



Advancing the **Julia Creek** Project

Mining Monday Presentation | February 28th 2022



Team & Corporate



Led by a team of highly successful and invested mining professionals, with proven track record of mine development



John Foley

Chairman

Extensive experience as current Chairman of Precious Metal Resources Limited (ASX: PMR), Citigold Corporation Limited (ASX: CTO) and Carbon Credit Corporation (C3).



Gavin Loyden

Managing Director

Company Founder, having identified and acquired the significant dual commodity resource at Julia Creek. Responsible for QEM's early capitalisation, initial exploration program and initial scoping study.



John Henderson

Non-Executive Director

Over 40 years experience in major and mega project development, including executive roles with oil and mining multinationals such as BHP and Rio Tinto, as well as mid-tier and startup energy companies.



Daniel Harris

Non-Executive Director

Mining executive with 40 years resources sector experience. Current independent Director at Australian Vanadium (ASX:AVL), former exec at Atlantic (ASX: ATI and Atlas Iron (ASX: AGO). Director of US Vanadium LLC.



David Fitch

Non-Executive Director

Experienced in strategic planning, commercial negotiations and operations. Former COO & major shareholder of the Fitch Group and currently a director of BioCentral Laboratories. David is the largest shareholder of QEM.



ASX Symbol: QEM

Shares on Issue	113.4 million
Market Cap (27 February 2022)	\$17.55m
Share Price (27 February 2022)	\$0.16
Cash (as at 31 December 2021)	\$1.78m

Major Shareholders (~48% QEM Director Shareholding)

David Fitch (Non-Executive Director)	28.1%
Gavin Loyden (Managing Director)	18.2%

Julia Creek Project



Opportunity for a World-Class Vanadium & Oil Shale Project, with associated Hydrogen Production



Unique dual commodities exposure of oil and vanadium pentoxide (V_2O_5)



Staged development strategy to de-risk project



Shallow-Low strip ratio allows for standard open cut mining method



Test work to date shows up to 200% yield achievable for oil extraction (Based on MFA); 90% extraction rate for V_2O_5 ; Bench scale pilot plant recently completed



Vanadium defined as Critical Mineral by Australian, US & EU Governments



Globally significant JORC (2012) Indicated + Inferred Resource 2,760 Mt @ 0.30% V_2O_5



783 MBOE of oil in the SPE-PRMS (3C) category



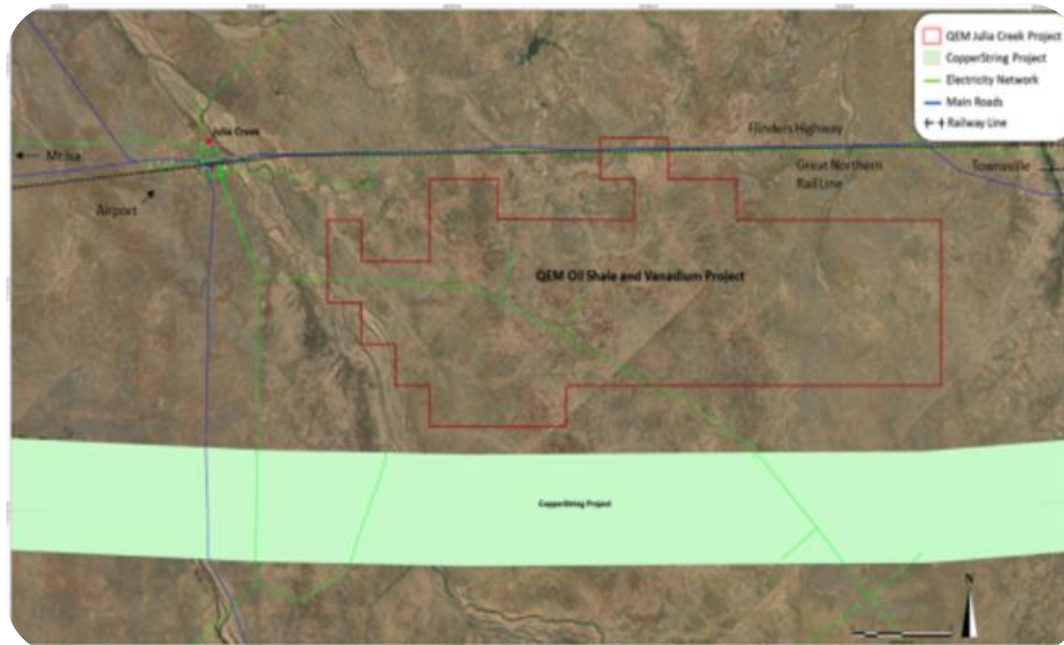
Renewable power and hydrogen to be directly applied to oil and vanadium production and to meet growing demand by government and industry

Julia Creek Project Location

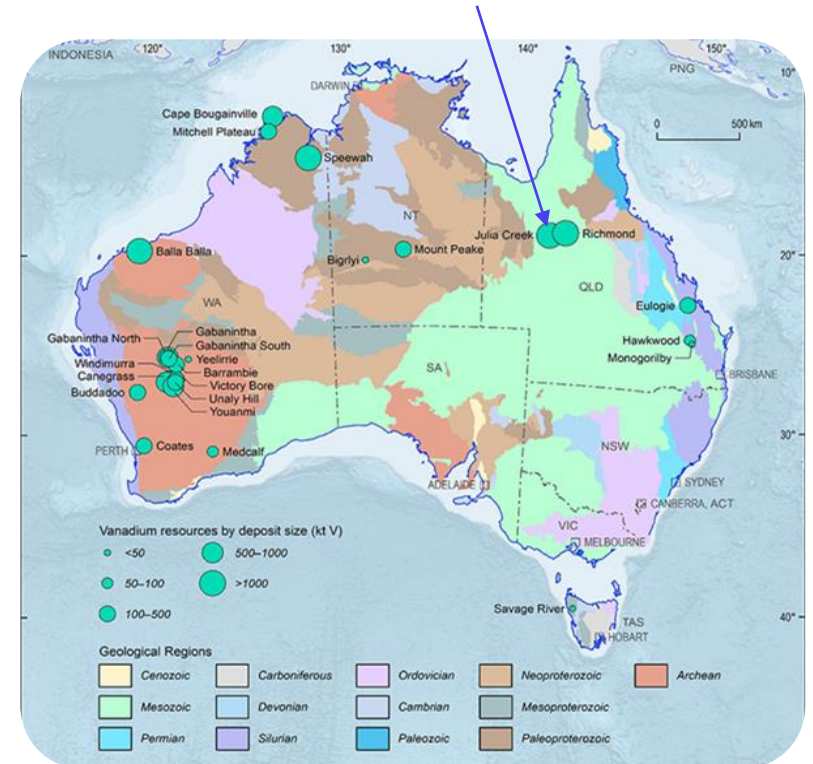


4 Exploration Tenements Covering 249.6km² in the Julia Creek Area, North-Western Queensland

- Tier-1 location
- North-West Minerals Province (NWMP)
- Mt Isa to Townsville (MITEZ) corridor
- Eastern Resource Development Corridor (ERDC)
- **Close to services and infrastructure**, including direct road and rail access to the Port of Townsville (600 km) and Mount Isa to the west (250 km).
- **Copper String 2.0** to immediate south (3 kms)

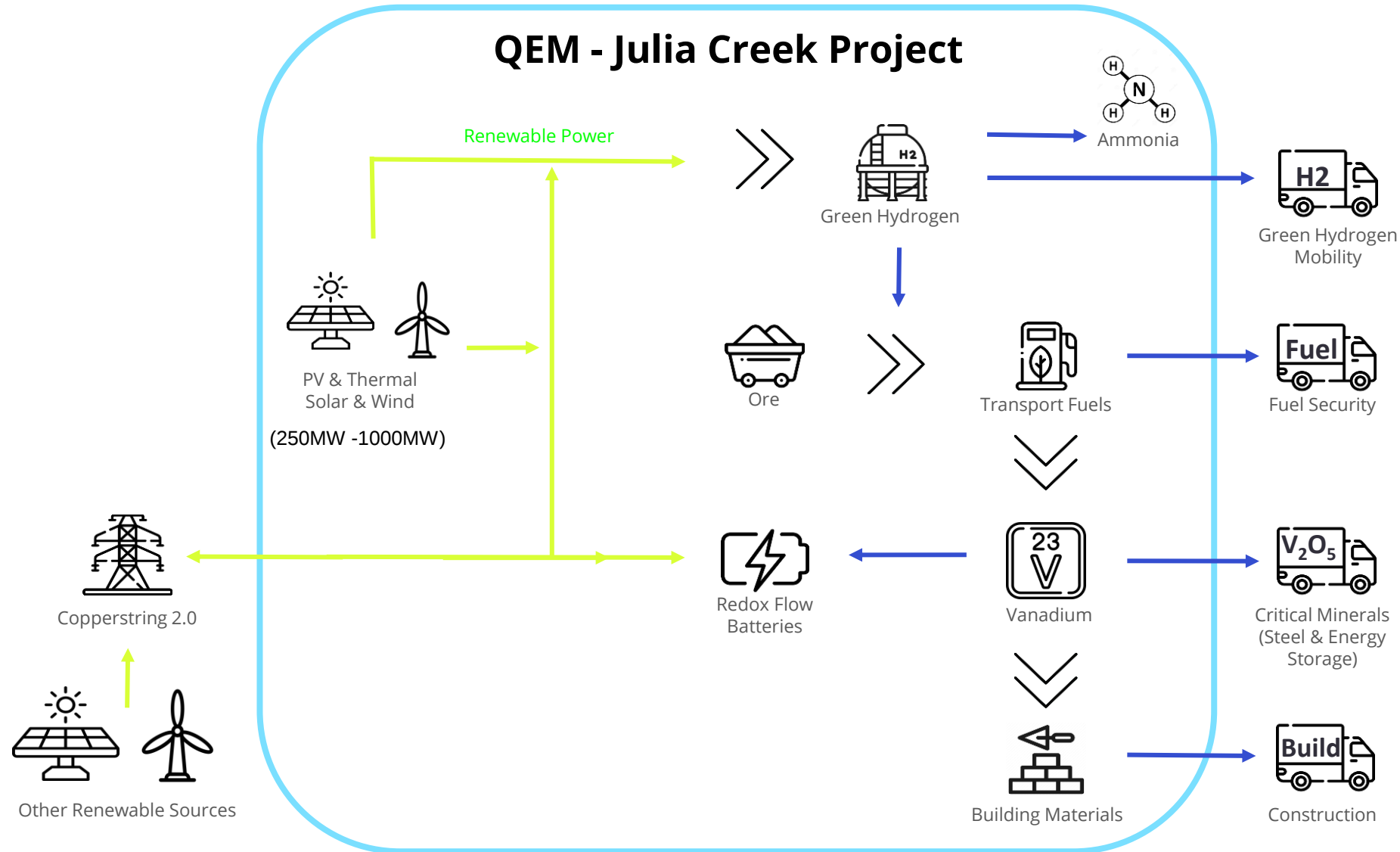


Julia Creek Project



Source: Geoscience Australia - Vanadium <https://www.ga.gov.au/scientific-topics/minerals/mineral-resources-and-advice/australian-resource-reviews/vanadium#heading-6>

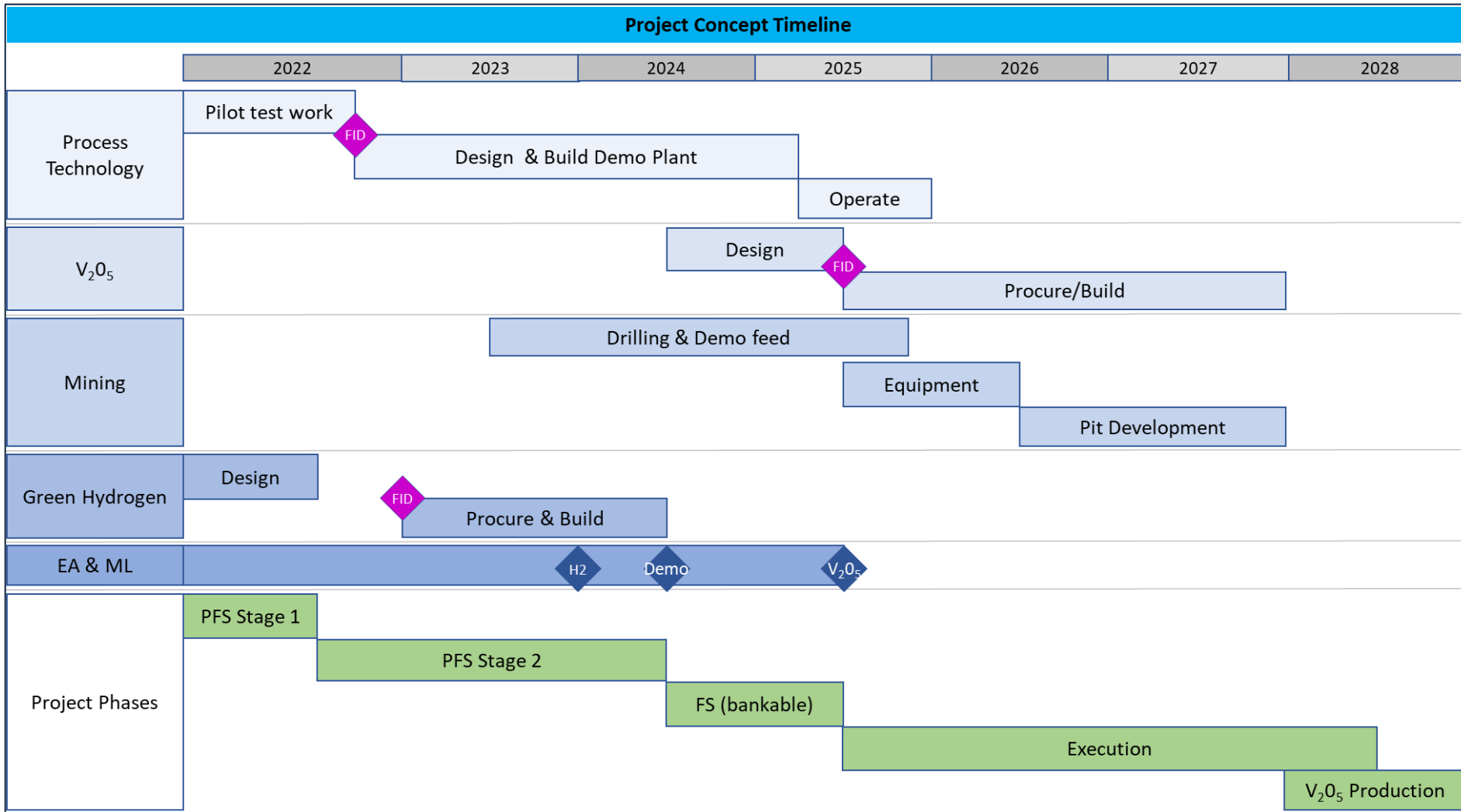
Project Concept Design



Project Development Stages



Carefully planned development strategy implemented to prove commerciality and reduce risk



Pilot Plant Update



Bench scale pilot plant- Fabrication now Complete

- Fabrication and certification of the bench scale pilot plant is now complete
- Due for delivery mid March
- Pilot will enable QEM to optimise oil and vanadium recovery, using proprietary extraction process
- Unit will be housed at the Melbourne headquarters of HRL Technology Group Pty Ltd, where the pilot plant will be installed and operated.
- **QEM remains on target to commence operational activity at the bench-scale pilot in April 2022.**
- The pilot plant is being built by specialist manufacturer AMAR and will validate QEM's proprietary extraction process ahead of a commercial demonstration plant.



2021 Site Inspection. Location for pilot plant at HRL Labs Victoria

Environmental Update



EPIC Environmental begins engagement

- EPIC is now engaged to development the Environmental Impact Statement. EPIC is undertaking extensive technical studies at Julia Creek, coordinating environmental approval applications, water access and establishing a Progressive Rehabilitation and Closure Plan
- Assistance with Major Project status application (Federal) and Coordinated Project status (State) being sought through the Qld Coordinator Generals Office.
- Baseline enviro studies to commence March 16th : 12-month air quality, groundwater and surface water monitoring program and terrestrial ecology studies.
- 12 water bores will be drilled on-site, as part of the early works program.
- Cultural heritage survey to begin this year.
- Topographic drone survey begins March 16.

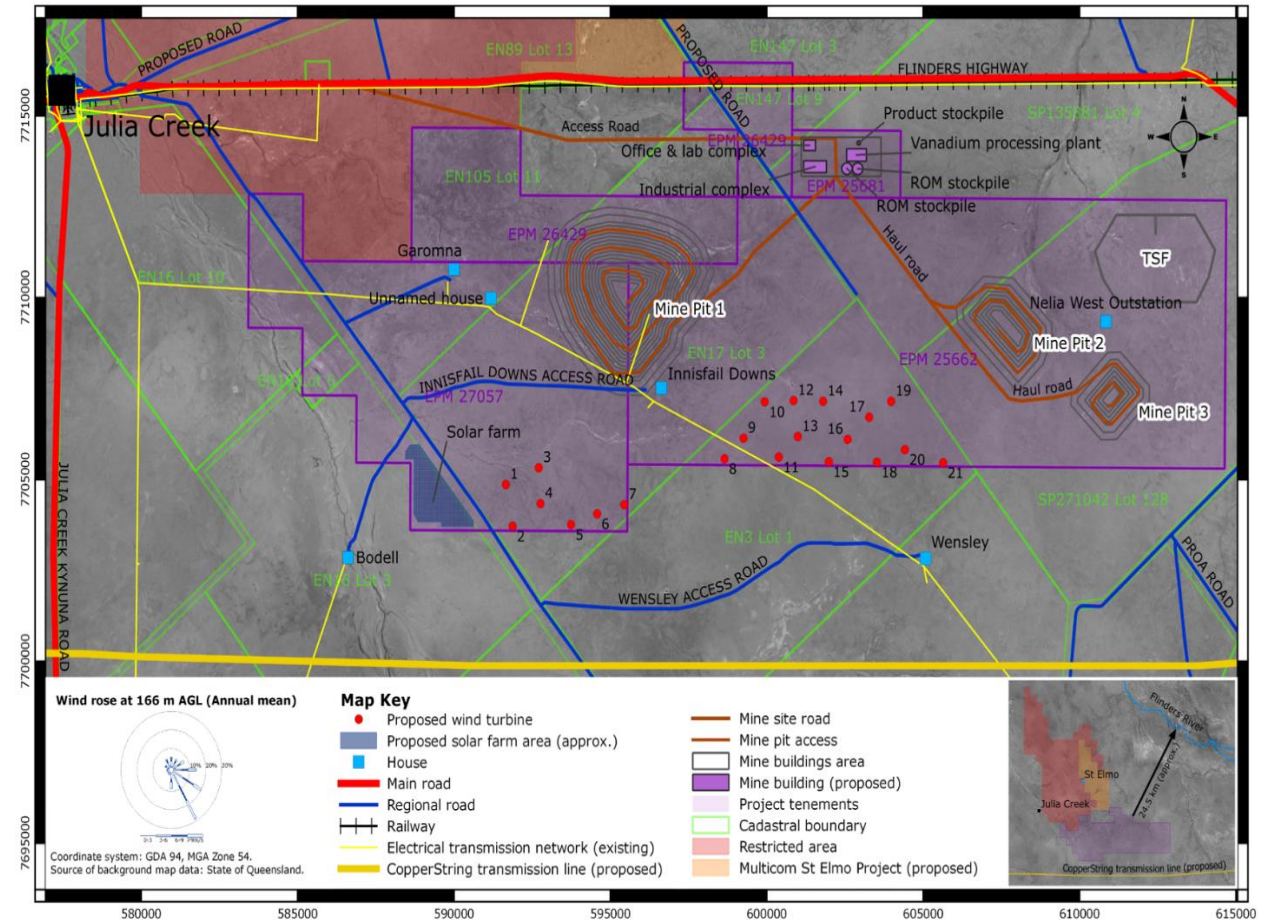


Renewable Power Update



“Situated in the best co-located wind and solar resources in Eastern Australia” - AEMO

- GHD completing optimisation modelling of Stage 1: 250 MW hybrid solar/wind layout.
- Further desktop assessments on 500MW and 1GW scenarios underway.
- Fulcrum 3D is supplying a 160m Met Mast for a 12-month (min) on-site wind and solar monitoring station to gather baseline meteorological data. Delivery in June.
- SODAR and Lidar units will also be stationed on site. Delivery 6-8 weeks.
- Topographic drone survey. March
- Alternative renewables also being investigated -Solar Thermal.
- Connection enquiry sent and received to CopperString 2.0 for import/export into NEM.

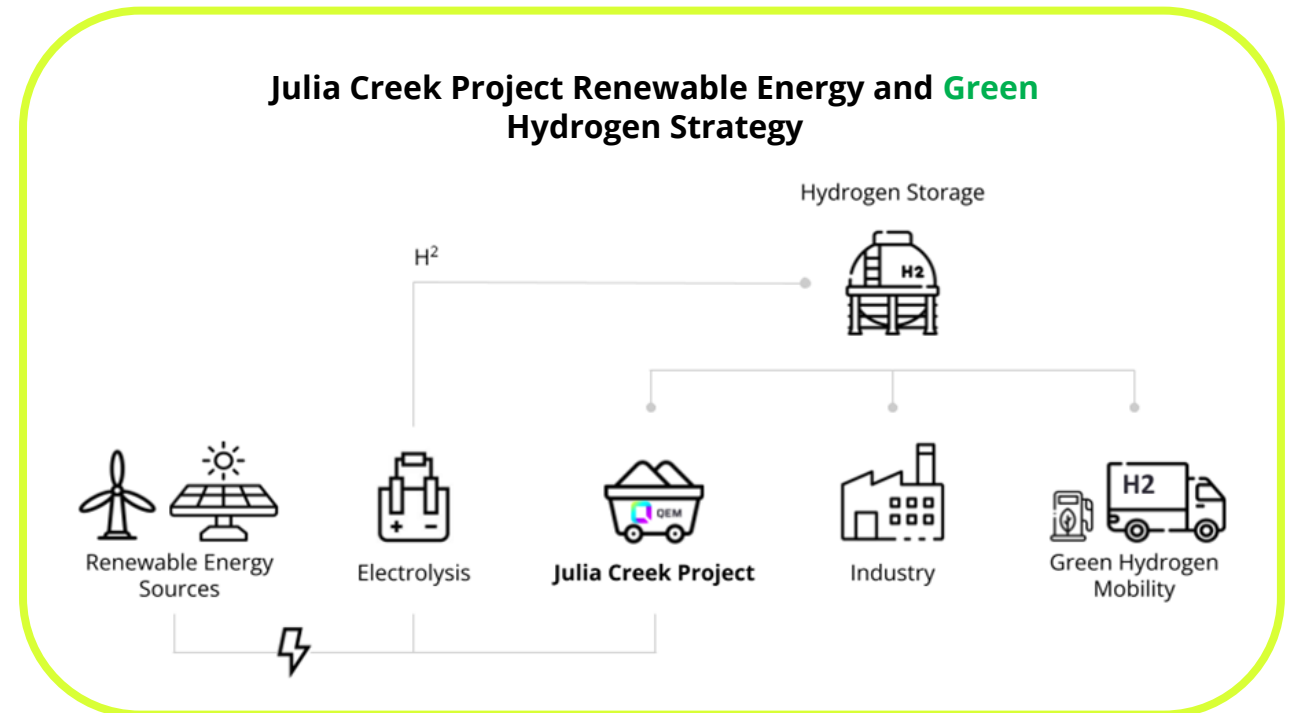


Hydrogen Update



Hydrogen - for oil upgrading and a lower emissions future

- **Project Infrastructure:** Green Hydrogen can be produced and used on-site to upgrade produced raw oil into usable transport fuels, such as low-sulphur diesel
- Excess production could potentially create a hydrogen hub for the North-West Minerals Province (NWMP).
- Potential benefits for regional communities, industry and heavy transport in the region.
- Significant support being shown by Governments to progress hydrogen projects in Queensland.
- Andrew Forrest's FFI and the Queensland Government recently announced a \$1 billion electrolyser manufacturing plant in Gladstone. It will be the largest in the world and highlights the significant investment into the hydrogen industry.



Community Update



Julia Creek- McKinley Shire Council meeting

- Directors Gavin Loyden and John Henderson, along with Joanne Bergamin, recently met with most sitting members of the McKinley Shire Council in Julia Creek, to discuss the activities and update the Council on progress being made on the project.
- Project detail very well received, and the Council is very supportive of new mineral project development in the region.
- Potential benefits to the wider community discussed, such as regional and local employment potential, future community amenity and regional development.
- Council will be regularly updated as progress is made, and milestones achieved.
- Landowners are kept well informed via a weekly Project Report and all owners are supportive of the project advancing.



Vanadium Uses



Vanadium - The Versatile Element

Improves Steel Tensile Strength

Most widely used alloy to strengthen steel (HSLA.) in construction, automotive, aerospace, rail, shipping, tools, drilling and more.

Lowers CO₂ emissions

In steel-Lowers CO₂ emissions by 185 million metric tons annually -Texas A&M University

Supports Fuel Efficiency

High strength-to-weight ratio makes vanadium a critical component in the automotive industries. 85% of vehicles by 2025. Henry Ford first used in Model – T.

Durability & Weather Resistance

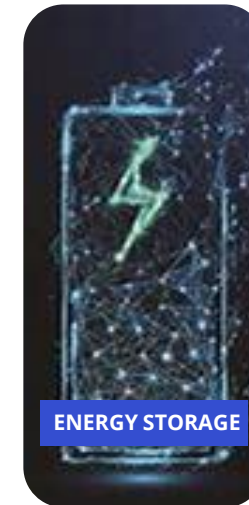
Vanadium alloys are naturally durable to extreme temperature and corrosion, making it irreplaceable in the aerospace industry. Suitable for hydrogen storage & pipes (reduces failure due to hydrogen embrittlement).

Chemical & Catalysts

Catalysts, 'Smart Glass', sulphuric acid production, ceramics, dyes, cathodes for lithium batteries.

Renewable Energy Storage

Vanadium Redox Flow Batteries (VRFB) are the preferred solution for large scale energy storage globally. Produces 78% less CO₂ than Li-B - Cradle-to-gate, with recycling and renewables.



Renewable Energy Storage



Building a Renewable Future with Vanadium Redox Flow Batteries

	Vanadium	Lithium
Number of Cycles (Lifespan)	100,000+ (20-30 yrs)	3000-10,000 (5-7 yrs)
Low Self-discharge (stays charged)	✓	✗
Low Environmental Footprint	✓	✗
Highly Expandable	✓	✗
Generates Low Levels of Heat	✓	✗
Charges & Discharges Simultaneously	✓	✗
Can Release Energy Instantaneously	✓	✗
Suitable for Connection to Power Grid	✓	✗ (Without Inverters)
Small Footprint	✗	✓
CAN BE COMPLETELY RECYCLED	✓	✗



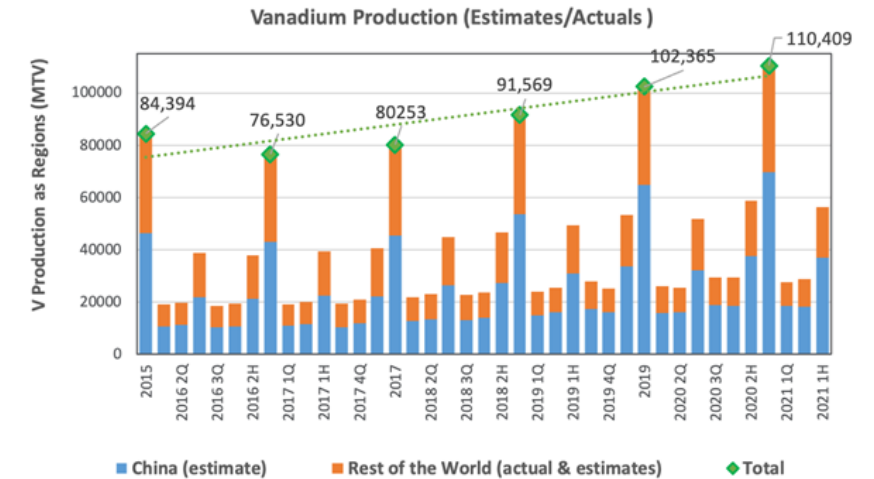
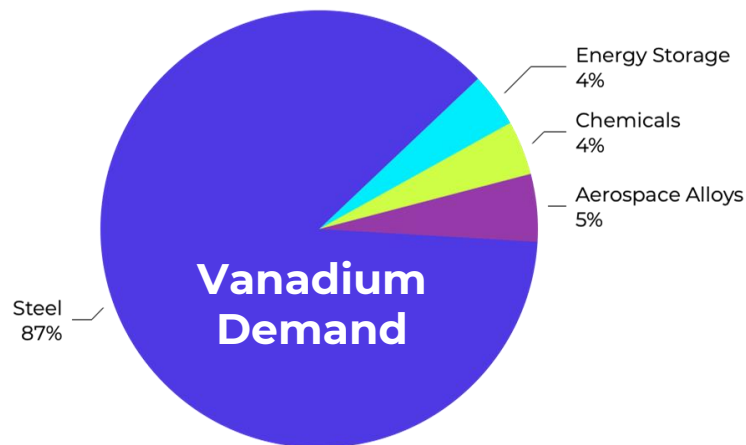
Source: <https://www.energyandcapital.com/articles/the-best-thing-since-lithium/1531>
Mining Journal June 2018

Vanadium Market



Set for growth

- Global Production 2020 ~**110,409 MTV** or approximately 197,000tpa V2O5
- Market is expected to reach \$2.36 Billion in 2025 at a **CAGR of 10.2%**
- Vanadium was added to the '**US & Australian Strategic Metals List**' in 2018
- Demand for VRFB is expected to equate to ~**23% of vanadium market by 2030, currently only <3%**
- Australia holds approximately ~**20%** of undeveloped global reserves- no domestic production at present



V₂O₅ Vanadium Pentoxide Flake 98% Price USD / lb

Europe : US\$10.60/lb (0.00%)
Feb 18, 2022



Oil Market



Looming Energy Crisis

- Globally, nations are dealing with a severe rise in energy prices. Demand is high and supply is tight.
- In the last 12 months, Australia lost half of its remaining oil refineries, with just two remaining which has **left our fuel supply vulnerable to crisis**.
- A dramatic rebound in the global economy and tight supply has seen demand and price for oil skyrocket, with **prices recently reaching levels above US\$100bbl**.
- Prices at the bowser are rising nationally. Recent invasion of Ukraine is adding to pressure globally.



CL:NMX - Crude Oil Price



Source: NASDAQ <https://www.nasdaq.com/market-activity/commodities/cl:nmx>

NG:NMX - Natural Gas Price



Source: NASDAQ <https://www.nasdaq.com/market-activity/commodities/ng%3Anmx>

Fuel Resilience

COVID-19 demonstrates supply chain risks

- Australia is an island nation that lacks resilience, depending heavily on imported fuel
- Australia's obligation as a member of the International Energy Agency (IEA):

Required	Actual
- At least 90 days of supply - Not held since 2012 - Current stockpile is critically low	- 30 days of petrol for automobiles - 20 days of diesel - 20 days of aviation fuel (Australian Petroleum Statistics 2020)

- Dependency on transport fuel imports has grown from ~**60%** in 2000 to over **93%** today adding around **\$30B** to Australia's trade deficit in 2021.
- COVID-19 has further exposed Australia's lack of resilience in this area
- **QEM considers this an opportunity!**



QEM's Commitment to ESG



Environmental

- Low carbon footprint
- Utilises renewable energy sources
- Target products such as V₂O₅, fuel & hydrogen to support emission reduction targets



Social

- Supports local community – engagement, Indigenous relations and employment, long-term jobs, training, youth programs, sport
- Encourages employees to volunteer and fundraise (St Vinnies CEO Sleepout, St Vincent de Paul Society, Endeavour Foundation)



Governance

- Dedicated to corporate transparency
- Critical Minerals- traceability and provenance. Ethically sourced
- Indigenous engagement
- Management aligned with shareholders

Right Project at The Right Time



The catalyst to help unleash the inherent potential wealth of the NWMP and beyond



Vanadium

QEM aims to become a leading supplier of high-quality vanadium pentoxide in Australia



Dual Commodity Deposit

Julia Creek in North Queensland allows production of both Vanadium (a Critical Mineral) and high-quality transportation fuels including Hydrogen



Transport Fuels + Hydrogen

QEM aims to provide innovative and environmentally friendly solutions that are important to our energy future

Contact



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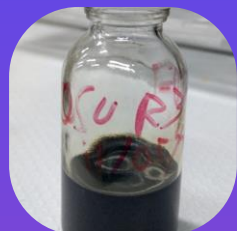
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Appendix – A

Julia Creek Resource

Julia Creek Resource Overview



Table 1: Summary of JORC Mineral Resource Estimate

Resource Class	Strat.Unit	Mass (Mt)	Average Thickness (m)	Total						
				Insitu Density (gm/cc)	V2O5 (wt%)	Cu (ppm)	Mo (ppm)	Ni (ppm)	Zn (ppm)	Al (ppm)
Indicated	CQLA	73	3.16	2.27	0.25	155	138	123	780	4752
	CQLB	67	2.97	2.24	0.28	182	168	142	890	5706
	OSU	40	1.94	2.08	0.33	223	153	191	1087	55317
	OSL	38	1.87	2.11	0.32	199	149	184	1015	55009
Inferred	CQLA	687	2.57	2.28	0.23	154	139	121	819	2854
	CQLB	874	3.33	2.15	0.38	220	221	201	1184	5323
	OSU	504	2.01	2.11	0.30	232	147	188	1148	62477
	OSL	481	1.98	2.13	0.29	212	134	171	1058	60316
Total		2,760		2.18	0.30	201	166	170	1043	26100

Note:

1. The estimate uses a minimum cut-off of 0.2% V₂O₅ for the oil shale units, and minimum cut-off of 0.15% V₂O₅ for the Coquina units.

2. The total resource tonnage reported is rounded to reflect the relative uncertainty in the estimate categories and component horizons may not sum correctly.

Table 2: Summary of SPE-PRMS Oil Resource

Strat.Unit	Mass (Mt)	Average Thickness (m)	Total		
			Oil Yield (L/tonne)	MMBarrels (insitu-PIIP)	MMBarrels 3C
CQL	1,701	5.93	44	446	401
OSU	544	2.01	72	231	208
OSL	518	1.97	63	193	174
TOTAL	2,760		53	870	783

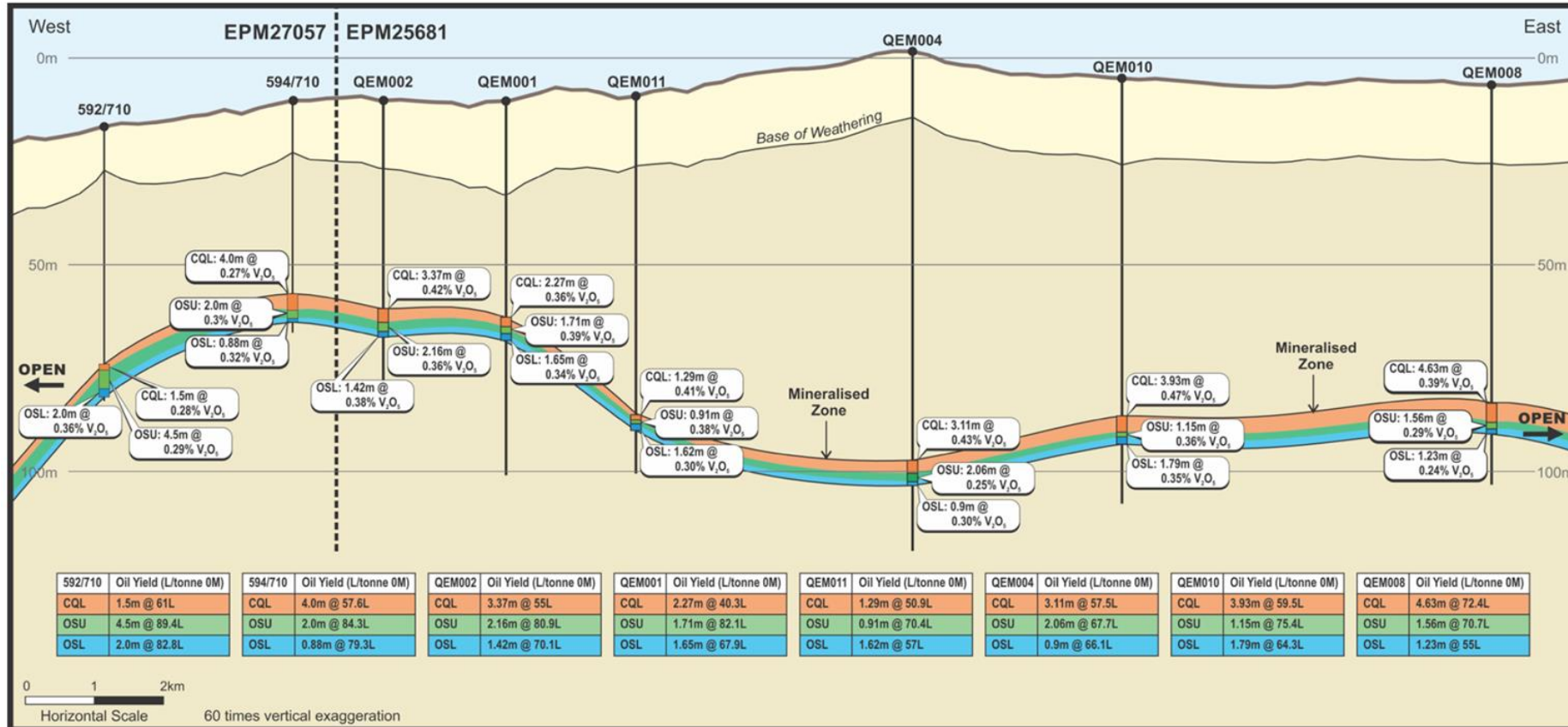
Note:

1. The total resource tonnage reported is rounded to reflect the relative uncertainty in the estimate and component horizons may not sum correctly.

Julia Creek Oil Yield



Cross Section the Julia Creek Oil Deposit



Source: Measured Group

The estimation methodology used is deterministic. The estimation is based on grids constructed for unit structure, thickness and oil grade parameters