

Natural hydrogen regulation in South Australia

Workshop de Hidrogenio Natural

Elinor Alexander

Department for Energy & Mining



Acknowledgement of Country

As guests here on Kaurna land, we acknowledge everything this department does impacts on Aboriginal country, the sea, the sky, its people and their spiritual and cultural connection which have existed since the first sunrise. Our responsibility is to share our collective knowledge, recognise a difficult history, respect the relationships made over time, and create a stronger future. We are ready to walk, learn and work together.

Ngaityalngadlu taikunthitya yalaka

Yantupinarna Kaurna yartangka, ngadlu tampinhi tupa yaintyu pirku wapinhi, wiwunthi yaitya yarta, yarlu, ngayirda, miyurnakuma paraku tuwila tapa purruna tarraitpayinhi. Muna tirntu parrka-parrka wanti.

Ngadluku taingi ngutu yungkurinhi, tampinhi yurni ngantanhi pukingka, niipurna pintyathi mankurritiya, taingintya tarrkarri pintyanhi.

Nata ngadlu padnitha, tirkatha Kuma kumangka warpulayi-utha.



South Australia - Department for Energy and Mining



One of the very few government departments globally that recognises the link between mining and renewable energy, the department covers:

- **Mineral and Energy Resources,**
- **Energy and Technical Regulation,**
- **Growth and Low Carbon.**

The department regulates mining, upstream energy resources and the electrical and plumbing industries.

A brief history..

OFFICIAL

1836 – SA founded

1859 – Colonel Drake drills the world's 1st successful oil well

1866 – Australia's first oil well drilled in SA

1883 - Geological Survey formed

1931 – Ramsay Oil Bore records hydrogen shows

1941 - SA petroleum legislation

1963 – Cooper Basin gas discovered

1967 – First commercial gas discovered in SA - Caroline 1 CO₂

2000 – Modern legislation - Petroleum Act 2000

2003 – Australia's first deep geothermal well - Habanero 1

2009 – Evergreen legislation - Petroleum & Geothermal Energy Act 2000

2023 – Energy transition-ready legislation - Energy Resources Act 2023

Australia's first hydrogen exploration well drilled.



Testing gas in Ramsay Oil Bore, 1931



View from the old Ramsay Oil Bore to Ramsay 1, October 2023 (Gold Hydrogen).

Premier Dunstan enjoying the bouquet of Tirrawarra 1 oil, 1970



Premier Playford on holiday, with government field crews in the Cooper Basin, 1960

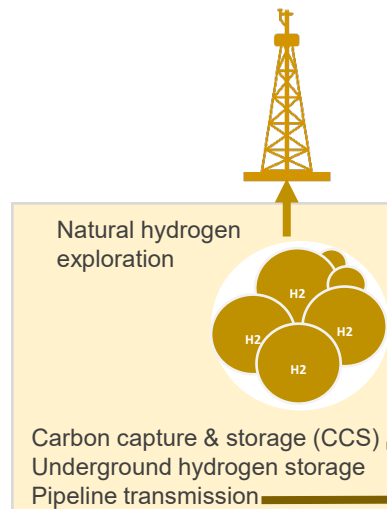


South Australia's hydrogen legislative framework

Petroleum & Geothermal Energy Act 2000 (now Energy Resources Act 2023)

- single window into government for natural hydrogen.
- includes underground storage and pipeline transport for all 'colours' of hydrogen

Natural (gold, white) hydrogen



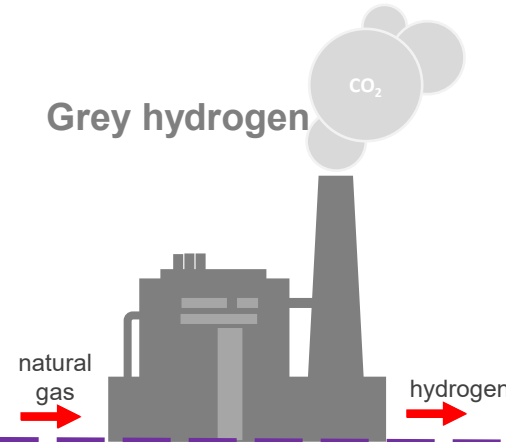
Hydrogen and Renewable Energy Act 2023

- Single window into government for all manufactured/generated hydrogen.

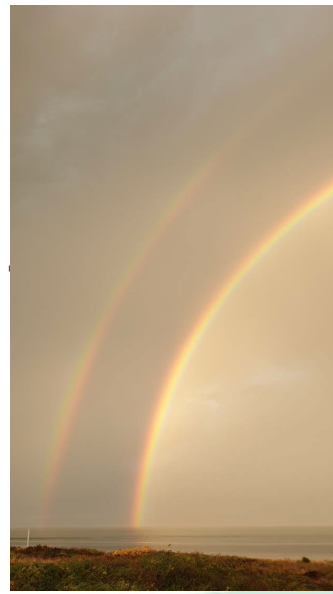
Blue hydrogen



Grey hydrogen



Green hydrogen



Petroleum and Geothermal Energy Act 2000

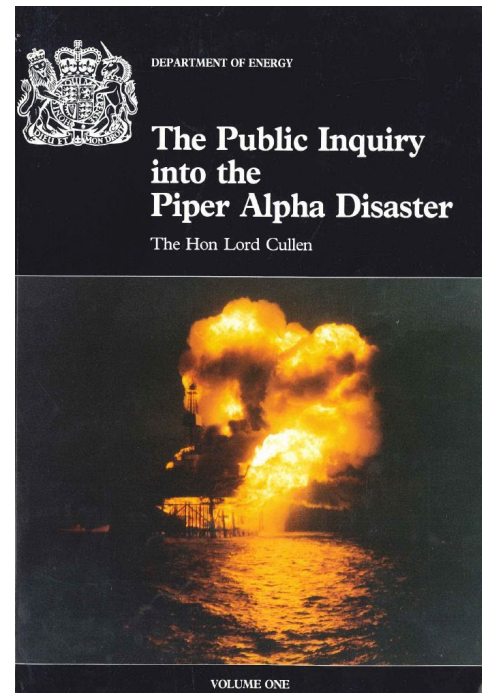
Petroleum Act 1940

- Prescriptive legislative framework
- “Tick box” style of regulation
- Covered licensing, environment and WH&S

In 2000, following the Piper Alpha Incident, DEM’s regulatory philosophy shifted to a risk-based approach – the Licence operator demonstrates how they will achieve and measure satisfactory outcomes.

Key objects include:

- providing security of tenure to licensees,
- protecting the environment and public,
- security of gas supply.



Energy Resources Act 2023 ***(formerly Petroleum and Geothermal Energy Act 2000)***

- Legislation has been kept 'evergreen' via amendments - most recently in November 2023;
- Objective/risk based regulatory framework;
- Covers licensing and regulation of exploration and exploitation of:
 - Petroleum and other prescribed **regulated substances***;
 - Deep geothermal energy;
 - Gas storage reservoirs for regulated substances (gas, CCS, hydrogen etc.); and
 - Transmission pipelines for regulated substances.

***In February 2021 changes to the Regulations added hydrogen as a 'regulated substance' – joining petroleum, CO₂, H₂S, He, N and substances produced with petroleum.**

This amendment enabled natural hydrogen exploration.

Energy Resources Act 2023 – what's new?

- The PGE Act was last significantly reviewed and amended in 2009.
- The *PGE Amendment Bill 2023* was passed by Parliament last year – *Energy Resources Act 2023*.
- The most significant proposed amendments include:
 - Changing the title of the PGE Act to the 'Energy Resources Act', to reflect the actual broader scope of the Act which now covers geothermal, **natural hydrogen**, underground coal gasification, carbon dioxide, and carbon capture and storage (CCS).
 - Modifying the definition of transmission pipeline to allow for the transport of **manufactured hydrogen** and imported substances such as liquefied natural gas.
 - Adding an option provision for the charging of a rent payment for commercial geological storage of regulated substances (e.g. imported CO₂ and **hydrogen**) via gas storage licences under the Act.
 - Improving and streamlining stakeholder consultation for activity approvals.
 - Introducing Ministerial approval requirement for change in control of licence, greater than 20% or as prescribed in the regulations.
 - Introducing statutory security to the Crown, so Crown has first priority over a licensee's property in event of bankruptcy.
 - Extending the existing power for the Minister to designate areas of the state as competitive tender regions (**natural hydrogen**).

Types of licences relevant to natural hydrogen



Exploration

Petroleum Exploration Licence (PEL) and Regulated Substances Exploration Licence (RSEL)

Authorises exploration for regulated resources, and operations to establish the nature and extent of a discovery and the feasibility of production. Maximum area 10,000 km².

- Work program bidding or 'over the counter'
- 5 year first term followed by two renewals of 5 years

Retention

Petroleum/Regulated Substance Retention Licence

- Non-commercial discovery
- 5 year term, can be renewed if still not commercial





Production Licences

Petroleum/Regulated Substance Retention Licence

- Commercial discovery
- Until production ceases (e.g. 24 month rule)

Approvals process

STAGE 1:	Licensing: grant of licence authorising the licensee to carry out the specific activity to which the licence relates.
STAGE 2:	Environmental assessment and approval of environmental objectives: assessment and approval of environmental objectives required to be achieved by a proponent and upon which the Department for Energy and Mining (DEM) will regulate it against.
STAGE 3:	Activity notification and approval: submission of location-specific activity notification for assessment and approval where required.
STAGE 4:	Post Closure Liability: at end of project life the licensee can apply to relinquish the licence and for long term liability to be either limited or excluded – residual risks will be assessed and the Minister may grant such approval with/without conditions.

	Title over natural hydrogen & helium occurrences and certified prospective resources, with extensive exploration upside
	Flagship 'Ramsay Project', exploration permit granted, plus application permits
	Ramsay 1 and Ramsay 2 exploration well results indicate Hydrogen and Helium
	Enabling engagements with leading global hydrogen experts and contractors
	Significant commercial and environmental competitive advantage



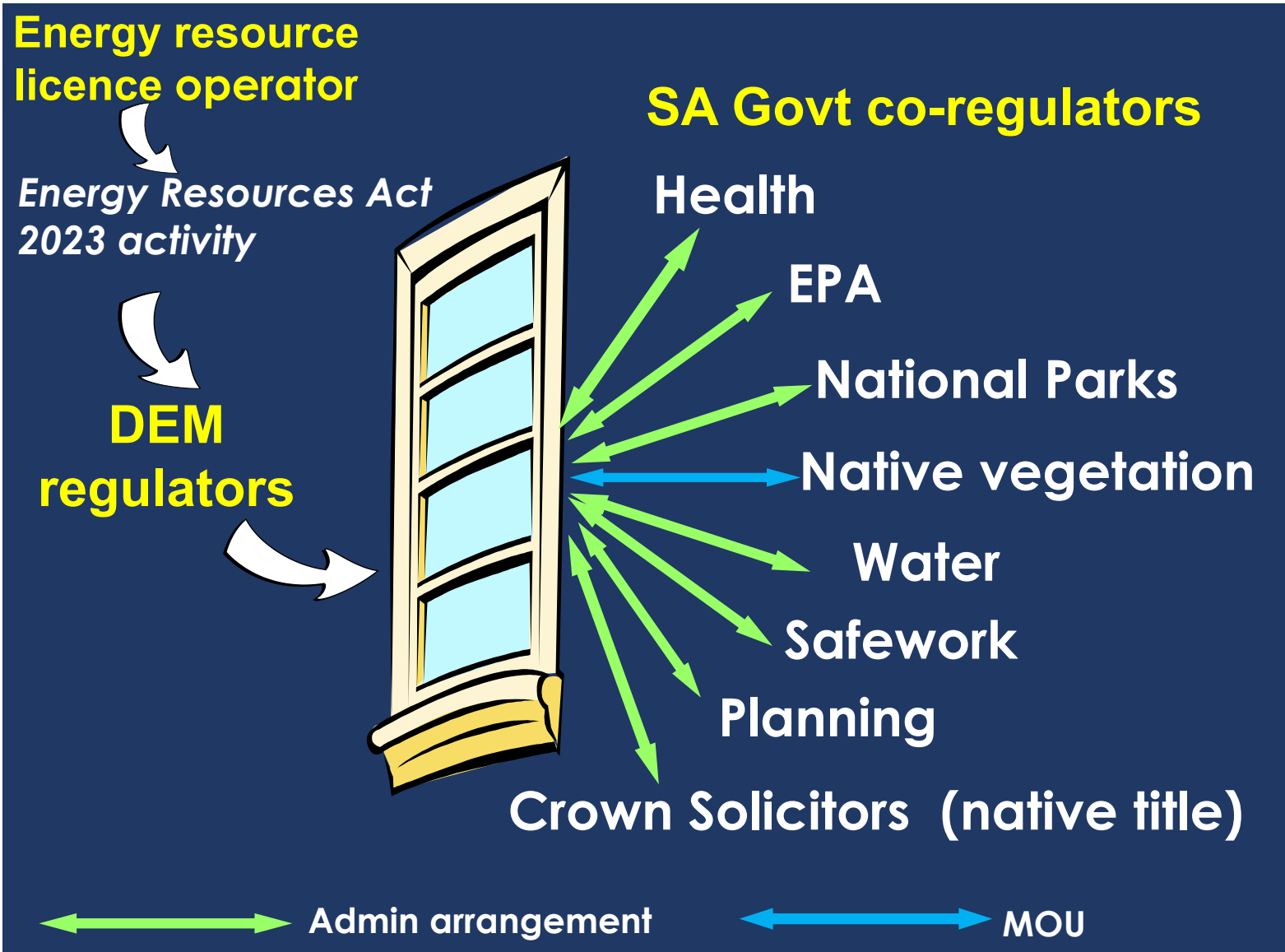
Gold Hydrogen Drilling EIR Environmental Impact Report:



Gold Hydrogen drilling SEO Statement of Environmental Objectives:

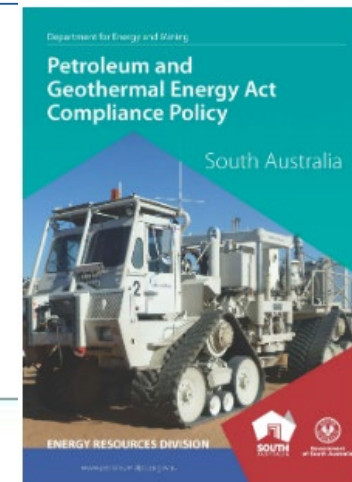
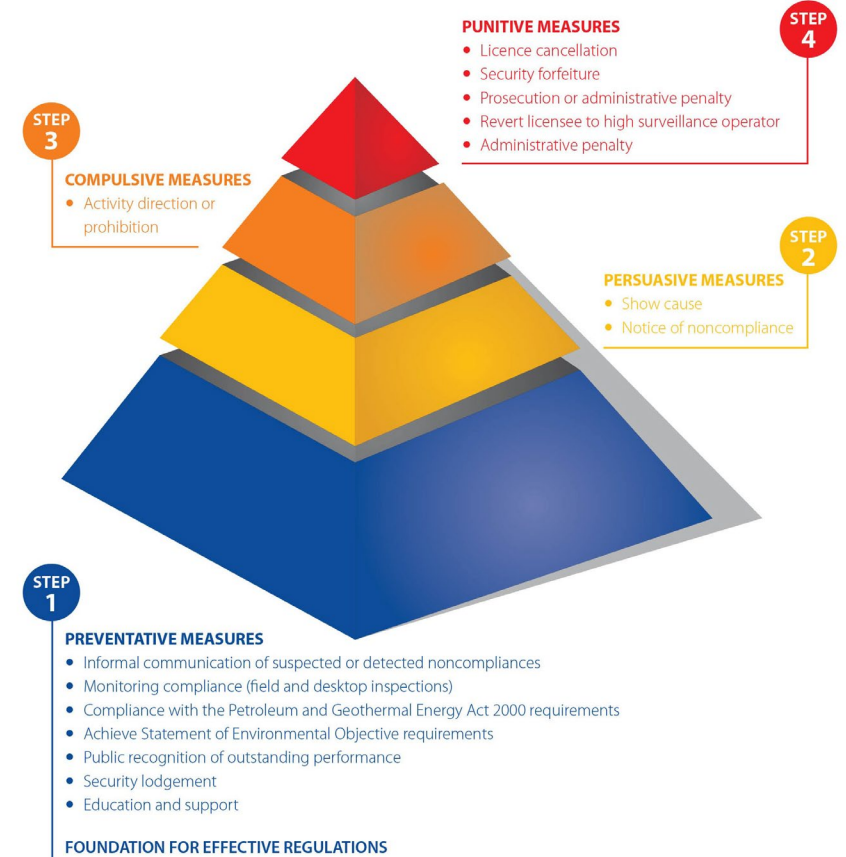


The department is SA's one window into government



Compliance Enforcement

- Compliance Strategy
 - Strategic approach to determining areas of focus
 - Risk-based assessment
 - Feedback loop
- Various information sources and regulatory tools available for utilisation
 - Targeted desktop, office, virtual and field inspections
 - Operational reporting
 - Incident reporting obligations
 - Activity notifications and assessments
 - PSEMS self-assessments
 - Periodic and strategic meetings
- Compliance Enforcement in line with Compliance Policy



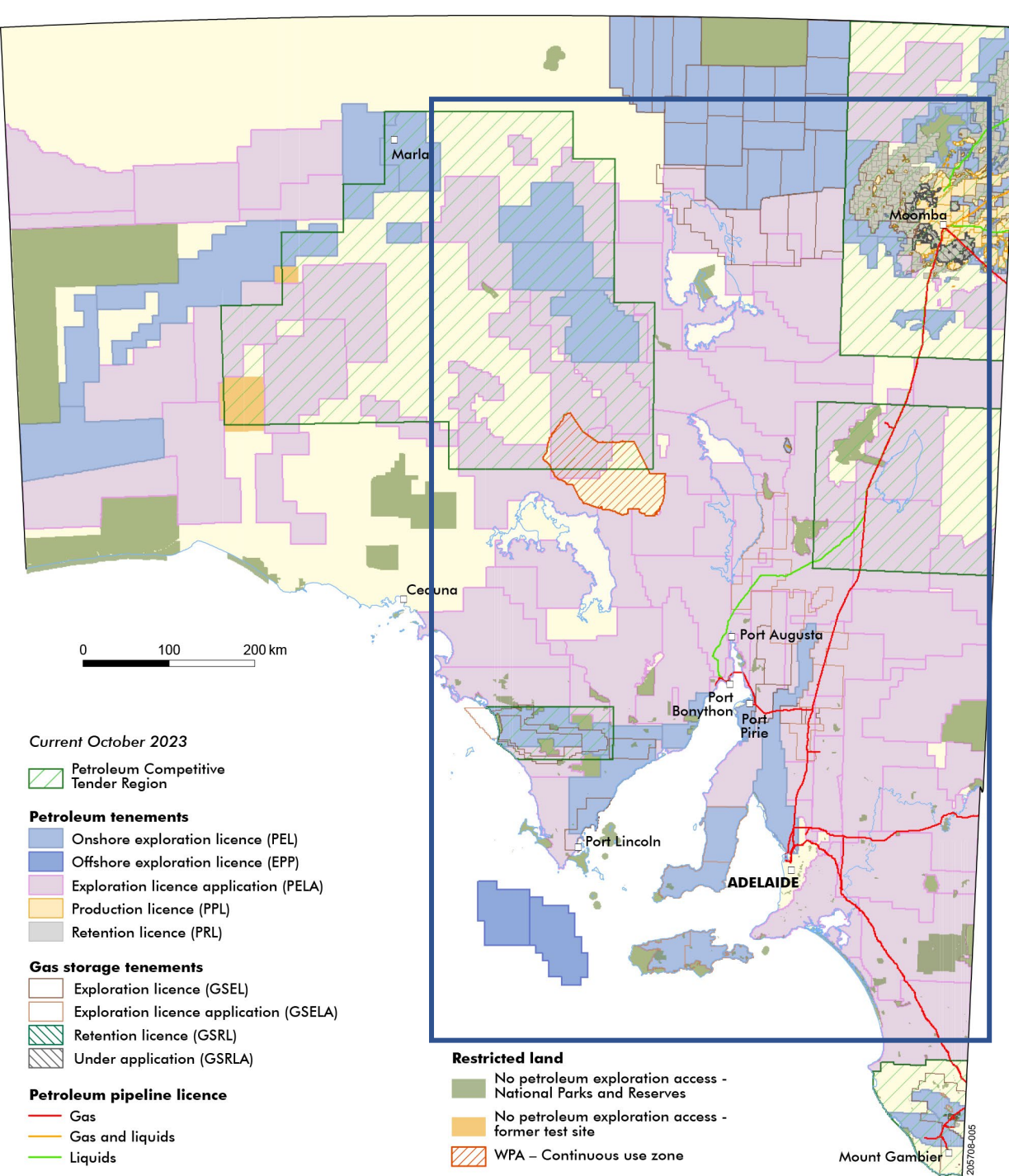
Licensing



A Petroleum Exploration Licence (PEL) or a new Regulated Substances Exploration Licence (RSEL) is required to explore for natural hydrogen.

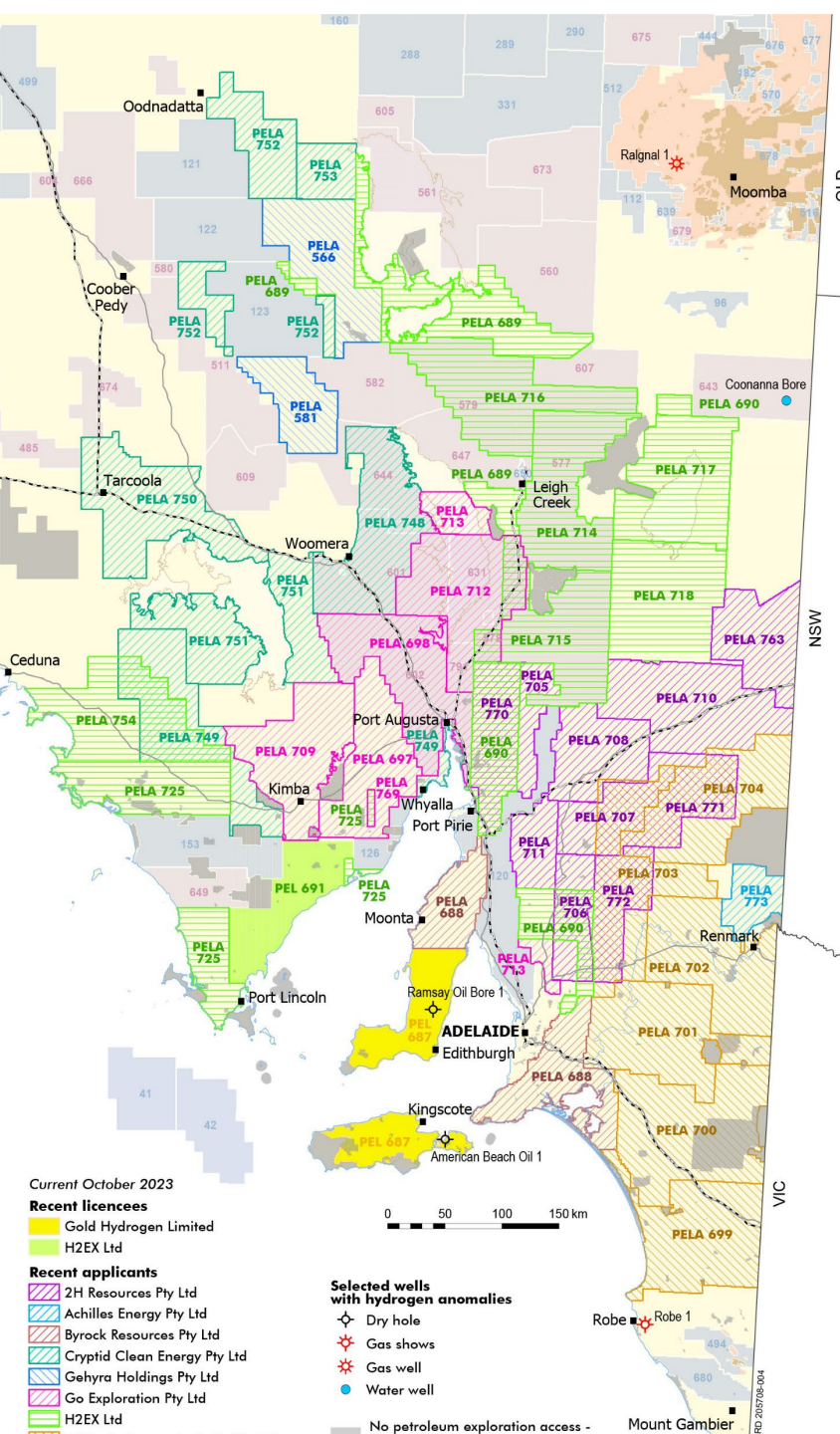
Three 5 year terms, 1/3 relinquishment at end of each term.
Discoveries are held by Petroleum Production Licences.

- To apply for a PEL or RSEL:
 - Pay the application fee of \$5,174.
 - 5 year work program with at least 1 well.
 - Provide evidence of technical & financial capacity.
- Competitive tender regions - vacant acreage is only available via formal DEM releases based on work program bidding (5 year exploration program, evidence of financial and technical capacity).

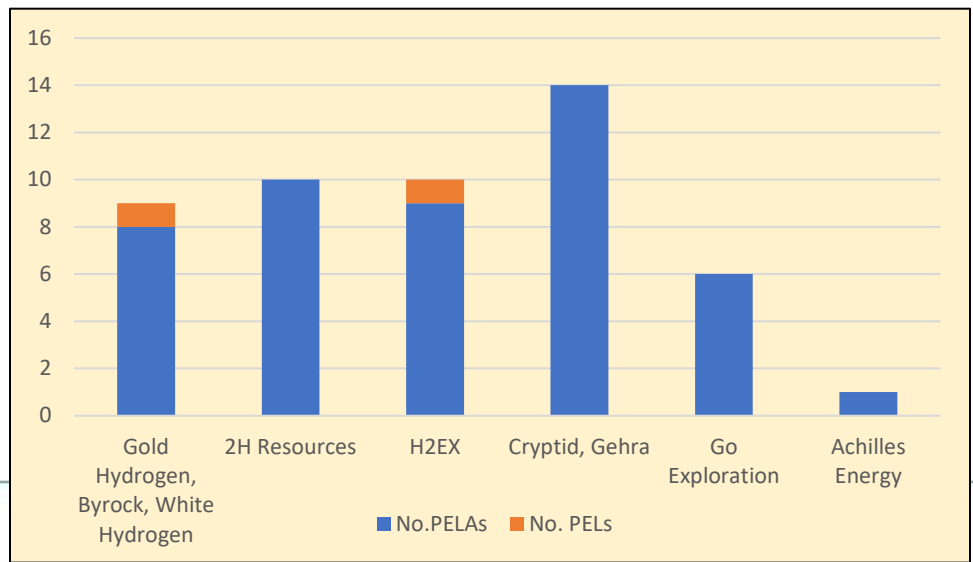


Salt Lake on Sundown Rd, Yorke Peninsula – fairy circle?

OFFICIAL Hydrogen exploration status



- >40 'over the counter' applications have been lodged for PELs targeting natural hydrogen since February 2021.
- Applications are assessed by DEM-ERD and if valid, licences are then offered to the applicants.
- In areas where Native Title may exist, a Native Title Agreement is required before licence grant.
- The first PEL was granted in July 2021 to Gold Hydrogen Pty Ltd shown in yellow. Second PEL was granted to H2EX in June 2022 shown in green.
- 2H Resources is the first mover in 6 PEL applications.



Gold Hydrogen

Ramsay Oil bore, 1931



Ramsay 1 seen from Ramsay Oil Bore (Gold Hydrogen)



OFFICIAL



Ramsay 1 drilling, October 2023



Ramsay 2 flow testing, March 2024

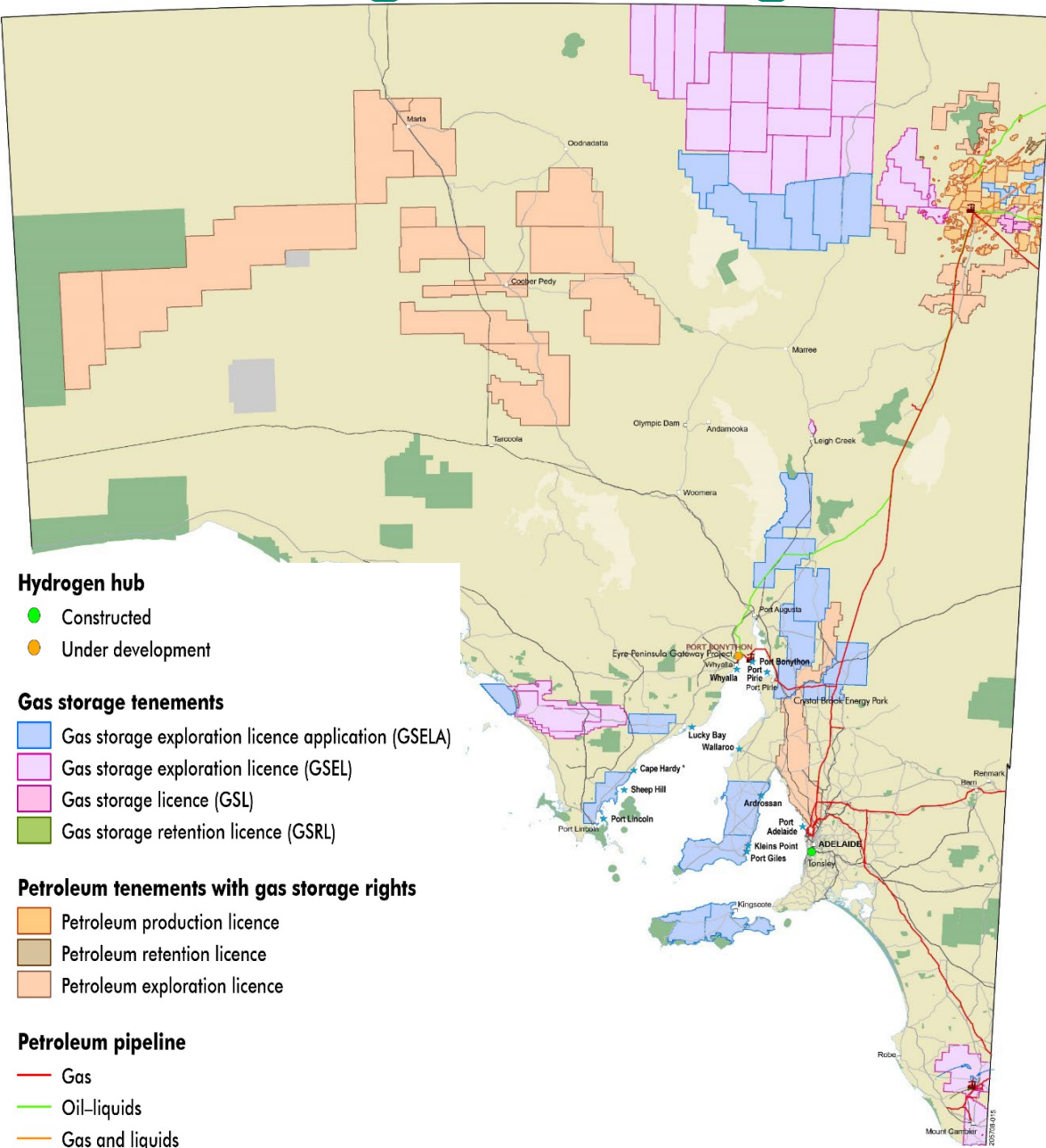
Well Testing Objectives and Other Key Points

- Commenced 5 March 2024 at the Ramsay 1 well site, then moving to Ramsay 2
- Minimum 21 day scheduled well testing program plus post testing compositional and technical results period
- Primary objectives - to extract gases to the surface in sufficient quantities, and to obtain more gas samples for international analysis
- Identify the helium properties and its potential value
- Pilot Project planning:
 - Hydrogen to energy
 - Helium bottling plant

Well testing Equipment on Site at Ramsay 1



Gas Storage Licencing framework



- Nationally consistent assessment and approval processes;
- Resource access and property rights;
- Regulation for transportation of CO₂;
- Monitoring and verification;
- Long term liability post closure.

The following licences provide the rights to store regulated substances, including hydrogen:

- **Gas Storage Exploration licences (up to 2,500km²)** - exploration and operations to establish the nature, extent and feasibility of underground storage.
- **Gas Storage Retention Licenses (up to 1,000km²)** - provides GSEL holder with security of title over currently non-commercial storage sites for a reasonable period of time until they become commercial.
- **Gas Storage Licences (up to 1,000km²)** - when a storage site is proven, the licensee is entitled to a Gas Storage Licence.



Natural hydrogen legislation in other Australian jurisdictions

Western Australia

- The legislation seeks to enable existing title holders to explore for Hydrogen has been introduced into parliament and awaiting debate, sometime after the 12th March onwards.
- Natural Hydrogen is treated as a regulated substance in the bill (as per South Australia).

Northern Territory

- Amendments to the *Petroleum Act 1984* (NT) commenced on 22 June 2023, amending the definition of petroleum to include hydrogen.
- The amendment allows existing exploration permit and licence holders to explore for and produce hydrogen.
- Under the *Energy Pipelines Act 1981* (NT), a pipeline is used for the conveyance of an energy-producing hydrocarbon. The *Energy Pipelines Act 1981* will be amended in 2025 to allow the conveyance of natural hydrogen in a pipeline.

New South Wales

- NSW has enabled hydrogen exploration via the *Mining Act 1992* but has yet to make acreage available for applications.

Tasmania

- No natural H₂ exploration licences have yet been issued for Tasmania but are allowed under *Mineral Resources Development Act 1995* category 4 (*Petroleum products including natural hydrogen but excluding oil shale*).

Victoria and Queensland

- Not permitted and no legislative changes are currently planned.

Offshore

- Exploration and storage not permitted, legislative review planned.

Disclaimer

The information contained in this presentation has been compiled by the Department for Energy and Mining (DEM) and originates from a variety of sources. Although all reasonable care has been taken in the preparation and compilation of the information, it has been provided in good faith for general information only and does not purport to be professional advice. No warranty, express or implied, is given as to the completeness, correctness, accuracy, reliability or currency of the materials.

DEM and the Crown in the right of the State of South Australia does not accept responsibility for and will not be held liable to any recipient of the information for any loss or damage however caused (including negligence) which may be directly or indirectly suffered as a consequence of use of these materials. DEM reserves the right to update, amend or supplement the information from time to time at its discretion.

For more information on natural hydrogen in South Australia:

