



Advancing the **Julia Creek** Project

Fresh Equities Webinar | 7 December 2021



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Competent Persons and Qualified Estimator Statements

The information in this announcement that relates to exploration results, mineral resource and contingent resource estimates for the Company's Julia Creek Project was first reported by the Company in its IPO prospectus dated 20 August 2018 and supplementary prospectus dated 12 September 2018 (together, the "Prospectus") and the subsequent resource upgrade announcement ("Resource Upgrade") dated 14 October 2019. The Company confirms that it is not aware of any new information or data that materially affects the information included in the Prospectus and Resource Upgrade, and in the case of estimates of Mineral Resources and Contingent Resources, that all material assumptions and technical parameters underpinning the estimates in the Prospectus and Resource Upgrade continue to apply and have not materially changed



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

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 (2 December 2021)	\$21.55m
Share Price (2 December 2021)	\$0.195
Cash (as at 30 September 2021)	\$2.46m

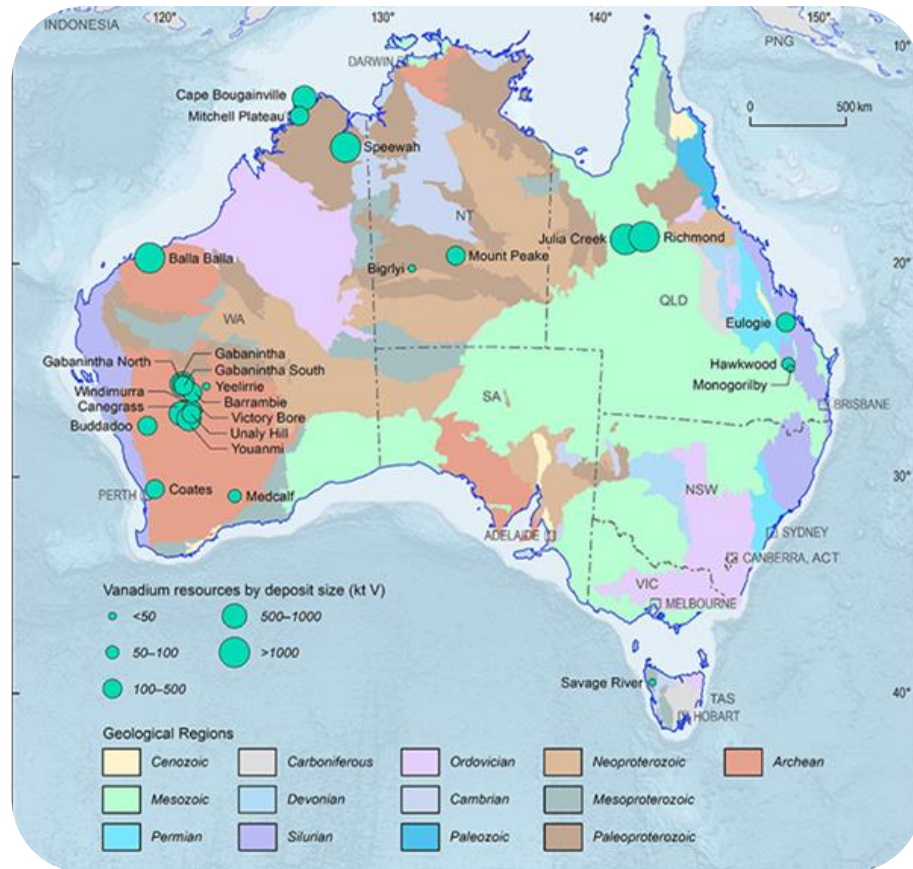
Major Shareholders (~48% QEM Director Shareholding)

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

Julia Creek Project Location

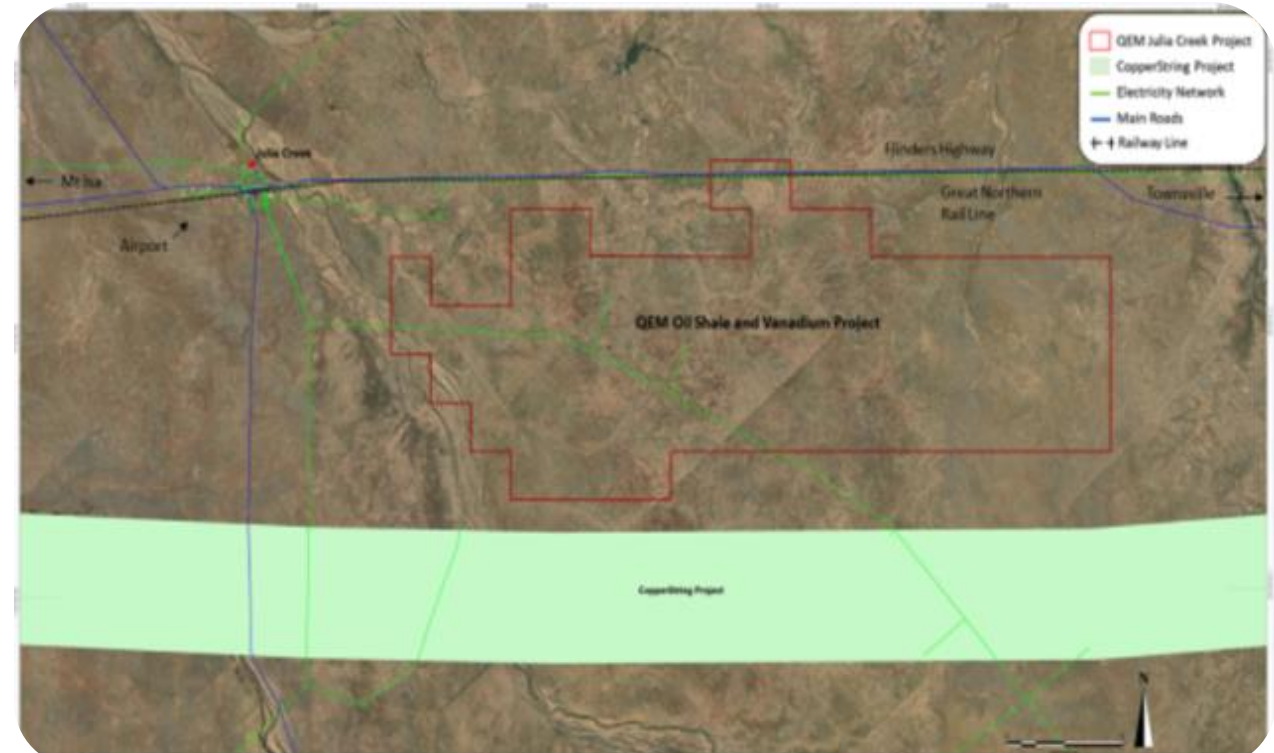


100% owned Exploration Tenements Covering 249.6km² in the Julia Creek Area, North-Western Queensland



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

- **Tier-1 location** within the **North-West Minerals Province (NWMP)** an area containing over **\$740B of known resource value**.
- Established infrastructure and services, 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



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; 90% extraction rate for V_2O_5 ; Bench scale pilot plant under construction



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

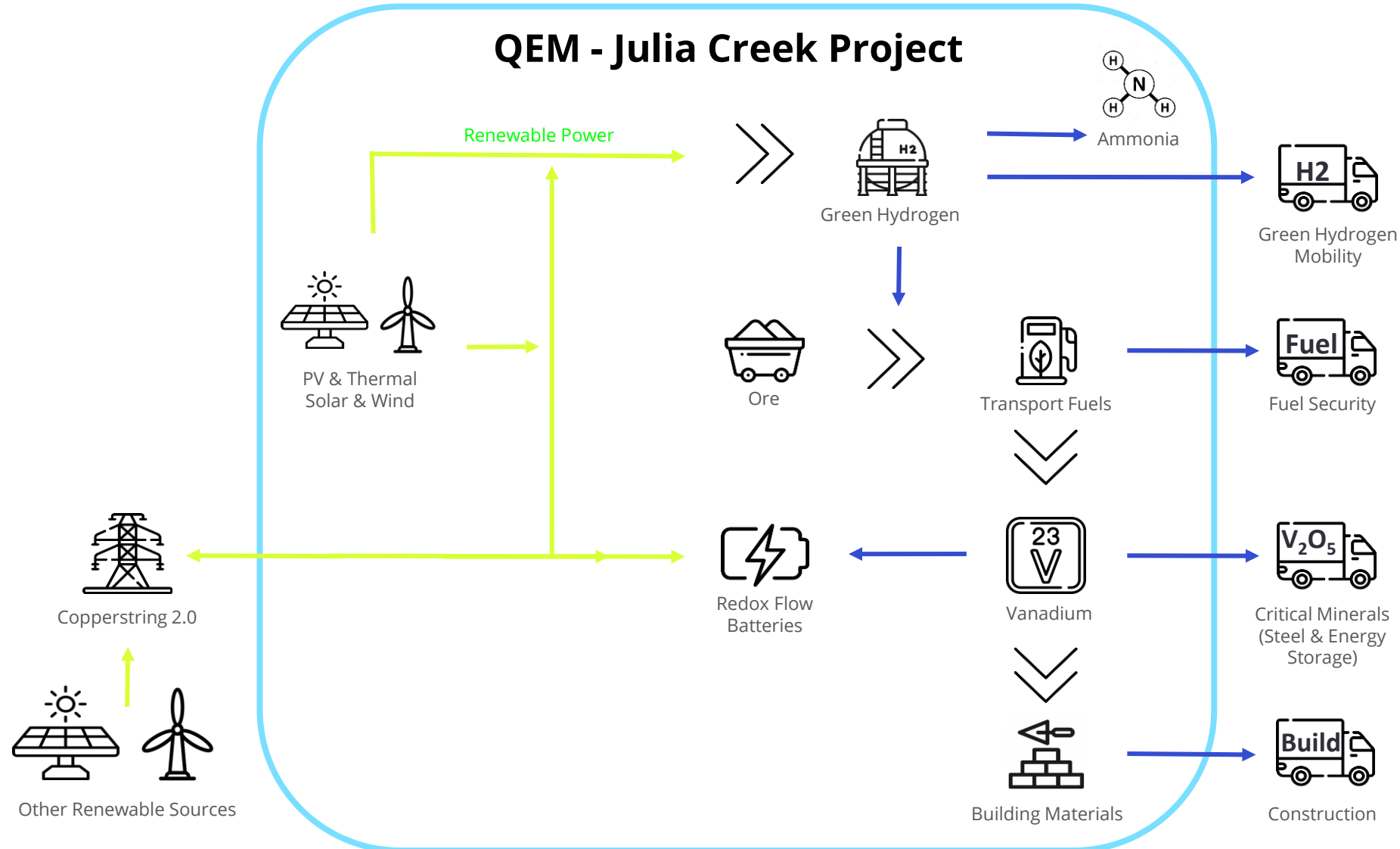


783 MMBL's of oil in the 3C category



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

Project Concept Design



Exploration Update



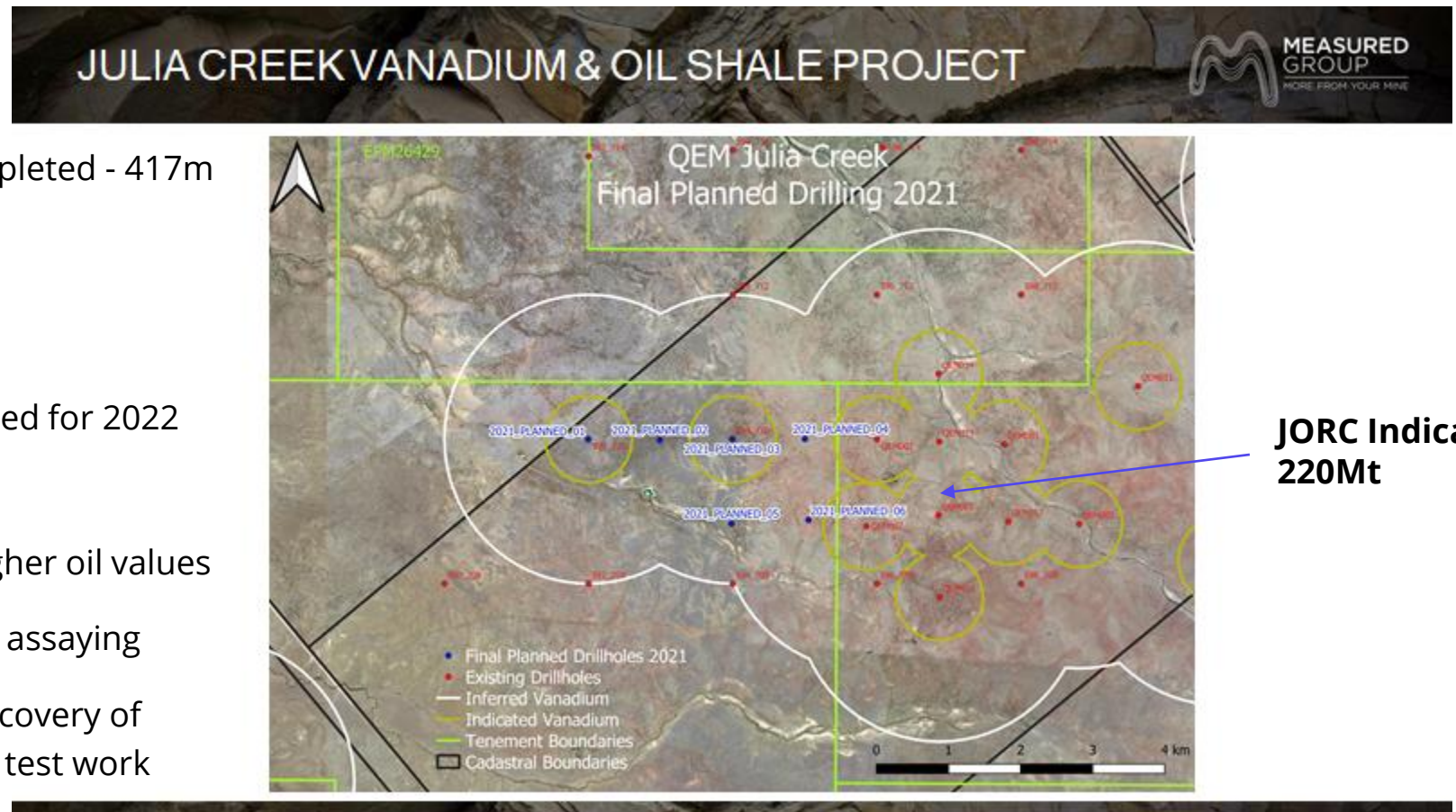
Drill program completed November 2021

Nov 2021 Exploration program:

- Six hole drilling campaign completed - 417m

Program Goals:

- Increase resource confidence
- 1500kgs of core sample collected for 2022 testing program
- Targeting area of predicted higher oil values
- Core samples sent to Mitra for assaying
- 4C core drilling to maximise recovery of sample material for pilot plant test work



Pilot Plant Update



Bench scale pilot plant under construction

- Bench scale pilot plant to enable QEM to optimise oil and vanadium recovery, conduct petrology evaluation and gain greater understanding of the Company's internal hydrogen requirements.
- The hazard and operability (HAZOP) study on the bench-scale oil and vanadium pilot plant was successfully completed in July 2021 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 plant during 1H FY22.**
- The pilot plant is being built by specialist manufacturer AMAR and will validate QEM's proprietary extraction process ahead of a commercial demonstration plant.



Environmental Update



EPIC Environmental begins engagement

- EPIC's engagement will include: development of an Environmental Impact Statement, undertaking extensive technical studies at Julia Creek, coordinating environmental approval applications and establishing a Progressive Rehabilitation and Closure Plan.
- Provide Assistance with Major Project Status (Federal) and Prescribed Project Status (State) through Qld Coordinator General's office.
- Baseline enviro studies to commence: 12-month air quality, groundwater and surface monitoring program, and terrestrial ecology studies.
- 17 water bores planned for March/April 2022, as part of early works program.
- Cultural Heritage survey to begin in 2022.

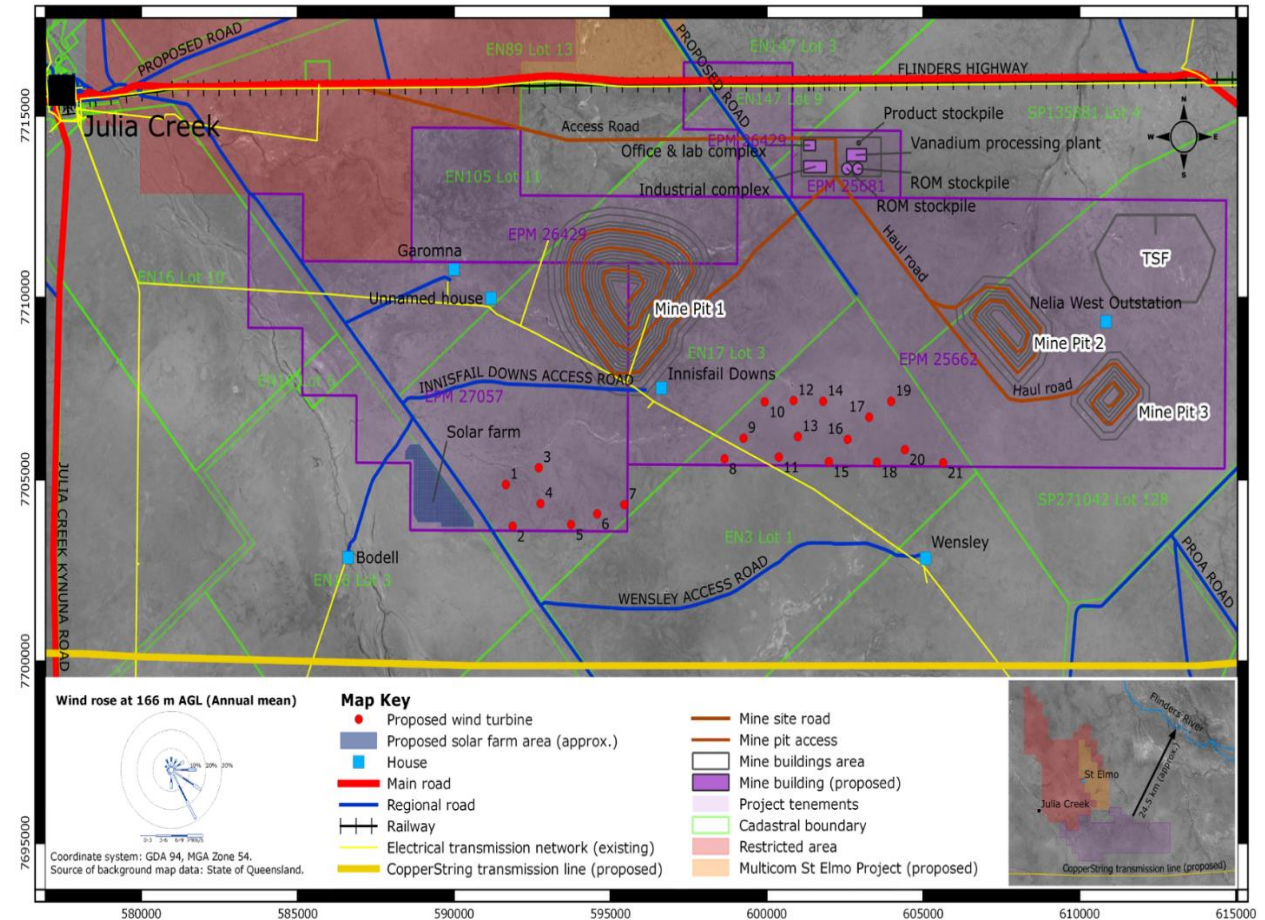


Renewable Power Update



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

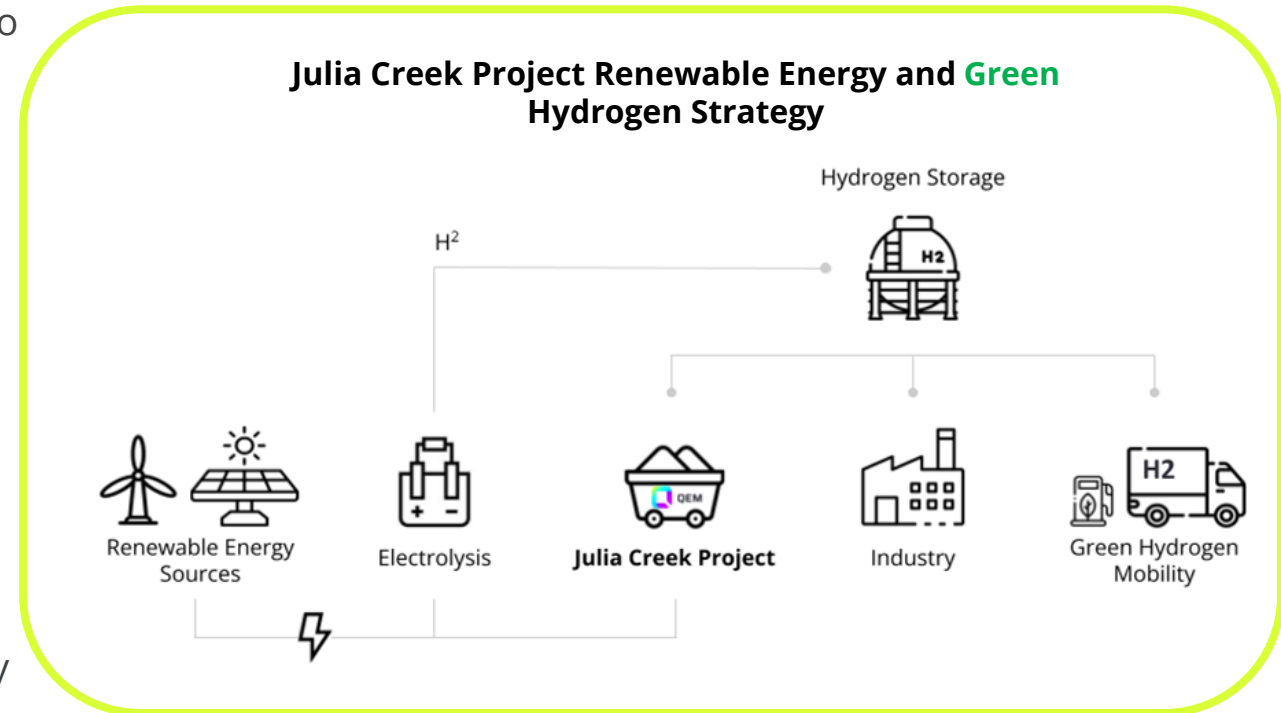
- Preliminary assessment focuses on mapping and modelling of a 250 MW hybrid solar/wind layout
- Further desktop assessments to be carried out on 500MW and 1GW scenarios underway
- GHD engaged to procure a Met Mast for a 12 month on-site wind and solar monitoring station and begin studies for renewable power generation
- Alternative renewables being examined - Solar Thermal
- Connection enquiry sent to CopperString 2.0 for import/export connection into NEM



Hydrogen Update

Hydrogen - for oil upgrading and a lower emissions future

- **Project Infrastructure:** Green Hydrogen could 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 and the Queensland Government's recently announced \$1B electrolyser manufacturing plant in Gladstone will be the largest in the world; Highlights the significant investment into the hydrogen industry



Community Update



Julia Creek- McKinlay Shire Council meeting

- Directors Gavin Loyden and John Henderson, along with Joanne Bergamin, recently met with the McKinlay Shire Council in Julia Creek to discuss project activity and update the Council on progress being made on the project.
- QEM's project outline was 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 amenities and regional development.
- Council feedback will be regularly sought as progress is made and milestones achieved.



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. In 85% of vehicles by 2025. Henry Ford first used in Model – T.

Durability & Weather Resistance

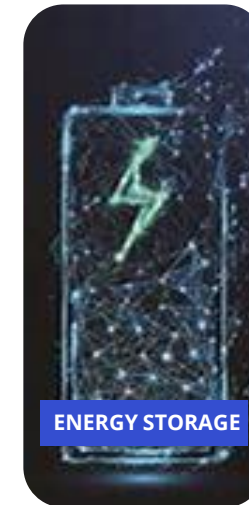
Vanadium alloys are naturally durable to extreme temperature and corrosion, making it irreplaceable in the aerospace industry. Suitable for hydrogen storage & pipes (reduces failure due to hydrogen embrittlement).

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	✓	✗

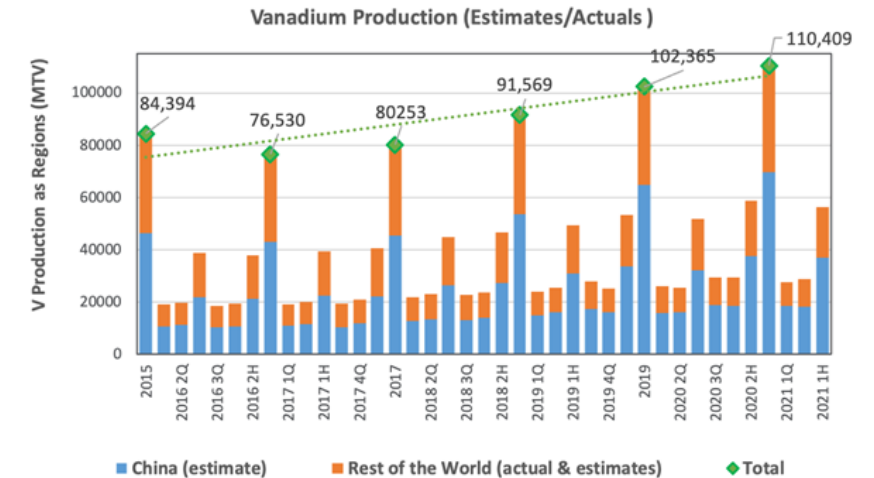
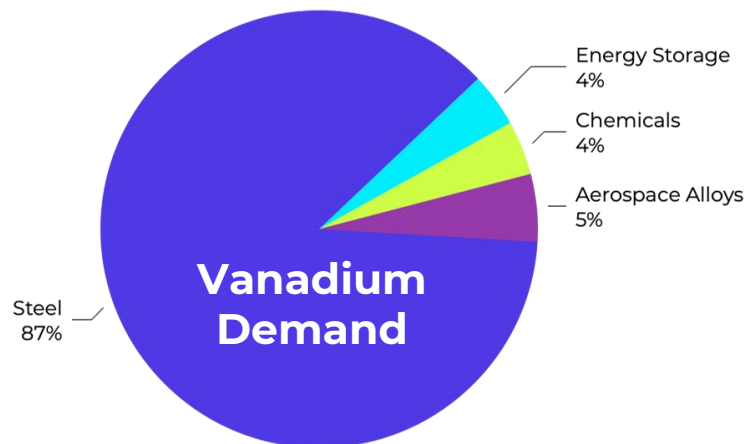


Vanadium Market



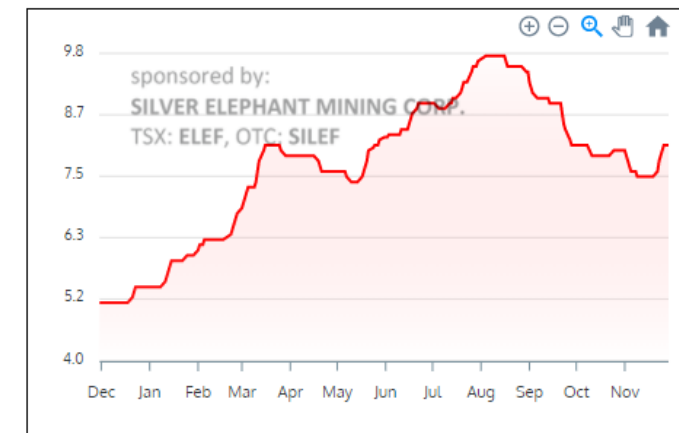
Set for growth

- 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 be 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\$8.10/lb (0.00%)
Nov 29, 2021



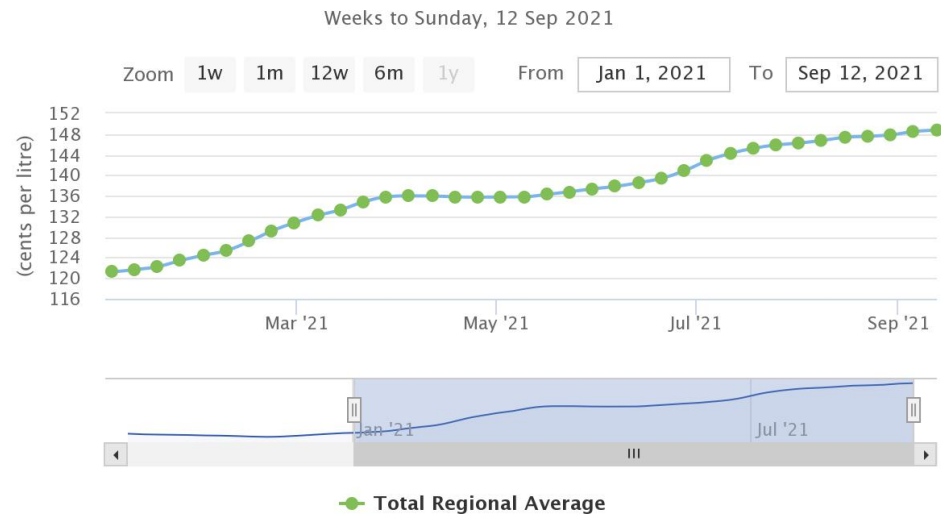
Oil Market



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 has seen demand and price for oil skyrocket, with **prices recently above US\$80bbl**.
- Bowser prices are on the rise nationally.

Average Weekly Prices for Total Regional Average



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
<ul style="list-style-type: none">- At least 90 days of supply- Not held since 2012- Current stockpile is critically low	<ul style="list-style-type: none">- 30 days of petrol for automobiles- 20 days of diesel- 20 days of aviation fuel <small>(Australian Petroleum Statistics 2020)</small>

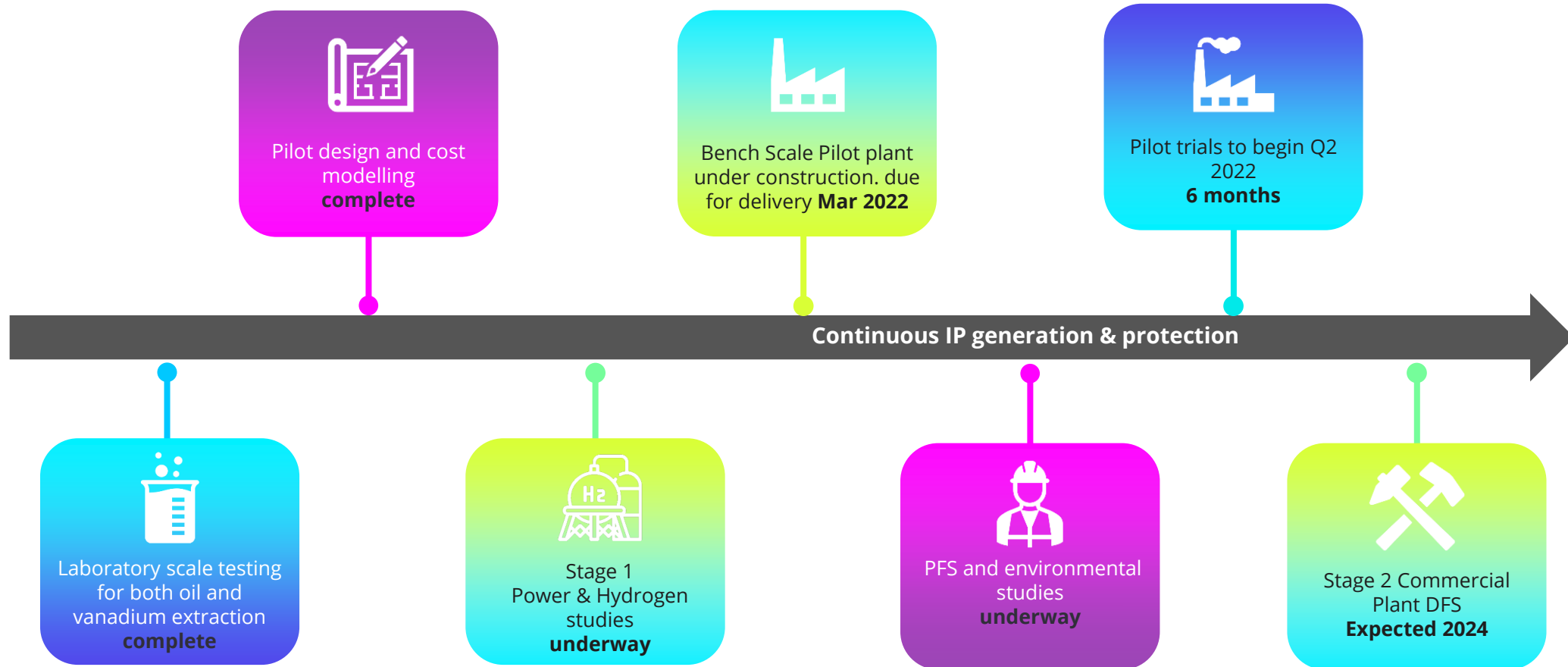
- Dependency on transport fuel imports has grown from ~**60%** in 2000 to over **93%** today adding around **\$30B** to Australia's trade deficit in 2020
- COVID-19 has further exposed Australia's lack of resilience in this area
- **QEM considers this an opportunity!**



Development Strategy



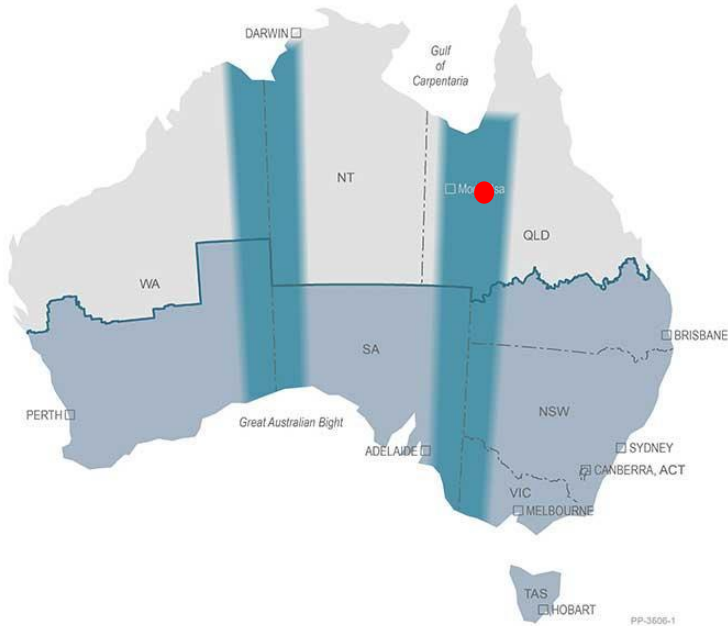
Carefully planned development strategy implemented to prove commerciality and reduce risk



Supportive Policy Environment



Well Aligned with Government Policy and Financing Agencies



Federal Government Resource Development Corridors

- *Julia Creek located in key Eastern Development Corridor*



- Critical Minerals Facilitation Office
- Fed Gov Eastern Resource Dev Corridor
- Queensland Hydrogen Industry Strategy
- Queensland Major Projects Facilitation
- Queensland Dept of State Development
- \$1.5 Billion CopperString 2.0 project



Strong Government support for Critical Minerals - Vanadium

- Queensland State Government, in collaboration with the Australian Federal Government and Townsville City Council is supporting Queensland's vanadium project developers by building a **\$15m** multi-user, commercial demonstration plant in Townsville Queensland, beginning 2022.



QEM's Commitment to ESG



Environmental

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



Social

- Supports local community – engagement, Indigenous relations, 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
- Support for women in leadership roles and WIMARQ GC Sponsor
- Management aligned with shareholders

Right Project at The Right Time

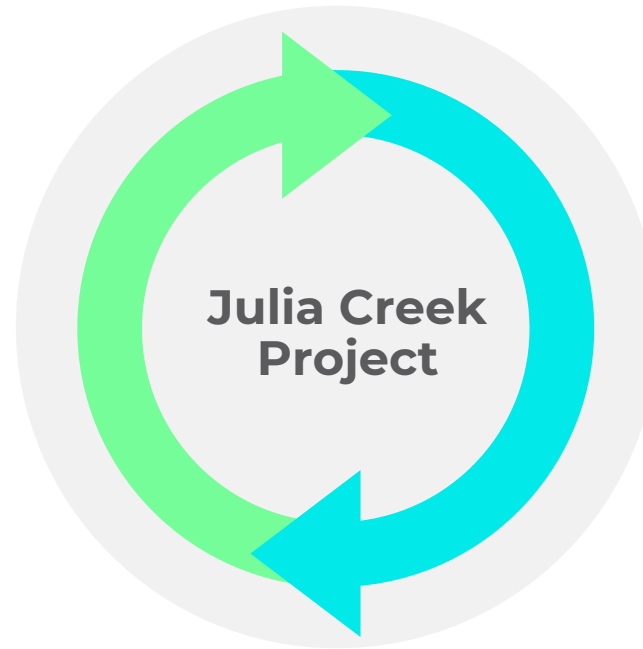


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Appendix – A

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

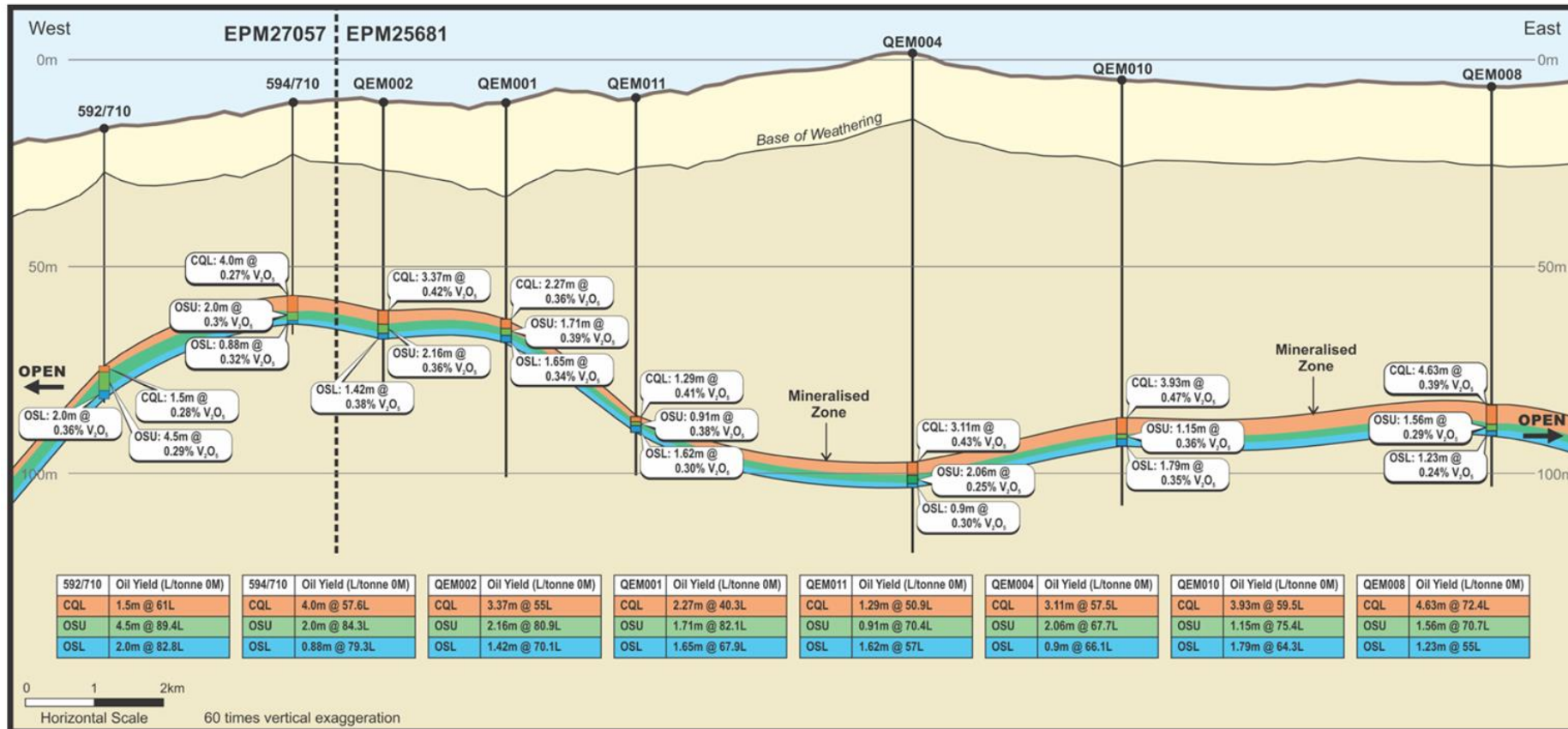
Note:

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



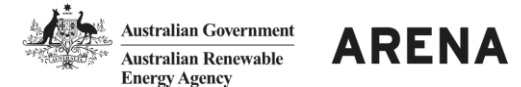
Appendix – B

Government Policy Support

Government Funding Bodies

Government Backing Policy Aims with Funding Support

- In Sept 2021, the **Australian Government** established the **\$2B Critical Minerals Facility**.
- **Northern Australian Infrastructure Facility (NAIF) \$2.47B** for infrastructure development.
- **Resources Technology and Critical Minerals Processing National Manufacturing Priority Roadmap \$1.5B** in funding for critical minerals processing development.
- **ARENA's Advancing Renewables Program** for projects which optimise the transition to renewable electricity, commercialise clean hydrogen & support the transition to low emissions metals
- **The Clean Energy Innovation Fund (CEFC) \$200m** in early-stage clean technology companies.
- **Queensland Hydrogen Industry Strategy \$19m** in funding for hydrogen projects in the state, particularly in regional areas, with additional \$5m announced recently to support feasibility studies.
- **Resources Community Infrastructure Fund \$100m** established by QLD Government.
- **Exploring for the Future \$10m** expansion of the Government's program-focussed on new economy minerals such as vanadium.
- **Queensland's Strategic Blueprint for North West Minerals Province (NWMP) \$39m** over 4yrs.



Government Backing: **NAIF**



Julia Creek within Northern Australian Infrastructure Facility coverage

NAIF is a Commonwealth Government agency established to facilitate economic growth by lending to infrastructure projects and businesses in northern Australia and helping to catalyse private sector investment.

NAIF is a \$5 billion development financier that provides loans to infrastructure projects in the Northern Territory, Queensland and Western Australia, in the last financial year, NAIF has made 11 Investment Decisions worth more than \$1.4billion

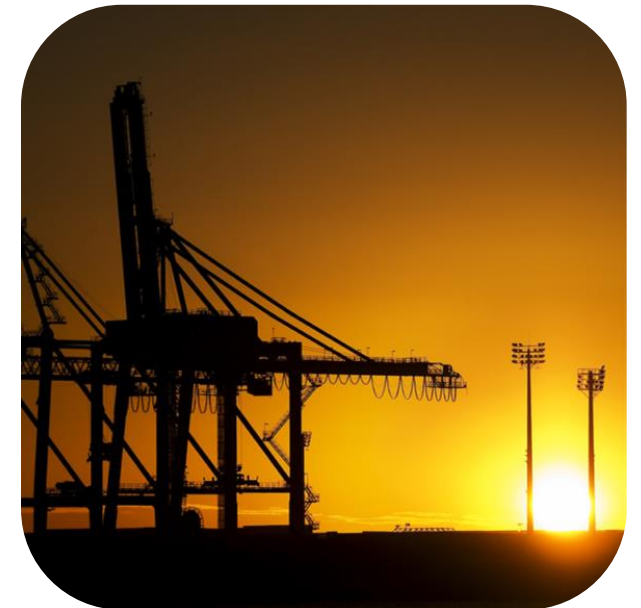
A key focus of any financing is to drive public benefit, economic and population growth and Indigenous involvement in northern Australia.

NAIF can lend up to 100% of the debt and has a higher tolerance for the unique risks of investing in northern Australia including but not limited to, distance, remoteness and climate.

Export Finance Australia

In September 2021, the Australian Government established the \$2 billion Critical Minerals Facility, which is managed by Export Finance Australia. This facility is for projects that are aligned with the Australian Government's Critical Minerals Strategy and are otherwise in Australia's national interest.

Export Finance Australia works alongside other Commonwealth financing bodies where mandates overlap. For critical minerals this can include working with the Clean Energy Finance Corporation and the Northern Australia Infrastructure Facility.



Government Backing: ARENA



ARENA fund has laid out Hydrogen project funding guidelines

ARENA Supports R&D in renewable hydrogen production, storage and use for energy, with the aim of delivering longer-term cost reductions and efficiency gains through innovative, disruptive technology developments.

- Feasibility studies for projects involving 100+ MW electrolyzers
- Commercial-scale deployments involving 10-40+ MW electrolyzers focused on industries and applications with large potential demand for hydrogen (e.g., ammonia production, power to gas, etc.) to drive the commercialisation of key component technologies
- Demonstration-scale projects involving 1-10 MW electrolyzers demonstrating new applications such as transport or remote area power systems with onsite hydrogen production and fuel cells/turbines replacing diesel generation, to drive the commercialisation for key component technologies
- Projects or activities that support the implementation of the National Hydrogen Strategy
- Projects that demonstrate or address issues with the use of hydrogen in industrial processes currently using fossil fuels (e.g., hydrogen as a fuel in boilers, kilns or other process heating applications, hydrogen as a reducing agent in steel manufacture)
- Subject to positive outcomes in financial and regulatory studies, QEM intends to seek financial support from the ARENA fund



ARENA





Appendix – C

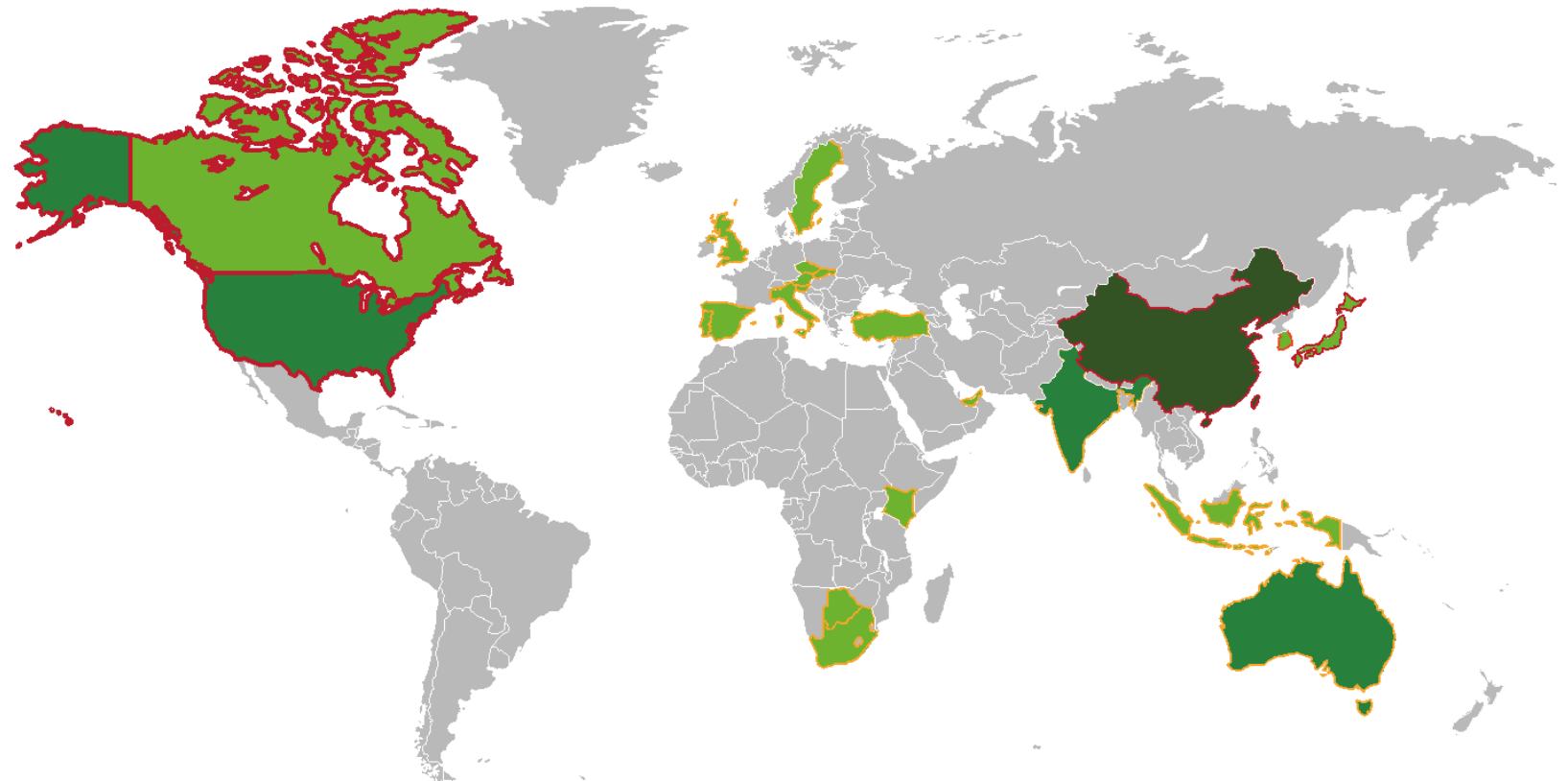
Vanadium Market

113 VRFB Installs Worldwide



39,664 kw of power, 209,800 kwh of energy

COUNTRY	VRFBs	kW	kWh
Australia	7	945	4629.90
Barbuda	1	3000	12000.00
Botswana	1	112	560.00
Canada	3	2500	10000.00
China	17	15825	48005.00
Czech Rep.	3	47	209.90
Denmark	3	40	260.00
Germany	15	1530	86190.00
India	4	155	740.15
Indonesia	2	400	500.00
Italy	5	631	2610.00
Japan	5	2330	7481.00
Netherlands	1	10	80.00
Portugal	5	5	60.00
Singapore	1	250	2000.00
Slovenia	1	10	45.00
South Africa	2	745	2950.00
South Korea	5	1250	4900.00
Spain	4	220	800.00
Sweden	1	800	1800.00
Switzerland	2	210	460.00
UK	5	805	5180.00
USA	17	7418	33173.70
Austria	1	14	84.00
Kenya	1	140	84.00
Slovakia	2	107	640.00
UAE	1	10	40.00



NUMBER OF VRFBs



SIZE OF VRFBs



Construction



Stronger, safer buildings

- Vanadium plays an essential role as an alloy of steel to provide increased tensile strength, durability and weather resistance.
- Announced in February 2018, China revised steel rebar standards to limit the use of inferior strength steels in its ever-growing construction industry.
- Due to these revised standards, global demand for vanadium is set to increase, with this development expected to add between 10,000t to 15,000t of vanadium demand, and signs of an increase in demand is already evident in the market today.
- Global crude steel production reached 1,869.9 million tonnes (Mt) for the year 2019, up by 3.4% compared to 2018. (Source: <https://www.worldsteel.org/media-centre/press-releases/2020/Global-crude-steel-output-increases-by-3.4--in-2019.html>)

Australian Steel Industry

- ~5.3Mt of steel are produced in Australia annually.
Australian Bureau of Statistics 2017-18.
- ~**100,000** people employed in the Australian steel industry
- Australia exports ~**800,000 tonnes a year**.
- Australian steel industry generates **\$29 billion** in annual revenue and is an essential part of the Australian economy.
- The Government of India is aiming to scale up steel production in the country to 300 MT by 2025 from about 90 MT in 2015-16.



Aerospace & Automotive



Vanadium and the future of transport

- **Aerospace** - Increased aircraft are required to service larger addressable air-travel market
- Both Boeing & Airbus both forecast annual global air traffic growth between 2016 and 2035 of nearly 5%. A titanium alloy containing 4% vanadium and 6% aluminium (Ti6Al4V) has been used extensively for blades, discs and casings of the compressors in many designs of the aero-engine gas turbine
- The development of new titanium alloys continues with the Vanadium component ranging from 8, 10 to 15%, which results in even higher strengths and the potential to make important contributions to weight reduction

Source: <http://www.nextsourcematerials.com/vanadium/about-vanadium/> Mining Journal June 2018

- **Automotive** – Today, 45% of **vanadium** goes into **cars**, and it is estimated that 85% will be **used** in manufacturing **auto vehicles** by 2025. This will reduce the weight of cars, thereby increasing their fuel efficiency and be able to meet fuel economy standards. (Source: Vanadium Corp)
- Engine components such as crankshafts and connecting rods are highly stressed and must withstand many cycles. Vanadium micro-alloyed forging steels are widely used for these parts, as well as other applications in the chassis, drivetrain, suspension and valve springs. (source: Vanitec.org)

