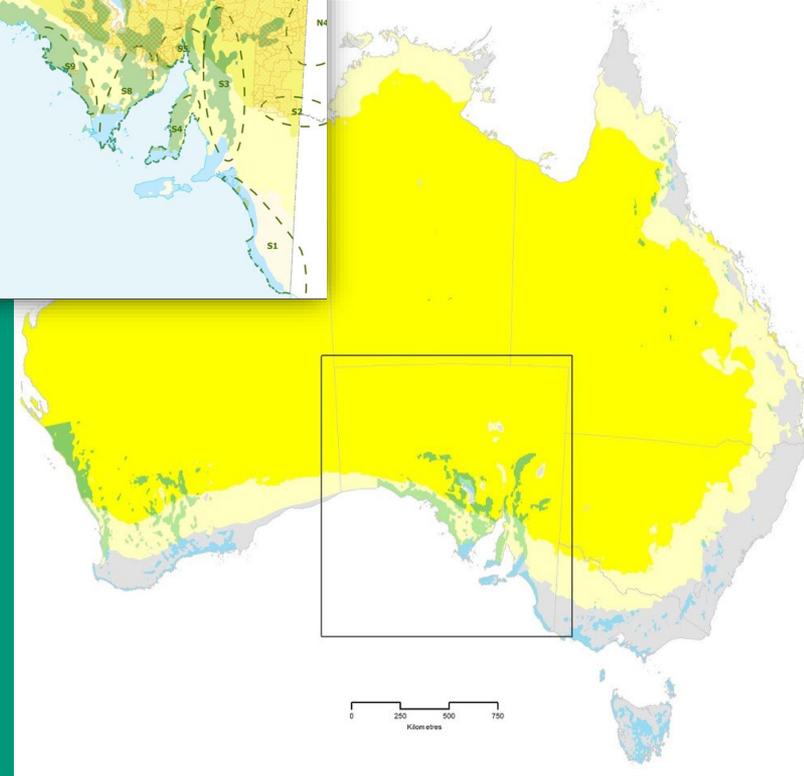
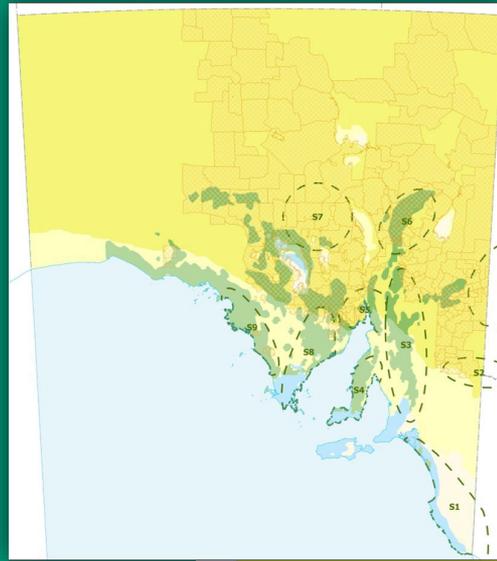
A rapid energy transformation

1% ➔ 68% p/a renewable electricity in 16 years



Globally competitive, abundant wind, solar & land

- ◆ SOLAR FARM
DNI greater than 23.5 MJ/m²
- ◆ SOLAR FARM
DNI greater than 20.5 MJ/m²
- ◆ WIND FARM
Predicted av. wind speed above 7.31 m/sec
- ◆ WIND FARM AND/OR SOLAR FARM
Predicted av. wind speed above 7.31 m/sec
DNI greater than 23.5 MJ/m²
- ◆ WIND FARM AND/OR SOLAR FARM
Predicted av. wind speed above 7.31 m/sec
DNI greater than 20.5 MJ/m²



Globally competitive,
abundant wind, solar and land

Current large-scale renewable project pipeline

	Operating	Under construction	Being developed (publicly announced)
	22	2	52
	3	1	
	4	2	
	\$5.3 B	\$1.3 B	≈\$20 B

The world is backing its ambition for net-zero energy with record investment

Toward 2030

SA targets at least 50% of 2005 carbon emissions

Commonwealth targets at least 43% of 2005 carbon emissions

Toward 2030

Australia targets net-zero emissions

Global electricity capacity rises by >400%

Renewables rise from 33% to 92% of total supply

Hydrogen rises to 12% of total energy supply

Global Investment

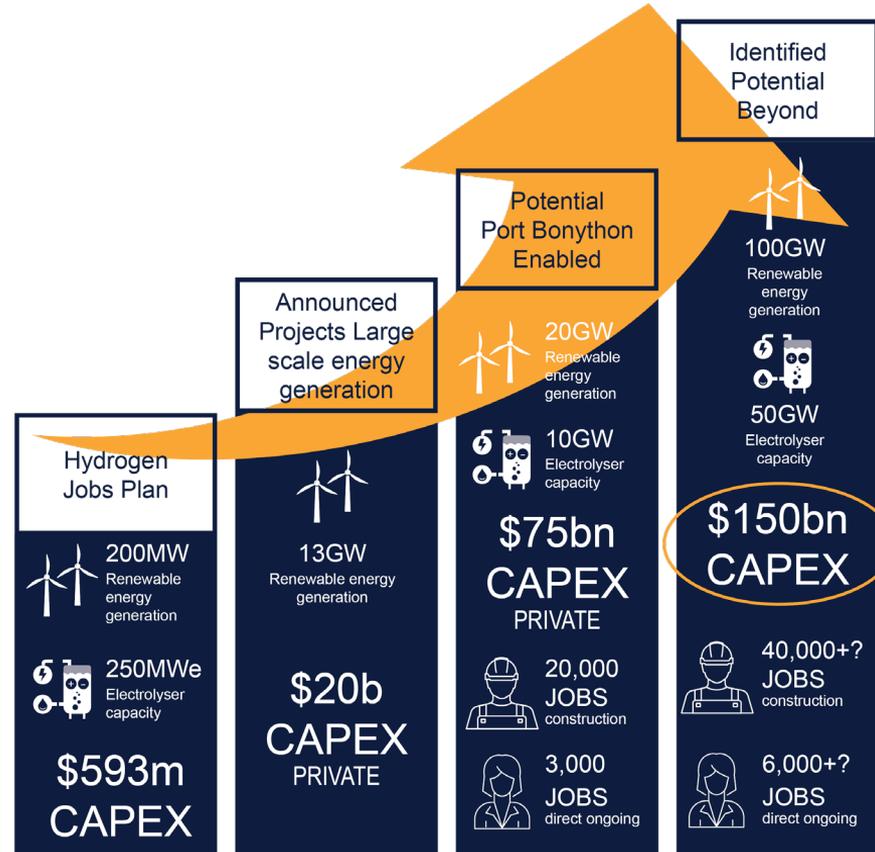
Hydrogen investments of **\$700bn** by 2030

Hydrogen is key

SA's ability to capture this transformational level of investment will rely on its agility, ambition and appetite for bold decisions.

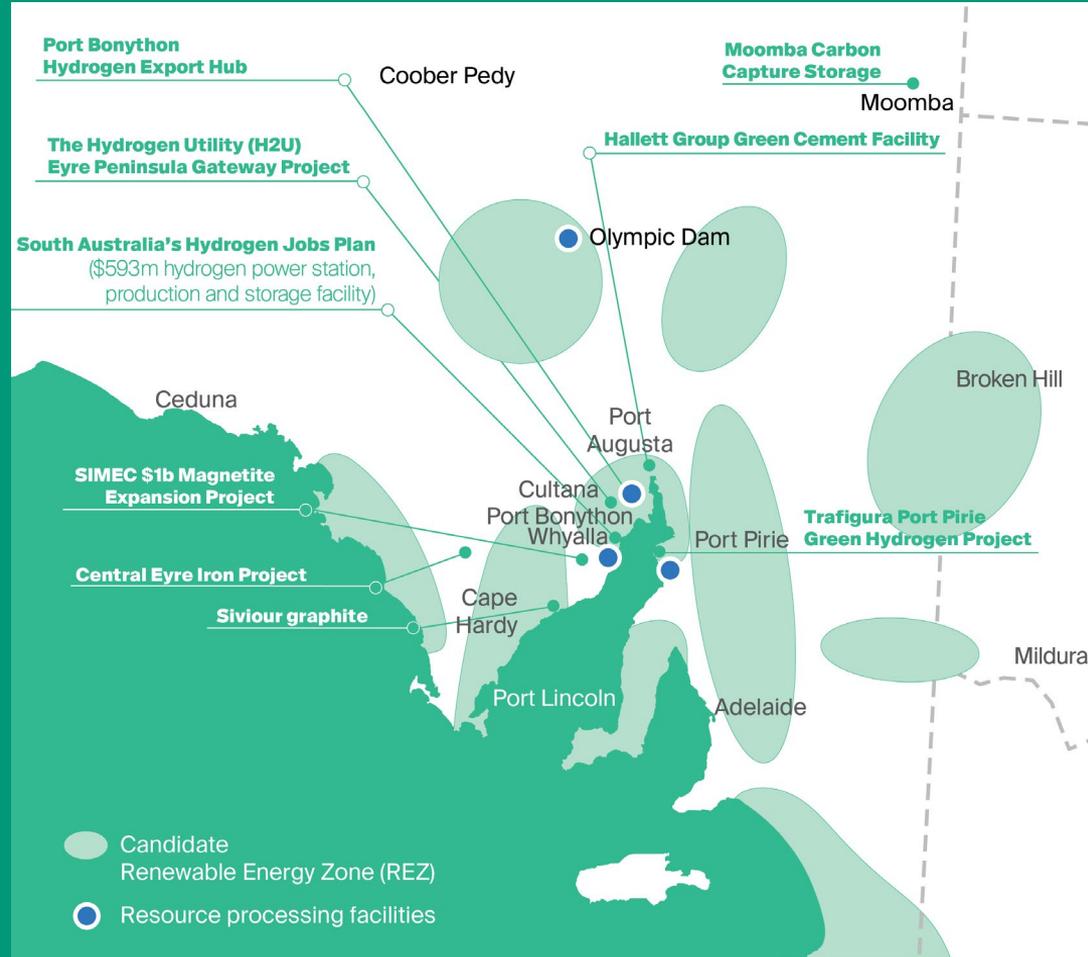
The scale of the opportunity:

- low carbon future and a viable path to climate resilience
- first mover advantage
- energy intensive industry attraction
- gigawatt-scale development and associated manufacturing opportunities
- high-skill jobs and hydrogen equipment, tech and services sector
- localised energy security
- new export offer



The Spencer Gulf is primed to become a clean energy powerhouse

- Significant public and private sector investment in mineral and resource exploration and hydrogen production



The journey to net-zero emissions must be well-managed

- Countries including Japan and Korea are looking to blue and green hydrogen as part of the long-term transition from LNG as they look to decarbonize their economies



South Australia's hydrogen journey



South Australia leads in hydrogen implementation



Australia's largest electrolyser

Hydrogen Park, SA

- Commissioned in 2020, an Australian first
- 1.25MW Siemens Proton Exchange Membrane electrolyser
- Blending 5% renewable hydrogen into the domestic gas network, supplying 700 homes
- Stage one in Australian Gas Infrastructure Group's plans to decarbonise Australia's gas network.



Hydrogen and Renewable Energy Act

South Australia is developing a new end-to-end regulatory framework for large scale renewable energy and hydrogen projects:

- A fit for purpose, 'one window to government' approach to regulation of the sector to deliver investment certainty and security, and unlock the pipeline of renewable energy projects
- Establish a threshold scale for which large scale renewable energy projects will be licenced under the new Act
- Expand our department's 'one window to government' practices, highlighted by the Australian Government's Productivity Commission report as leading practice
- Regulate the full lifecycle of projects, through to decommissioning and closure
- Partner with Aboriginal people as coexisting landowners
- Manage impacts and leverage the benefits for all South Australians and the environment, in line with environment, social and governance (ESG) requirements.

Functions delivered in a one-window to government Renewable Energy and Hydrogen Bill



South Australia's Hydrogen Power Plant

South Australian Government's commitment:

- \$593 million in capital funding
- 250 Mwe electrolyser
- 200 MW hydrogen fueled power plant
- hydrogen storage facility
- Operational by Dec 2025



South Australia's Hydrogen Power Plant

Objectives:

- Enhance South Australia's grid security, through new dispatchable generation
- 'Prove' hydrogen production and generation technology at scale
- Catalyse other hydrogen projects in development, including export focused projects
- Help to unlock the pipeline of renewable energy developments, associated manufacturing opportunities and supply chains
- Support South Australia's continued clean energy transition and decarbonisation



Market sounding process

In-depth analysis to extract critical insights and to inform project design and procurement.

60 responses:

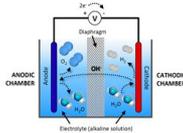
- OEMs for production, storage and generation
- Parties interested in Engineering, Procurement, Construction (EPC)/ Build Own Operate Model (BOOM) for some or all components
- Renewable energy providers
- Large and niche consultancies



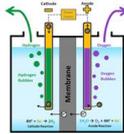
Potential technical pathways

Hydrogen electrolyser 250MWe

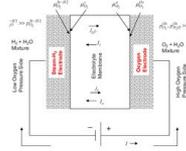
Alkaline:



PEM:



Solid Oxide:



Hydrogen gas storage

Line-packed pipeline:



Gaseous H2 sphere:

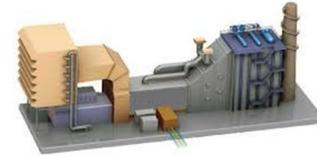


Liquified H2 sphere:



Hydrogen power plant 200MW

Gas turbine:



Fuel Cell:



South Australia's Hydrogen Export Hub developments



Port Bonython Hydrogen Export Hub

- Over 2,000 hectares of available land and 2.4km jetty
- EOI for land closed 1 July 2021
- 7 hydrogen projects shortlisted:
 - AMP Energy
 - Fortescue Future Industries
 - H2U
 - Neoen/Eneos
 - Neoen/Chiyoda/Mitsubishi
 - Origin Energy
 - Santos
- The proposed projects represent around \$13 bn investment and could generate up to 1.8 million tonnes of hydrogen by 2030.



Cape Hardy green hydrogen and industrial port precinct

- Located on Iron Road's privately owned 1200Ha, greenfield, gulf-front site
- Proximity to Eyre Peninsula's world-renowned wind and solar resources with desalination potential
- Natural nearshore deep-water suitable for both Capesize and Panamax vessels
- CEIP primary approvals include:
 - Development Approval for port construction
 - Indigenous Land Use Agreement (ILUA), including support for hydrogen manufacture and competitive export royalty regime
 - EPBC Act approval



South Australia's Export Strategy

By 2030, South Australia has the ambition to be producing and exporting more than one million tonnes of hydrogen per annum.

The strategy will:

- maximise the value of our renewable resources
- address bottlenecks and roadblocks in legislation, skills, and infrastructure required to establish a competitive export and value adding sector.



South Australia's prime position in renewables



World class renewable resources

South Australia has the wind, sun, land, infrastructure and skills to be a large-scale renewable hydrogen supplier



Strong community support

97% of South Australians desire renewables as their main source of energy



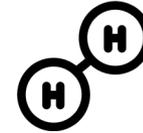
Integrated clean energy network

We are on track to our 100% target by 2030 with ambitions to generate 500% of the current local grid demand by 2050



Supportive investor environment

South Australia has a 'one window to government' dedicated account management system, streamlining regulatory approvals



Our vision

Our vision is to have multiple export scale hydrogen production facilities: liquid hydrogen (LH2), ammonia (NH3) and liquid organic hydrogen carriers (LOHC)



A world leading regulatory regime

Well defined regulatory framework with bipartisan support for renewables and clean hydrogen

Learn more

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