

FEASIBILITY STUDY UPDATE: Macarthur could ‘smash the carbon ball out of the park’ with renewable energy penetration at Lake Giles

Macarthur Minerals Limited (ASX: MIO) (TSX-V: MMS) (OTCQB: MMSDF) (the **Company** or **Macarthur**) is pleased to announce that outputs from analysis undertaken by VECKTA on an optimised power configuration solution for the Company’s high grade magnetite Lake Giles Iron Project has demonstrated potential for Macarthur to achieve renewable energy penetration for its stationary energy requirements from the commencement of operations at levels from 40% to as high as 90%.

If supported by the balance of the current Feasibility Study, then this could establish Macarthur as one of the few mining companies in Australia to commence operations with such a material percentage of decarbonized energy inputs for its stationary consumption requirements. At 90% penetration, Macarthur’s Lake Giles Iron Project could lead the Australian mining sector.

Highlights

- Macarthur recently announced that it had appointed VECKTA to provide critical inputs for the design of an onsite energy system as part of the Feasibility Study for the Lake Giles Iron Project (see 1 September 2021 announcement [here](#)).
- VECKTA, powered by XENDEE has undertaken a techno-economic analysis of viable energy solutions to identify an optimized mix of conventional and renewable energy at site. The analysis will enable Macarthur to strike the optimal balance of reliable power for mineral processing operations, minimizing the levelised cost of energy (LCOE), and the lowest possible carbon footprint to support operations.
- The results of VECKTA’s analysis indicate that the lowest LCOE for the Lake Giles Iron Project can be achieved through renewable energy penetration of around 90% for the project’s stationary energy demand, using a combination of solar and wind resources. Remaining load would be served by natural gas generators. The analysis has indicated that the comparative reduction in LCOE when compared with using diesel or natural gas as the primary fuel source is material.
- Macarthur is also considering a solar and gas hybrid solution with a renewables content exceeding 40%, to account for potential constraints (for example, restrictions owing to additional land tenure requirements) on the level of deployable wind generation.
- Macarthur will target a ‘no upfront capital’ solution to deploy the Lake Giles power station and will shortly commence preliminary discussions with interested parties via VECKTA’s capital market platform. The contract structure is expected to deliver energy to the project at a competitive project opex (c/kWh) over the life of the mine.
- If selection of the high case solution of 90% penetration is supported by the balance of the outputs from the Feasibility Study, Macarthur could be the first mining company in Australia to commence operations at 90% or greater renewables penetration, and the energy mix would place Macarthur in a unique position to target delivery of the lowest possible carbon footprint over life of mine.
- The Feasibility Study for the Lake Giles Iron Project remains on track.

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North American 'technology and smarts' will help deliver optimised energy solution 'Down Under'

The outputs from the analysis work undertaken by North American-headquartered VECKTA, have predictably determined that on-site energy generation utilising diesel as the sole fuel input will deliver both the highest operating cost per kWh and the highest CO₂ emissions for Macarthur's stationary energy requirements at Lake Giles. However, VECKTA's analysis has also determined that, incorporating a percentage of renewables penetration up to (and potentially exceeding) 90% of the project's total stationary load requirements could deliver greater than expected reductions in overall energy costs over life of the mine, when compared with diesel or gas alone.

An optimal system to achieve this level of renewable energy content could consist of on-site natural gas engines, solar PV and wind turbines. Whilst 90% is a high case, VECKTA's analysis concludes that the LCOE benefits at that level are notable. A solar and gas hybrid solution with a renewables content exceeding 40% could also deliver a favourable LCOE, and this configuration could be a leading option if restrictions (for example, restrictions owing to additional land tenure requirements) constrain the incorporation of wind energy.



Figure 1: Wind energy is one of the options under examination as part of Macarthur's renewable energy penetration strategy at Lake Giles



Figure 2: Solar energy could form part of Macarthur's renewable energy penetration strategy at Lake Giles

Whilst the capital costs for a microgrid system with greater than 40% renewables penetration would be higher than standalone diesel or gas, VECKTA's analysis (which has taken into consideration a range of factors including stationary load requirements for the magnetite processing plant and associated site infrastructure, the project location, fuel prices, technology costs and climatic conditions) indicates that renewable energy penetration for Lake Giles at between 40% to 90% would deliver:

- a significantly lower levelized cost of delivered energy when compared to diesel or gas alone; and
- the lowest possible carbon footprint.



Sustainability opportunity

VECKTA's analysis creates an opportunity for Macarthur to consider a full spectrum of options on potential energy mix to ensure that it can achieve the most economically and environmentally sustainable solution for the Lake Giles Iron Project. The VECKTA analysis will be an essential input for the delivery of the current Feasibility Study.

As part of the Feasibility Study for the Lake Giles Iron Project, Macarthur will also be considering whether the funding approach for delivery of the microgrid will be managed directly (via a specialist capital provider) or indirectly via a "full wrap" developer under a build-own-operate structure. These structures provide Macarthur with the flexibility to deliver a long-term energy solution at sustained, low operating costs, while avoiding excessive upfront capital expenditures.

Further work needs to be completed within the current Feasibility Study and future engineering, including refining cost estimates and enhancing solar and wind resource analysis, which is anticipated to be assessed and awarded through the VECKTA marketplace. Details of the preferred power configuration selected for the project and its estimated costs will be disclosed when the Feasibility Study is released to the market.

Gareth Evans, CEO of VECKTA commented:

"At VECKTA we believe that businesses are key to a successful energy transition, and we need to empower them to proactively embrace this opportunity and act with confidence. Our mission is to simplify and accelerate the deployment of onsite energy systems and microgrids. It is very exciting to collaborate with Macarthur Minerals, a team who are innovating, challenging limits, and adapting with purpose to create a mining operation that will be profitable, socially responsible, and sustainable. They are truly leading the charge and we are proud to be supporting this sensational project."

Collaborating with Macarthur, our teams have technically and economically assessed viable onsite energy system configuration options and tradeoffs (emissions, costs, operational needs). The value VECKTA brings is that we customize a solution specific to the operational and business needs and do so in a solution agnostic way to ensure the optimal solution(s) are assessed and developed with no biases. The results at this phase of the project are very promising and demonstrate what can be achieved when we leverage technology to rapidly and cost effectively assess hundreds of thousands of variables that can influence a system design, performance, capital and operating costs. As the project progresses Macarthur will be able to leverage the VECKTA Marketplace Platform to match project needs with the most cost and schedule efficient capital, equipment and services in this dynamic ecosystem, to see the system become a reality."

Andrew Bruton, CEO of Macarthur Minerals commented:

"The cost of power for the magnetite process plant at Lake Giles will be one of the most significant factors in determining the overall operating costs for the project. The opportunity to look at ways to economically reduce power costs alongside the implementation of a socially responsible and sustainable energy solution, by integrating renewable energy into our planned operations at Lake Giles from 'day 1' is exciting."

What is unique about VECKTA's analysis for Macarthur is that it indicates the potential for greater renewables penetration on initiation. The results are encouraging us to look at the case for 'going bigger' on renewables from day one."

Achieving a material level of renewables penetration at the commencement of operations would undoubtedly set Macarthur up as a leader in the Australian the mining industry. At the high case of 90%, it would smash the ball out of the park when it comes to demonstrating the potential for the mining industry to meet the decarbonisation challenges that currently confront it."



As an emerging 21st century mining company, Macarthur is committed to a responsible ESG strategy that will deliver genuine and measurable decarbonisation outcomes, and this body of work by VECKTA demonstrates the potential not only to reduce costs, but to be socially responsible at the same time. It demonstrates that social responsibility and profit can co-exist as the global economy transitions to a lower carbon future in the coming decades.

This is exciting for our project, and we look forward to updating the market on the full details of the proposed power configuration and costs when the Feasibility Study results are published to the market."

On behalf of the Board of Directors, Mr Cameron McCall, Chairman

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Company profile

Macarthur is an iron ore development, gold and lithium exploration company that is focused on bringing to production its Western Australia iron ore projects. The Lake Giles Iron Project mineral resources include the Ularring hematite resource (approved for development) comprising Indicated resources of 54.5 million tonnes at 47.2% Fe and Inferred resources of 26 million tonnes at 45.4% Fe; and the Lake Giles magnetite resource of 53.9 million tonnes (Measured), 218.7 million tonnes (Indicated) and 997 million tonnes (Inferred). The JORC reporting tables and Competent Person statement for the magnetite and hematite mineral resources have previously been disclosed in ASX market announcements dated 12 August 2020 and 5 December 2019. Macarthur has prominent (~721 square kilometre tenement area) gold, lithium and copper exploration interests in Pilbara region of Western Australia. In addition, Macarthur has lithium brine Claims in the emerging Railroad Valley region in Nevada, USA.

About VECKTA

VECKTA is the Energy Transition Market Platform. VECKTA integrates the world's most advanced energy system engineering tools with an end-to-end marketplace to integrate and accelerate the development of distributed energy systems (DES) and microgrid projects. VECKTA empowers businesses and communities to quickly and easily baseline their energy situation today, customize a solution specific to their needs (cost, reliability and/or emissions) and then seamlessly engage and contract the best equipment, services, and capital providers in the market to finance, deploy and operate it sustainably and profitably. www.veckta.com

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