

DIRECTORS

Chairman
John Foley

Managing Director
Gavin Loyden

Non-Executive Director
John Henderson

Non-Executive Director
Daniel Harris

Non-Executive Director
David Fitch

Non-Executive Director
Tim Wall

**JULIA CREEK
PROJECT**

Vanadium
Oil Shale

**QEM Limited**

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Quarterly update for the period ending 30 September 2022

Highlights

- **Completed two rounds of bench-scale pilot plant testing, providing confidence in the viability of the extraction process.**
- **Implemented geotechnical, water quality and environmental studies**
- **Receiving live wind and solar data from met mast, SoDar and solar monitoring equipment**
- **Completed an oversubscribed \$2.2m placement post-quarter**
- **Enhanced the Company's Board post quarter, with the appointment of a highly credentialed non-executive director.**

QEM Limited (ASX: QEM) ("**QEM**" or "**Company**") is pleased to provide an update on its activities for the quarter ending 30 September 2022.

QEM Managing Director Gavin Loyden said the bench-scale testing results achieved during the quarter are pivotal for the Company to progress its development of the flagship Julia Creek vanadium and oil project.

"The extraction results across both commodities substantially bolster confidence in the potential viability of our extraction process at a scale that is significantly greater than any testing we have previously conducted," Mr Loyden said.

"In addition to the bench-scale pilot testing, we are positioned to unlock latent value at our critical minerals project, after completing a drilling program during the quarter and commissioning a meteorological mast, the latter of which marks a major step forward in our understanding of the renewable energy potential for the Julia Creek project.

"With all facets of the Julia Creek project progressing positively during the September quarter, QEM completed a share placement post-quarter to build upon on this momentum, which I was delighted to see was an oversubscribed capital raising and with a very minor price discount that is uncommon in placements among companies of our scale.

"This highlights a tangible belief in the Company's long-term growth prospects and will enable us to continue the strong momentum we have recently generated into the quarters ahead.

"In the near term, we are targeting an updated mining scoping study along with mineral characterisation and beneficiation work, due to commence in the next quarter with The University of Queensland's Sustainable Minerals Institute (UQ), as well as building on the extraction test results to date with additional vanadium and oil pilot plant processing works."

Bench-Scale Pilot Plant Testing

After successfully commissioning the vanadium and oil shale bench-scale pilot plant at the Melbourne headquarters of HRL Technology Group Pty Ltd (see ASX

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announcement dated 25 May 2022), QEM significantly progressed the pilot plant testing during the September quarter.

The first round of testing (T1) was conducted with six kilograms of oil shale feed from the Julia Creek project mixed with six kilograms of a hydrogen donor solvent. The results of T1 were announced to the ASX on 9 August 2022, indicating vanadium extraction of up to 71.5% based on a four-hour leaching time and oil yields up to 142% greater than yields reported under an MFA. These enhanced oil yields were achieved via the use of a donor solvent during the extraction process and were in line with previous laboratory test work, albeit on a much more significant scale and accommodating for vanadium extraction.

While T1 delivered promising results, opportunities for extraction optimisation were proactively identified for the second round of testing (T2), with the results released to the ASX on 27 September 2022. An even greater volume of material was processed for T2, utilising eight kilograms of oil shale feed from the Julia Creek project mixed with 16 kilograms of solvent, in order to test the efficacy of the different ratio of feed to solvent.

T2 subsequently delivered a substantial rise in vanadium extraction rates of above 80% and as high as 92%, based on a 24-hour leaching time, as well as oil shale extraction results indicating oil yields of ~170% greater than yields using a Modified Fischer Assay (MFA).

In addition, during T1 there was a build-up of solid deposits (naphthalene) in the oil product collection equipment and related pipework, but pragmatic modifications implemented for T2 fully amended these issues. The bench-scale pilot plant continued to operate effectively in T2, with key run targets for autoclave temperature and pressure achieved throughout testing.



QEM's pilot plant in action during the September quarter.

QEM is currently assessing the ability to further optimise the performance of the bench-scale pilot plant, and further improvements have been made for the third test (T3), including installation of additional gas meters to capture and measure all gas units.

Beneficiation work will now be conducted on the solid material, post oil extraction, to further improve outcomes for metals recovery and reduce acid consumption. Alkaline leaching tests are also now being

conducted, so that a proper comparison can be made between acid and alkaline methods, the results of which will lead to a selection being made for the take forward case.

2022 Drilling Program

During the September quarter, QEM completed a geotechnical and water borehole drilling program as part of its geotechnical, water quality and environmental studies.

Wind and Solar Monitoring

During the September quarter, QEM completed the installation and commissioning of a 163-metre meteorological mast (met mast) at the Julia Creek project. The met mast, which was developed by Fulcrum 3D, has been fitted with anemometers and other instruments to measure wind speed and other weather conditions. This tower is now providing real-time data, needed to better understand the potential for renewable power generation for the Julia Creek Project and will run for 12-18 months.

Additionally, QEM notes that the wind speed (soDAR) and solar measuring equipment placed on site and commissioned in the June quarter by Fulcrum 3D has been operating effectively. The soDAR and solar equipment is used to measure and record solar radiance, wind speed and other technical data required for wind and solar farm design.



QEM's met mast was commissioned during the September quarter.

Share Placement to Fund Key Project Development Initiatives

Following shareholder approval on 12 August 2022, the Company issued 3,463,415 shares at 20.5 cents per share to Director David Fitch, raising \$710,000.

Post September quarter, on 3 October 2022, QEM announced it had received firm commitments to raise ~\$2.2m via an oversubscribed placement to new and existing sophisticated and professional investors at 22 cents per share. On 11 October 2022, the Company issued the placement shares to unrelated parties under the Company's existing Listing Rule 7.1 capacity.

The placement received continued support from existing shareholders, including non-executive director and major shareholder David Fitch, who subscribed for \$600,000 to maintain his ~29% shareholding. These shares will be issued subject to shareholder approval at a Company's annual general meeting on 17 November 2022.

In tandem with existing cash reserves, proceeds from the placement will fully fund QEM's pilot plant program, including additional petrology and vanadium pentoxide processing, building on the successful T2 results.

Complementing these activities, the funds will enable QEM to undertake beneficiation and mineral characterisation work with the University of Queensland to further optimise the processing plan.

Board Appointment

As QEM continues to advance its flagship Julia Creek project towards the next stage of development, post-September quarter - on 12 October 2022 - the Company announced the appointment of Tim Wall as a non-executive director to further enhance QEM's board.

Mr Wall is a highly experienced company director and executive across the energy, infrastructure, transport and resources sectors, with a strong leadership track record at multiple ASX100 companies.

His impressive list of recent achievements includes driving a strategic shift in manufacturing while President of Global Manufacturing & Corporate HSE for Incitec Pivot, which generated an EBIT uplift of at least \$40 million for the business.

Mr Wall also delivered successful operational outcomes while occupying senior managerial positions at Caltex Australia and BP Australia.

QEM continues to maintain a strong focus on diversity, equity and inclusion, and the Company welcomes the ESG credentials that Tim brings to the Board.

His 4-year board tenure on the not-for-profit National Association of Women in Operations, speaks to his commitment to supporting women in the sector.

ESG

At the end of the March quarter 2022, QEM engaged Socialsuite to assist in streamlining, monitoring, and disclosing the Company's ESG progress and initiatives. QEM's first baseline ESG report was subsequently released to the market (see ASX announcement dated 31 March 2022). On 26 July 2022, the Company released its next quarterly ESG report, with disclosures on the 21 core metrics set by the World Economic Forum (WEF) in its standardised and globally recognised *Stakeholder Capitalism Metrics* ESG framework, closing out Q4 FY2022.

ESG highlights for this quarter include:

- The directors' skills were reviewed, and an ESG-inclusive Board matrix was adopted and placed on the website;
- The Board of QEM is aligned with the Queensland Resources Council's diversity target of 30 percent female participation across the sector by 2026, and is aiming for the same at all levels of the organisation as QEM grows; and
- QEM continued its community-based initiatives both where its flagship project resides in Julia Creek and at its head office base on the Gold Coast. QEM proudly sponsored the Julia Creek Town v Country Big Weekend junior girls and boys and senior rugby league teams and women's netball team. Locally, on the Gold Coast, QEM was a sponsor of Pink Ribbon Cup Race Day, in support of the National Breast Cancer Foundation.

Via quarterly ESG reporting, QEM aims to increase the transparency of its overall reporting to keep its ESG goals on track, and to be able to communicate the Company's progress to internal and external stakeholders, including potential investors. QEM understands the importance of maintaining transparency in the way it operates so stakeholders and investors understand the Company goals and the progress it is making on them.

ASX: QEM

The following table shows QEM's progress against WEF's core ESG metrics during this quarter compared to the last.

QEM Limited		Progress			
ASX:QEM		P In progress C Completed N Not applicable			
Period Comparison (Period 1 vs 2)					
Governance		Period 1 (Apr to Jun 2022)		Period 2 (Jul to Sep 2022)	
Code	Description	Status	Progress (A1-A5)	Status	Progress (A1-A5)
GOVERNING PURPOSE					
GO-01-C1	Setting purpose	VERIFIED	C C C C C	VERIFIED	C C C C C
QUALITY OF GOVERNING BODY					
GO-02-C1	Governance body composition	VERIFIED	C P P C C	VERIFIED	C C P P C
STAKEHOLDER ENGAGEMENT					
GO-03-C1	Material issues impacting stakeholders	VERIFIED	C P C C C	VERIFIED	C C C C P
ETHICAL BEHAVIOUR					
GO-04-C1	Anti-corruption practices	VERIFIED	C C C	VERIFIED	C C C
GO-04-C2	Mechanisms to protect ethical behaviour	VERIFIED	C C	VERIFIED	C C
RISK AND OPPORTUNITY OVERSIGHT					
GO-05-C1	Integrating risk and opportunity into business process	VERIFIED	P C C C C	VERIFIED	C C C P C
Planet					
		Period 1 (Apr to Jun 2022)	Period 2 (Jul to Sep 2022)		
Code	Description	Status	Progress (A1-A5)	Status	Progress (A1-A5)
CLIMATE CHANGE					
PL-01-C1	GHG emissions	VERIFIED	P C P	VERIFIED	P C P
PL-01-C2	TCFD implementation	VERIFIED	P P P	VERIFIED	P P P
NATURE LOSS					
PL-02-C1	Land use and key biodiversity areas	VERIFIED	N N C N N	VERIFIED	N N N C N
FRESHWATER AVAILABILITY					
PL-03-C1	Water consumption	VERIFIED	P P P P P	VERIFIED	P P P P P
People					
		Period 1 (Apr to Jun 2022)	Period 2 (Jul to Sep 2022)		
Code	Description	Status	Progress (A1-A5)	Status	Progress (A1-A5)
DIGNITY AND EQUALITY					
PE-01-C1	Diversity and inclusion	VERIFIED	P P C P C	VERIFIED	P C C C C
PE-01-C2	Pay equality	VERIFIED	P P P P	VERIFIED	P P P P
PE-01-C3	Wage level	VERIFIED	P P	VERIFIED	C P
PE-01-C4	Child, forced or compulsory labour	VERIFIED	P	VERIFIED	P
HEALTH AND WELL-BEING					
PE-02-C1	Health and safety	VERIFIED	P C	VERIFIED	C P
SKILLS FOR THE FUTURE					
PE-03-C1	Training provided	VERIFIED	P P	VERIFIED	P C
Prosperity					
		Period 1 (Apr to Jun 2022)	Period 2 (Jul to Sep 2022)		
Code	Description	Status	Progress (A1-A5)	Status	Progress (A1-A5)
EMPLOYMENT AND WEALTH GENERATION					
PR-01-C1	Rate of employment	VERIFIED	P P	VERIFIED	P P
PR-01-C2	Economic contribution	VERIFIED	C C	VERIFIED	C C
PR-01-C3	Financial investment contribution	VERIFIED	C N	VERIFIED	N C
INNOVATION OF BETTER PRODUCTS AND SERVICES					
PR-02-C1	Total R&D expenses	VERIFIED	C	VERIFIED	C
COMMUNITY AND SOCIAL VITALITY					
PR-03-C1	Total tax paid	VERIFIED	C	VERIFIED	C

ESG Report Data Disclaimer
 QEM Limited | Period Comparison | Published on 26 Oct 2022

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CopperString 2.0

In the June quarter, QEM issued a Connection Enquiry Information Request to understand CopperString's position regarding potential connection points to QEM's infrastructure. CopperString subsequently responded to the Company's enquiry, which detailed an initial proposal to determine the connection point's maximum export into the grid and maximum load requirement from the grid. Following the positive response, technical discussions progressed over the September quarter with further updates anticipated in the coming months.

Related Party Payments

Pursuant to item 6 in the Company's Appendix 5B – Quarterly Cashflow Report for the Quarter ended 30 September 2022, the Company made payments of \$132k to related parties for director fees.

ENDS

This announcement was authorised for release on the ASX by the Board of QEM Limited.

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ABOUT QEM

QEM Limited (ASX: QEM) is a publicly listed company which is focussed on the exploration and development of its flagship Julia Creek Project, covering 250km² in the Julia Creek area of North Western Queensland.

The Julia Creek vanadium / oil shale project is a unique world class resource with the potential to utilise and deliver innovative and sustainable energy solutions, through the production of energy fuels and vanadium pentoxide. QEM strives to become a leading producer of liquid fuels and in response to a global vanadium deficit, also aims to become a global supplier of high-quality vanadium pentoxide, to both the nascent energy storage sector and the Australian steel industry.

This globally significant JORC (2012) Mineral Resource of 2,850 Mt @ 0.31% V₂O₅ is one of the single largest ASX listed vanadium resources and represents a significant opportunity for development.

The tenements form part of the vast Toolebuc Formation, which is recognised as one of the largest deposits of vanadium and oil shale in the world and located less than 16km east of the township of Julia Creek. In close proximity to all major infrastructure and services, the project is intersected by the main infrastructure corridor of the Flinders Highway and Great Northern Railway, connecting Mt Isa to Townsville.

*The information in this announcement that relates to the 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 announcements ("Resource Upgrade") dated 14 October 2019 and 7 April 2022. 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.