



Gold Hydrogen

**Aiming to Develop Naturally
Occurring Australian Hydrogen
and Helium**

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Statements in this presentation as to gas and mineral resources has been compiled from data provided by Gold Hydrogen's Chief Engineer, Mr. Billy Hadi Subrata. Mr. Hadi Subrata's qualifications include a Bachelor and Master of Engineering Science from University of New South Wales, Sydney, Australia, and he is an active member of Engineers Australia and SPE. Mr. Hadi Subrata's has 18 years of relevant exploration, development and production experience in petroleum, conventional and unconventional hydrocarbons, and hydrogen. Mr. Hadi Subrata has sufficient experience that is relevant to Gold Hydrogen's resources to qualify as a Reserves and Resources Evaluator as defined in the ASX Listing Rules 5.11. Mr. Hadi Subrata consented to the inclusion in this report of the matters based on his information in the form and context in which it appears.

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Executive Summary - Low Cost, Natural Hydrogen

	<p>Title over natural hydrogen resource occurrences and prospective areas</p>	<p>Certified Prospective Resource for natural hydrogen with an unrisks Best Estimate of 1.3 billion kilograms (Refer Slide 13 for details)</p>
	<p>Flagship ‘Ramsay Project’, exploration permit granted, plus application permits</p>	<p>Ramsay Project 7,820 km² (green on map) is 100% owned by Gold Hydrogen. Other locations under exclusive application to Gold Hydrogen are a further 67,512 km² – total of 75,332km²</p>
	<p>Ramsay 1 exploration well results indicate Hydrogen and Helium</p>	<p>Preliminary gas sample analysis have yielded high purity levels of up to 73% hydrogen plus helium in high purity levels at 3.6% (both air corrected) or a raw value of 1.4% He. Refer ASX releases of 31 October and 6 December 2023 for full details.</p>
	<p>Ramsay 2 exploration well initial helium results</p>	<p>Preliminary gas samples analysis have yielded high and consistent level of hydrogen through the entire well with helium up to 6.8% in a downhole sample (17.5% air-corrected). Results to be further analysed and tested, including flow testing. Refer ASX release of 6 December 2023 for full details.</p>
	<p>Enabling engagements with leading global hydrogen experts and contractors</p>	<p>Strategic engagements to date with CSIRO, SLB, Total Seismic, Xcalibur, Savanna Energy</p>
	<p>Significant commercial and environmental competitive advantage</p>	<p>As a replacement for carbon-based fuels, naturally occurring hydrogen offers significant cost and emission free advantages relative to other sources of hydrogen production. Global helium projects are commercial from 1% purity or less.</p>

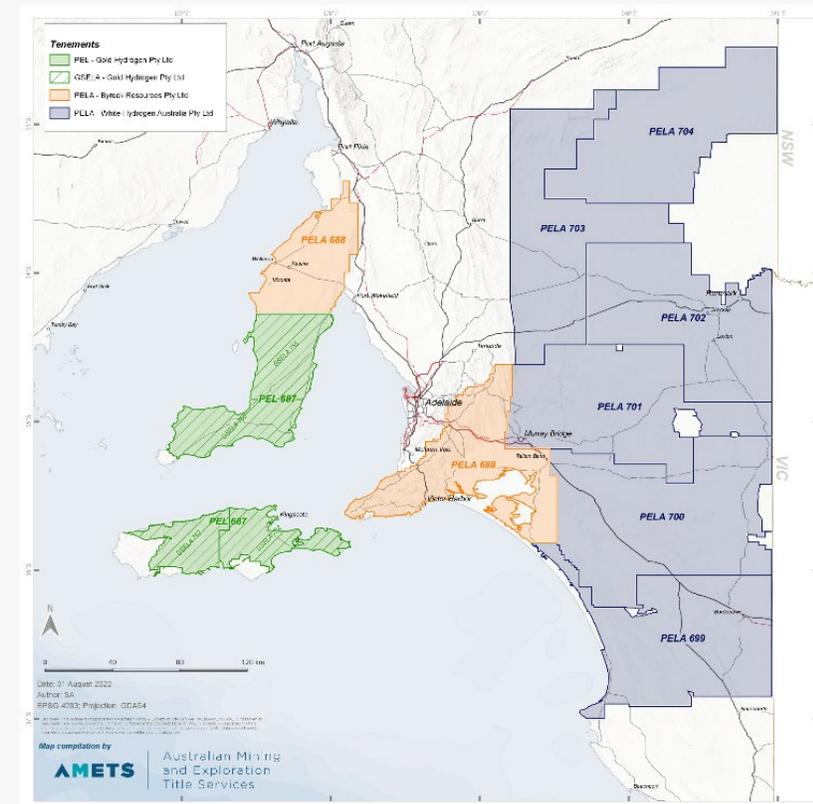


Figure: Overview of Gold Hydrogen tenements

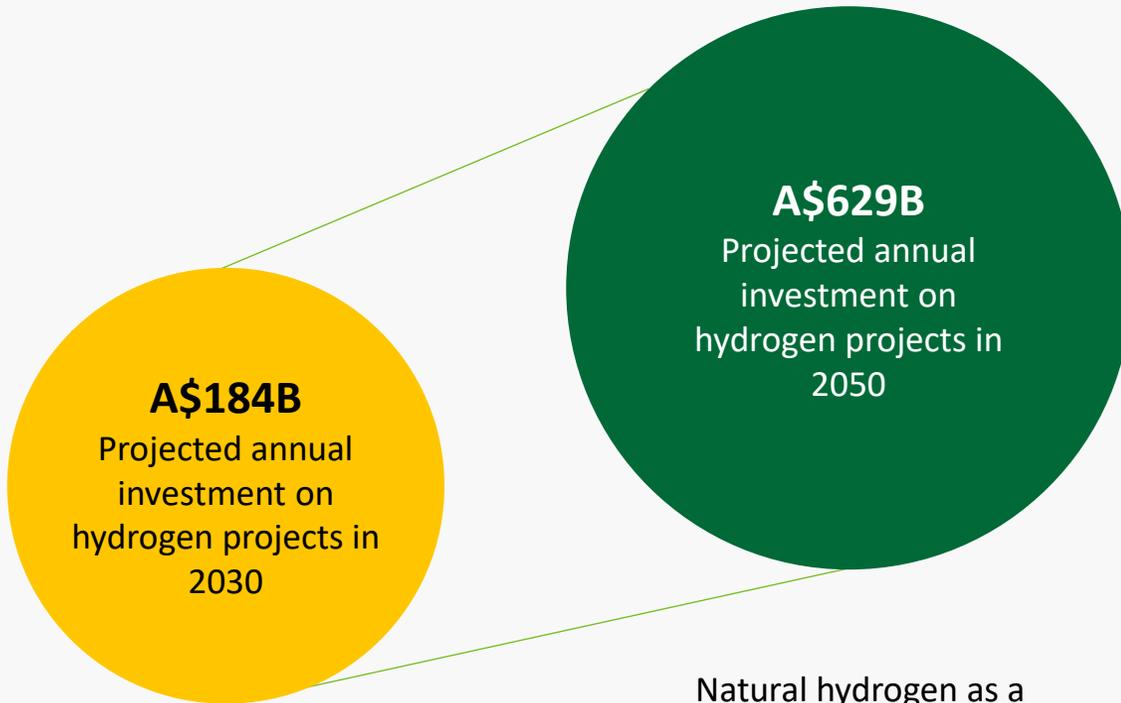


Industry Overview



Global Hydrogen Forecast

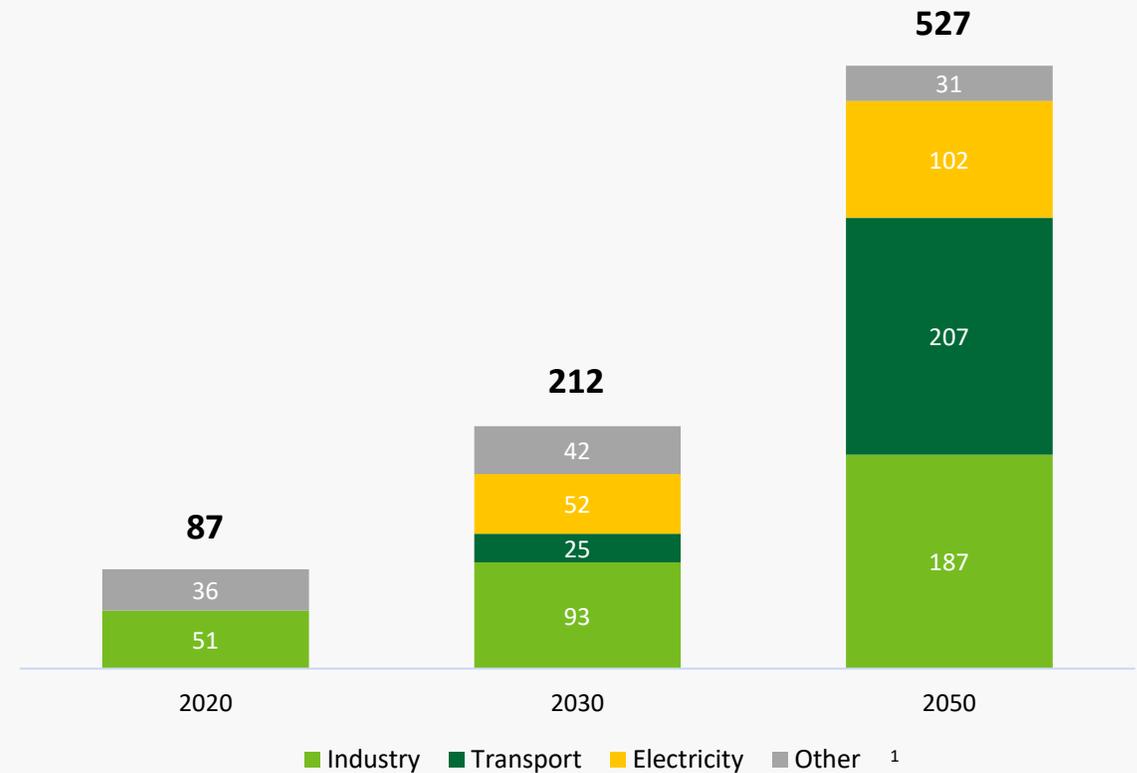
Substantial investment laying the foundation for hydrogen use



ESG push to decarbonise industries and economies is underpinning demand for hydrogen

Natural hydrogen as a carbon-neutral, low-cost source presents a very attractive opportunity to facilitate decarbonisation

Global Hydrogen Demand by Sector, Net Zero Emissions Target Scenario (Mt)



Source: International Energy Agency, Oct-2021
1. Other includes buildings, agriculture and refineries

Key Trends Driving Hydrogen Adoption

Most hydrogen used today is in the production of ammonia and steel, or by oil refineries

Future growth projections are based on a number of key trends that are driving adoption



ESG investment and country policies push to decarbonise



Technological advances across the hydrogen value chain



Hydrogen enhances flexibility of grids and industrial applications



Use of hydrogen as transport fuel or heat source alternative

Types of Hydrogen Production

Naturally occurring Hydrogen offers a significant cost and / or carbon advantages relative to other Hydrogen production (manufacturing) processes

Gold Hydrogen is exploring for 'gold' or 'white' (natural) Hydrogen



	Gold / White (natural)	Grey	Black/Brown	Blue	Green
Energy source	Natural hydrogen	Natural gas	Coal	Natural gas / coal	Renewables / biomass
Environmental impact	Low	High	Very High	Low	Low
No thermal process	✓	✗	✗	✗	✗
Production cost (A\$/kg) ^{1,2}	\$1.00	\$5.60	\$6.20-\$6.40	\$10.20-\$10.30	P: \$6.40-\$25.50 A: \$4.70-\$23.20
Cost comparable to existing power generation ³	✓	✗	✗	✗	✗



Today, ~95% of all hydrogen produced is from natural gas

Source: Frost and Sullivan, Sep-2022 (Refer Gold Hydrogen Replacement Prospectus dated 29 November 2022)

1. Source: Christophe Rigollet¹, Alain Prinzhofer^{2,3}, Natural Hydrogen: A New Source of Carbon-Free and Renewable Energy That Can Compete With Hydrocarbons, First Break, Volume 40, Issue 10, Oct 2022, p. 78 – 84

DOI: <https://doi.org/10.3997/1365-2397.fb2022087>; "The Bourakébougou field, in Mali, represents the first natural hydrogen deposit studied both scientifically and industrially. It gives us information on its renewability, on the natural flows involved and therefore on its sustainable exploitation. It is possible to estimate that the cost of operating hydrogen would be less than \$1/kg, which is significantly cheaper than any manufactured hydrogen, whether green, grey, or blue. Equivalent work is in progress in other continents, in order to be able to compare our knowledge of this Malian field with other fields in the world, which will make it possible to better ensure the industrial and societal interest of R&D for this new field."

2. P = Polymer electrolyte membrane electrolysis. A = Alkaline Electrolysis. Gold Hydrogen cost is an estimate

3. For industrial buyers, a hydrogen offtake price of €3 (\$4.50) per kg would be required to incentivise hydrogen production over power generation

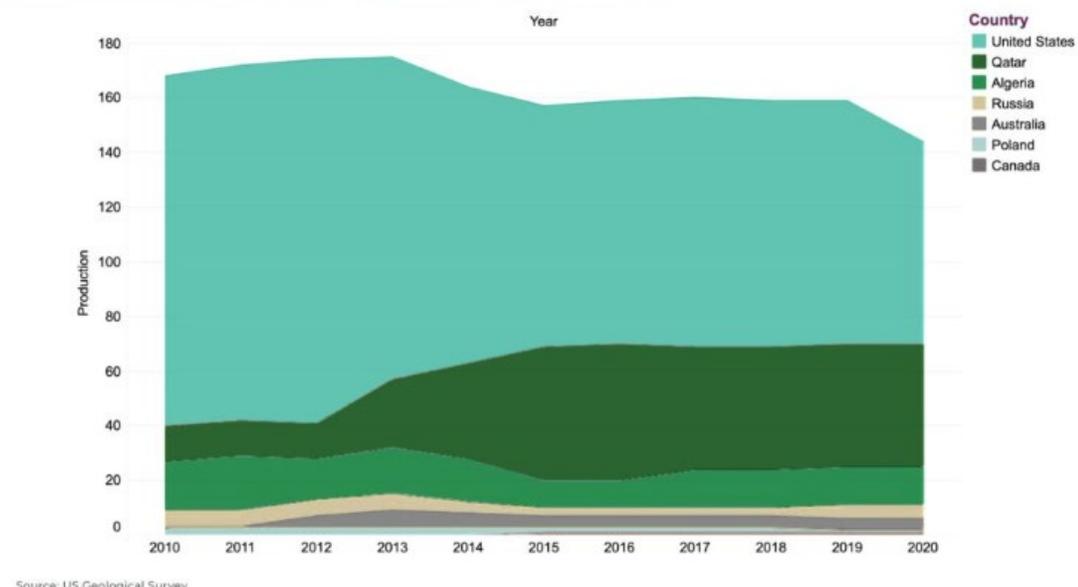
Global Helium Forecast

- Demand for helium continues to increase, with the market expected to grow 5-6% CAGR over the next 5 years.
- Helium’s unique properties give it a widespread usage across significant growth industries including medical, scientific research, space exploration, diving and energy industry applications.
- Helium is not publicly traded, and prices can vary sharply in the private market.
- Currently, two countries produce +85% of the world’s supply, causing supply chain issues.
- Majority of helium is produced as a by-product of oil and gas production, limited sources of “green” helium (ie. not a by-product of a hydrocarbon development).

“Helium prices are at all-time highs with a number of commentators reporting helium spot sales at between US\$2,000 and US\$3,000 per mcf.”

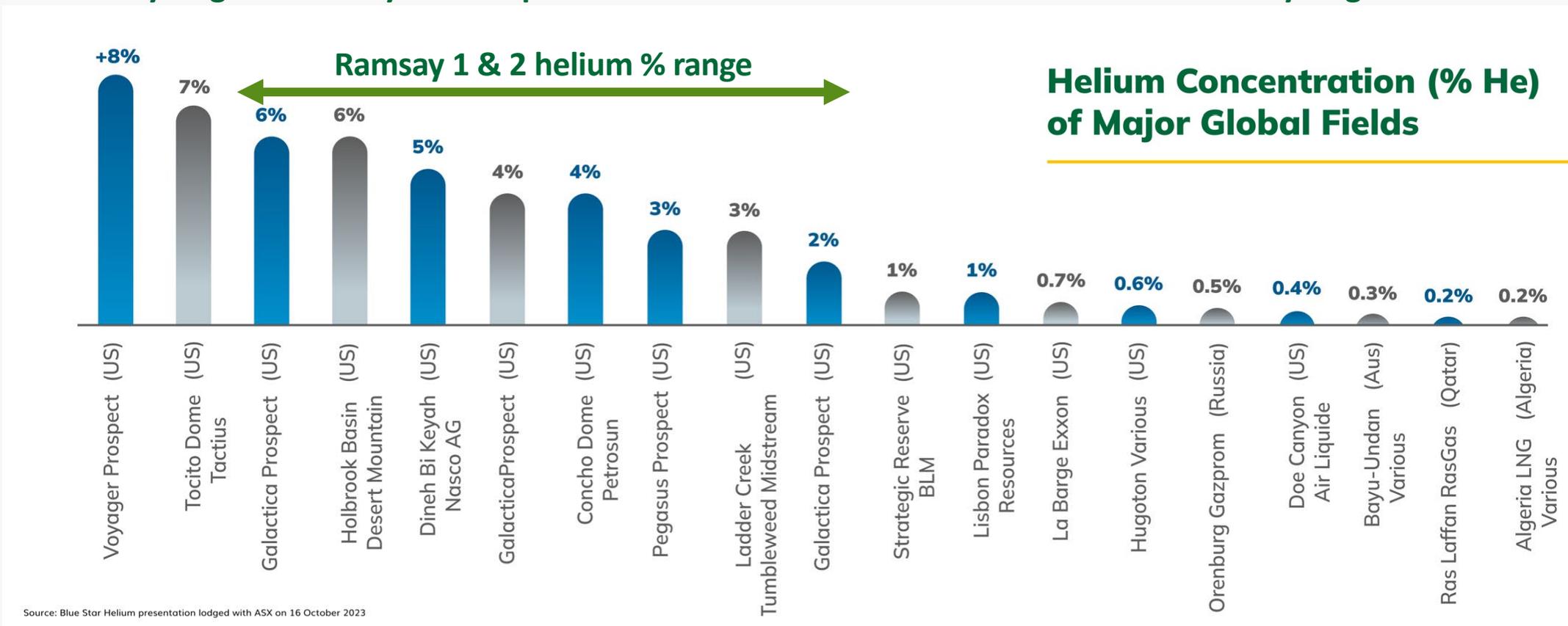
Trent Spry, Blue Star Managing Director and CEO

Estimated helium production by country



Global Helium Projects

Gold Hydrogen's Ramsay 1 & 2 exploration wells found Helium in addition to the 73% Hydrogen identified



Gold Hydrogen currently has insufficient data for the generation of a prospective resource for Helium. This will be an ongoing focus of exploration and development initiatives if Helium continues to be encountered.



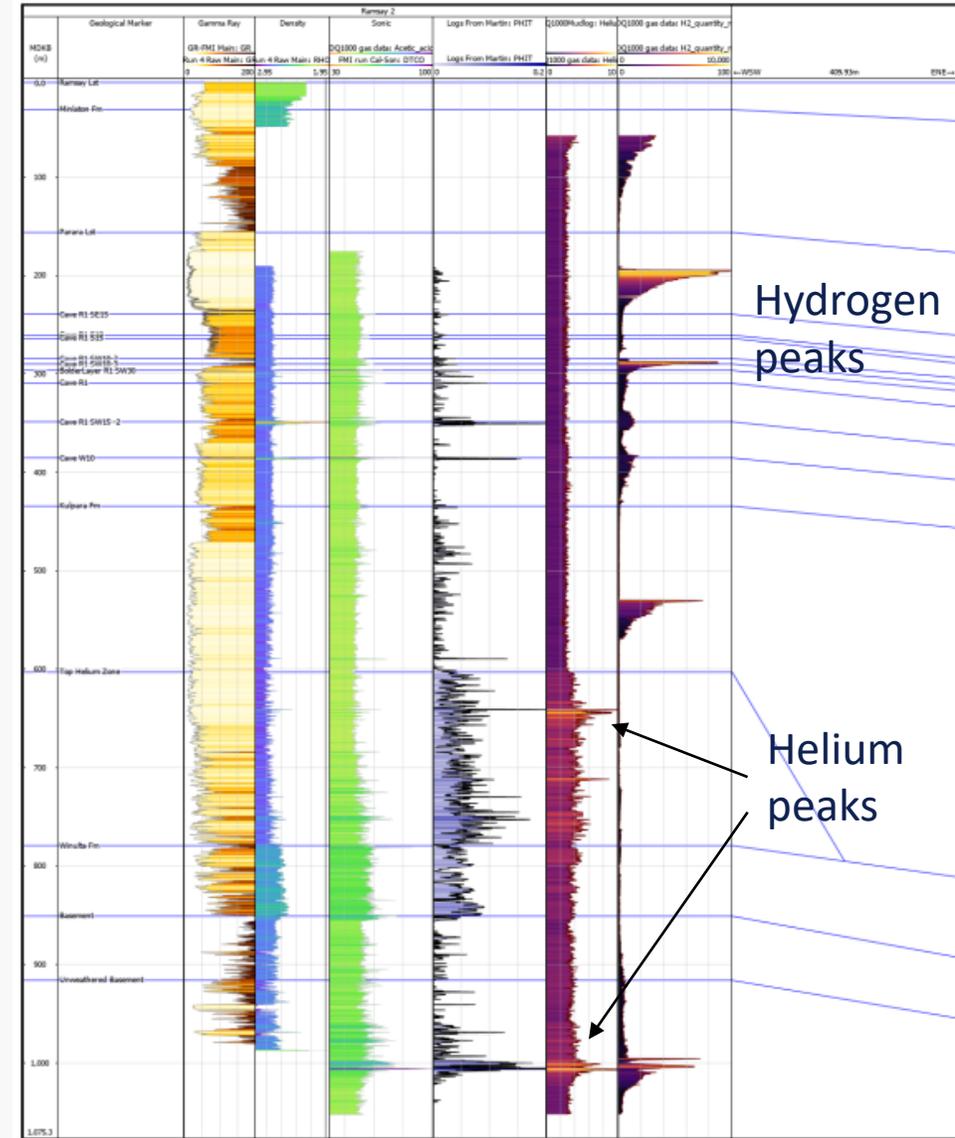
Company Overview

Ramsay 2 Well: Results

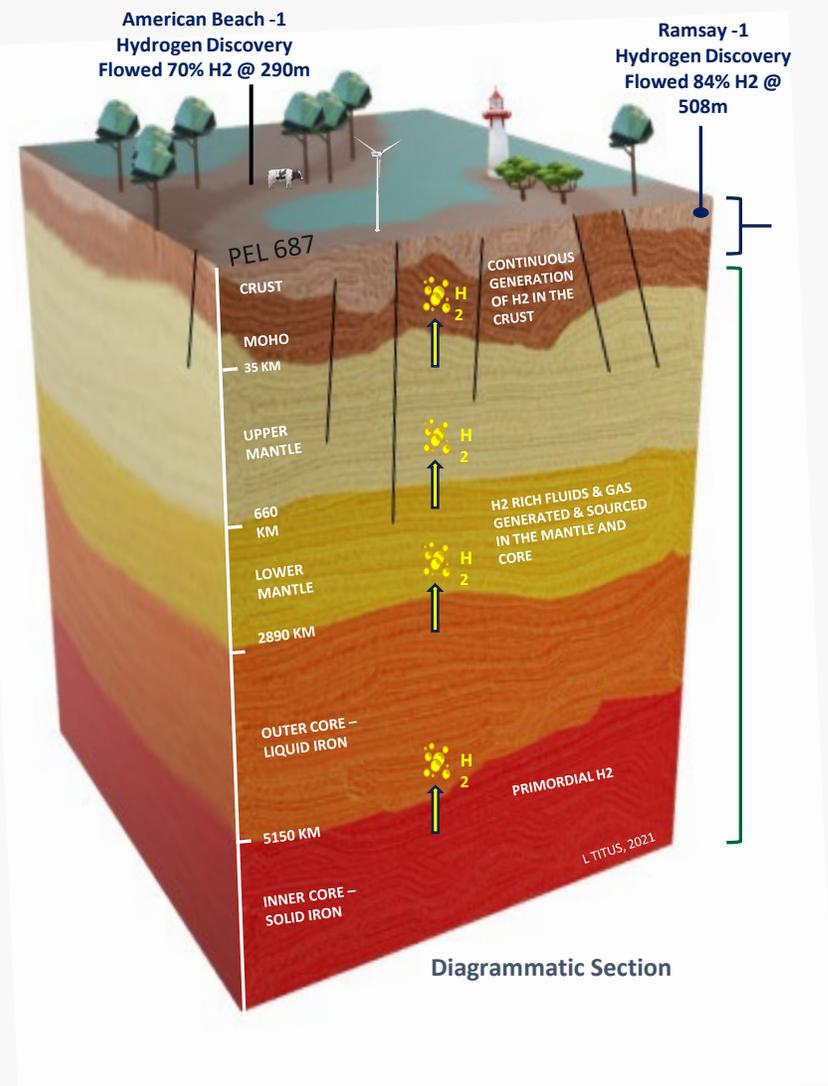
- Good returns and excellent mudgas samples from 100m to 1068m (well TD), demonstrating the efficient mudgas measuring process.
- Higher quality samples obtained with less air contamination.
- Hydrogen seen in all samples, with little impurities other than Nitrogen.
- Helium found as shallow as 239.9m and in the basement section.
- Laboratory testing of Ramsay 2 well samples ongoing.



Mudgas samples from different levels, awaiting testing



Gold Hydrogen Prospective Resources



Certified Prospective Hydrogen Resources, existing discoveries and drill ready hydrogen prospects (calculated volume not determined)

 Unrisked Prospective Hydrogen Resources, PEL 687			
SPE-PRMS Sub-Class Category	Low Estimate (kTonnes)	Best Estimate (kTonnes)	High Estimate (kTonnes)
Prospect	165	1135	8050
Lead	42	178	770
Total	207	1313	8820

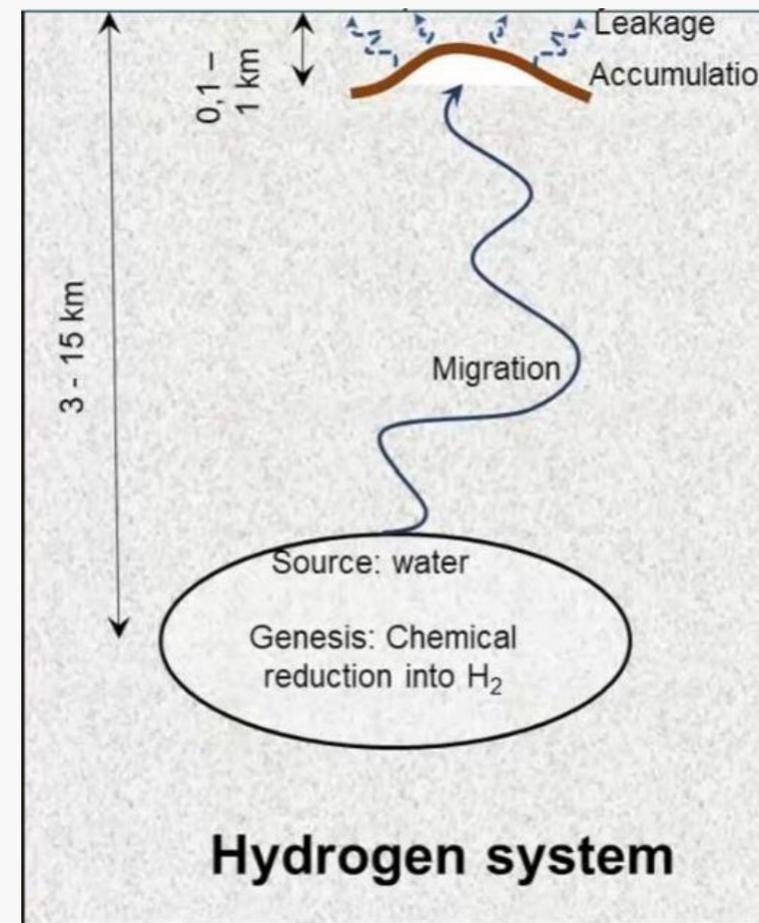
NOTE - All estimates are unrisked and aggregated arithmetically by category, hence caution that the aggregate low estimate maybe a conservative estimate and the aggregate high estimate maybe very optimistic estimate due to the portfolio effects of arithmetic summation. The estimated quantities of hydrogen that may potentially be recovered by the application of future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery, risk of development and risk of commercialization. Further exploration, appraisal and evaluation is required to determine the existence of a significant quantity of potentially recoverable Natural Hydrogen.

See ASX release of 13 January 2023 for full details and notes

Key Success Factors

Ramsay Project ticks the boxes in respect of the key attributes for the formation and accumulation of Natural Hydrogen

Key Success Factor	Ramsay Project	
Source & Generation	<i>Via hydrolysis and radiolysis reactions in old rocks</i>	Located at the Gawler craton of South Australia, where radiolysis and hydrolysis reactions of iron-rich rocks are ongoing creating naturally occurring hydrogen. 
Seals & Traps	<i>Required to enable accumulations of naturally formed hydrogen</i>	The Cambrian stratigraphy including tight limestones that overlie the basement source rocks provides likely seals that were penetrated by the historic wells that found hydrogen. 
Structure	<i>Major structural boundaries in an extensional geological regime where natural fractures exist</i>	Ramsay Project located on major lithospheric boundary and bend in the Tasman line of the Delamerian orogeny. Additionally, it is within the setting of the tectonically active horst-graben Adelaide extensional rift. 
Reservoir	<i>To be commercial, a reservoir of adequate volume, accessibility, flow rate and quality is required</i>	Ramsay Project Reservoir may extend to 5km depth (with only 50-150m thickness assumed in the Technical Expert Report) with occurrences of up to 84% Natural Hydrogen (89% air-corrected) from rocks which overlie the Basement Source rocks. 



Source: SPE Hydrogen Section, online. November 2, 2023
(Ref: Prinzhofer, 2021)

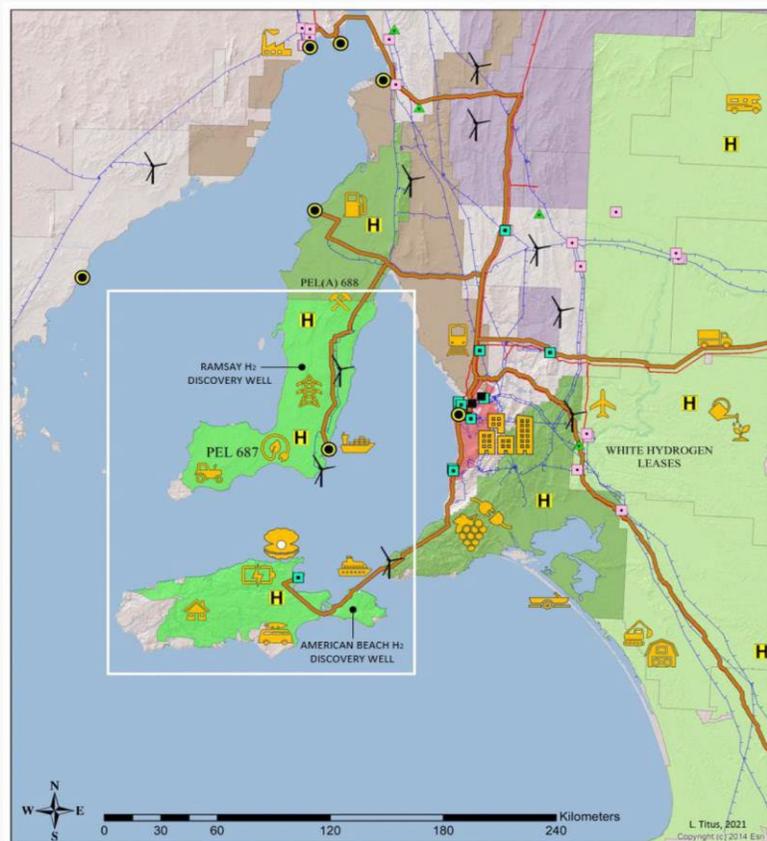
Gold Hydrogen Activity Since Inception

- *1920s - 1930s: Before Gold Hydrogen was formed, natural Hydrogen reported at 66% and 89% while drilling for oil*
- 2020: Gold Hydrogen formed, leases obtained
- 2020-2022: ongoing G&G desk- top work including seismic reprocessing, static modelling; planning and approvals processes for field exploration activities
- Jan 2023: Gold Hydrogen IPO; ongoing G&G
- Mar 2023: Airborne Gravity Gradiometer (AGG) Survey
- Apr 2023: Soil-gas sampling by CSIRO
- Jun-Jul 2023: Interpretation of airborne data
- Sep 2023: Drilling approvals received
- Oct 2023: Ramsay 1 exploration well spuds
- Nov 2023: Ramsay 2 exploration well spuds
- Next: Analysing data from Ramsay 1 and Ramsay 2 wells and determine next steps
 - Potential activities 2024: seismic, further exploration drilling, resource maturation

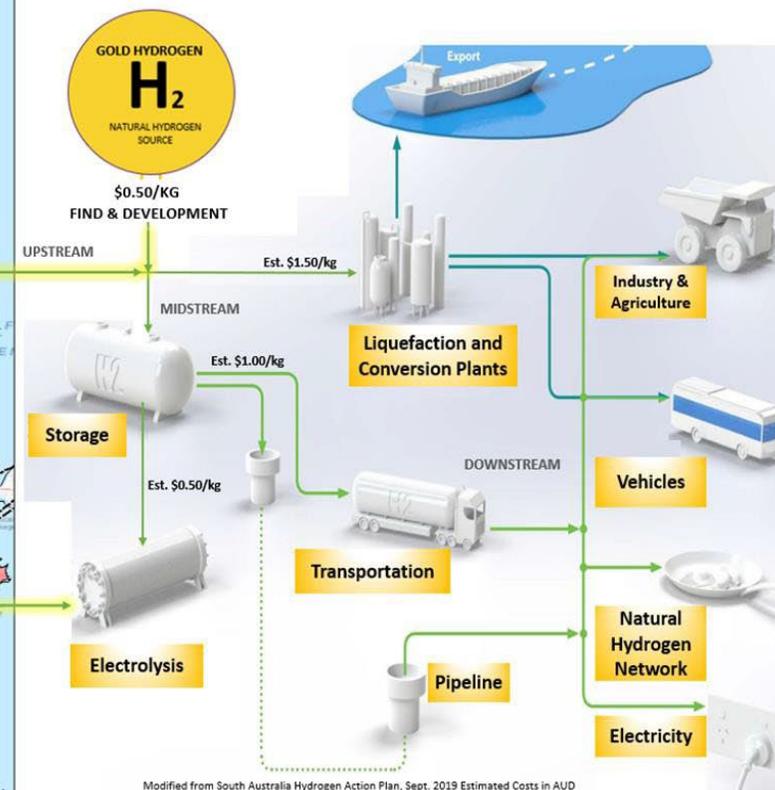
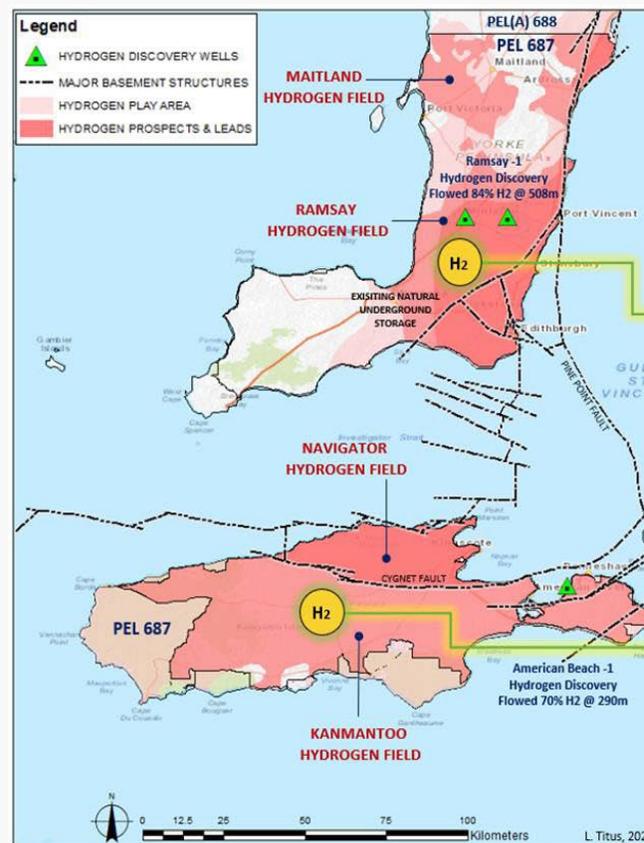
Ramsay 1 drill site and Savanna Energy drill rig



Large Scale Commercialisation Opportunity

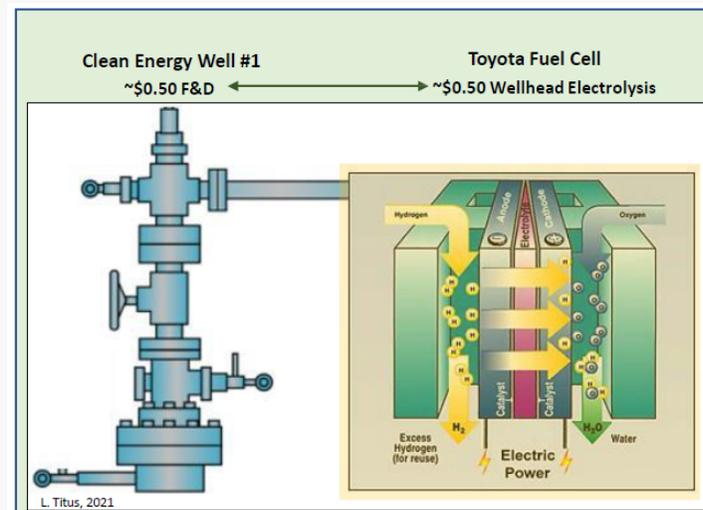


- Legend**
- Existing Power Generation FUEL SOURCE**
- H** NATURAL HYDROGEN
 - FOSSIL
 - HYBRID
 - SOLAR
 - WIND
 - BIOMASS
 - Proposed Hydrogen Pipeline
 - Existing Pipelines
 - Existing Transmission Lines
 - GA Proposed Hydrogen Ports
 - Gold Hydrogen PEL687
 - Byrock Resources PEL(A)688
 - Energy Exploration PEL126
 - White Hydrogen Leases
 - H2Ex Leases
 - 2H Resources Leases
 - Adelaide
- GOLD HYDROGEN CLEAN ENERGY ECONOMY



Helium – Potential Early Commercialisation Opportunity

- Initial test results indicating the potential for commercial concentrations of helium may provide Gold Hydrogen with an early commercialisation opportunity.
- If flow tests are successful, Gold Hydrogen may look to separate the helium from the hydrogen at the well head as Helium can be bottled and sold directly to the market.
- The separation may also be coupled with a hydrogen generator, similar to Mali well head power generation.
- Multiple commercialisation technologies are being considered from local power generation, onsite bottling or green ammonia production.
- Opportunity to produce “green” helium (ie. not a by-product of a hydrocarbon development) on site and sold into the local market.



An aerial photograph of a rugged coastline. The water is a vibrant turquoise color, with white foam from waves crashing against dark, layered rock formations. The rocks are brown and grey, with some patches of green moss or lichen. The overall scene is dynamic and natural.

Transaction Overview

Capital Raise

Offer details	
Offer structure and size	<p>Institutional placement to professional and sophisticated investors to raise approximately A\$14.8 million via the issue of approximately 19.7 million fully paid ordinary shares ('New Shares') under Gold Hydrogen's current placement capacity under ASX Listing Rule 7.1 (the 'Offer').</p> <p>New Shares issued under the Offer will rank pari passu with existing shares on issue.</p>
Offer Price	<p>Offer at a fixed price of A\$0.75 per New Share ('Offer Price'), representing a:</p> <ul style="list-style-type: none"> • 5.1% discount to the last close price of \$0.79 on 1 December 2023 • 9.7% discount to the 10-day volume weighted average price of \$0.83 to 1 December 2023

Indicative timetable ¹	
Trading halt lodged	Monday, 4 th December 2023
Offer bookbuild closes	3pm AEST 4pm AEDT Wednesday, 6 th December 2023
Announcement of Offer, New Shares recommence trading on ASX	Thursday, 7 th December 2023
Settlement of Offer	Tuesday, 12 th December 2023
Allotment and commencement of trading of New Shares issued under the Offer	Wednesday, 13 th December 2023

1. Timetable is indicative only and subject to change. All times referred to in this presentation are Australian Eastern Daylight Savings Time (AEDT) unless otherwise indicated.

Source & Use of Funds

- Gold Hydrogen remains well funded with approximately \$9.70m of cash, despite fast-tracking its maiden drilling campaign.
- Proceeds raised from the Offer will be used to fund a work plan to undertake further exploration, well testing and project development related activities on Ramsay Project.
- Gold Hydrogen remains on track with regard to forecast spending and expects to be in a net cash position at the end of CY25. **However, some elements of the program, including drilling, may be accelerated, dependent on results.**

Table below outlines the use of funds for the two-year exploration work plan.

Source of Funds	Amount (\$M)
• Working Capital Position	\$9.70
• R&D Refunds	\$5.90
• Bank Interest	\$0.50
• Offer Proceeds (Net)	\$14.00
Total Sources	\$30.20
Uses of Funds	Amount (\$M)
Exploration, Field Development and Drilling Related	
• Native Title, Land Access and Licence Fees	\$1.83
• Environmental and Permitting Costs	\$1.25
• Airborne and Seismic Surveys and Sub-surface Studies	\$3.81
• Drilling, Well Testing and Related Activities	\$17.0
• Commercialisation Trial	\$0.89
	\$24.80
Corporate and Administrative Costs	\$3.92
Total Use of Funds	\$28.70
<i>Remaining Working Capital at end of CY25</i>	<i>\$1.50</i>



Key Team

Key Management



Neil McDonald
Founder & Managing Director

Neil McDonald has more than 20 years of extensive commercial experience across the energy and minerals sectors in multiple Australian states. He has been involved from greenfield exploration to early development in projects across Queensland, Northern Territory and South Australia. He has worked on and helped commercialise some of Australia’s largest exploration projects for private and public companies.

As a commercial lawyer, Neil has a strong legal grounding in commercial and regulatory compliance in the resources industry. Areas of focus in his career have been: acquiring new assets for business growth, monetisation of existing assets, engaging domestic and international investors, new partnerships to maximise commercialisation of assets, developing non-partisan relationships at the highest political levels, both Federal and State.

Neil is a graduate of the Australian Institute of Company Directors.



Roger Cressey
Executive Director, Commercial & Operations

Roger Cressey has more than 35 years of experience in the resource industry, predominantly in gas exploration and production.

Roger has held CEO, COO and other executive roles within upstream and downstream operations across Australia, most recently in Queensland, NT and before that PNG. He has also held senior roles with companies active in Indonesia and Uganda.

Roger’s strengths lie in managing multi-discipline teams, strategy development and delivery.

He has a strong focus on engagement with both external and internal key stakeholders.



Karl Schlobohm
Company Secretary & Chief Financial Officer

Karl Schlobohm is a Chartered Accountant and Fellow of the Governance Institute of Australia, with over 30 years experience across a range of businesses and industries.

Karl has extensive listed company experience spanning the ASX, LSE, AIM and TSX exchanges, and has acted as CFO and / or Company Secretary for a number of publicly-listed companies in the resources industry including SolGold plc, Atlantic Lithium Ltd, DGR Global Ltd, Meridian Minerals Ltd and Tombola Gold Ltd



Josh Whitcombe
Chief Operating Officer

Dr Josh Whitcombe is a Chartered Chemical Engineer and RPEQ with over 20 years of experience in the Oil and Gas industry, both offshore and onshore.

Josh has held a number of Senior Management roles with small to mid-sized gas producers in Australia. After completing a PhD in oil refining he worked offshore with Shell International before returning to Australia 15 years ago.

Prior to joining Gold Hydrogen he has had extensive experience in both green field exploration and brown field conventional gas operations. He has demonstrated an ability to manage diverse technical challenges, while focusing on HSE and community outcomes.

Board of Directors



Neil McDonald
**Founder &
 Managing Director**

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Alexander Downer
**Independent
 Non-Executive Chair**

- Alexander Downer is one of the country’s best-known politicians and diplomats. Leader of the Liberal Party, Minister for Foreign Affairs and High Commissioner to the UK. Before entering politics he was an executive director of the Australian Chamber of Commerce.
- Since departing Canberra and the diplomatic service, he holds or has previously held board appointments including the Advisory Board of British strategic intelligence and advisory firm Hakluyt & Company, merchant bankers Cappello Capital Corp. the Adelaide Symphony Orchestra, Huawei in Australia, as well as ASX-listed Lakes Oil NL and Ironbark Zinc Ltd.
- Alexander is currently a Non-Executive Director of Yellow Cake Plc, is a columnist for the AFR and is Companion of the Order of Australia.



Katherine Barnet
**Independent
 Non-Executive Director**

- Katherine Barnet is a Chartered Accountant with over 25 years’ experience in the provision of professional services. Katherine is currently a partner at Olvera Advisors, a boutique Sydney-based consultancy, and has worked on some of Australia’s largest corporate matters and achieved success in developing, evaluating and understanding complex financial transactions, optimising sustainable growth and increasing value to corporate entities. Her recent corporate expertise has been focused on the renewable energy / mining, retail, property and construction industries.
- Katherine is a Fellow of CAANZ and ARITA and a member of the Australian Institute of Company Directors.



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 Commercial & Operations**

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	<p>Title over reported natural hydrogen resource occurrences</p>	<p>Certified Prospective Resource for natural hydrogen with an unrisks Best Estimate of 1.3 billion kilograms (Refer Slide 13 for details).</p>
	<p>Flagship project, exploration permit granted</p>	<p>Ramsay Project 7,820 km² (green on map) is 100% owned by Gold Hydrogen. Other locations under exclusive application to Gold Hydrogen are a further 67,512 km²</p>
	<p>Near term value inflection point</p>	<p>Stage One exploration drilling program commenced in October 2023 on the Yorke Peninsula, and Ramsay 2 exploration well spudded in November 2023 (fast-tracked due to the success of Ramsay 1).</p>
	<p>Enabling engagements with leading global hydrogen experts</p>	<p>Strategic engagements to date with SLB (Schlumberger), CSIRO, Total Seismic, and Xcalibur Multiphysics, Savanna Energy Services.</p>
	<p>Significant commercial and environmental competitive advantage</p>	<p>As a replacement for carbon-based fuels, naturally occurring hydrogen offers significant cost and emission advantages relative to other sources of hydrogen production.</p>

... and we have a potential Helium play as well



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