

Our ref: 240712

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Dear Adrian

CRITICAL MINERALS PRODUCTION TAX INCENTIVE

Pilbara Minerals welcomes the opportunity to provide feedback on the Government's Critical Minerals Production Tax Incentive (CMPTI).

Pilbara Minerals aims to be a leader in the provision of sustainable battery materials products and has a strategic goal of extracting greater value along the battery materials supply chain. We understand the economic and strategic priority the Government is placing on the development of domestic critical minerals processing, and we would like to contribute to realising these important outcomes.

As you will be aware, many governments internationally are proactively pursuing security of supply for critical minerals and the establishment of related, emerging industries. This strong push includes investment and the implementation of supportive policy settings. As a consequence, the potential for Australia to miss out on mid-stream and downstream value creation opportunities in the critical minerals sector is real.

It also remains the case that many of our international trading partners are happy to receive raw materials so that further processing can be undertaken in their own country, often as part of a co-located or integrated battery production process.

Pilbara Minerals commends the Government for its efforts in responding to this challenge through the announcement of the CMPTI in the 2024-25 Budget and we look forward to continuing to play a significant and constructive role in the development of the industry.

Challenges of Critical Minerals Processing in the Pilbara

Further downstream processing of lithium in Australia presents challenges to mining companies that operate in remote locations such as Western Australia's Pilbara region. Pilbara Minerals' Pilgangoora Operation, located 120 km south of Port Hedland, is a stand-alone operation that relies heavily on road transport for its supplies, and energy that is generated onsite by a stand-alone power generator using a combination of trucked-in diesel and natural gas, and solar.

Consistent with Government objectives, Pilbara Minerals would like to develop critical minerals processing opportunities in Australia. However, the challenges for critical minerals processing in the Pilbara are distinct from WA's South-West region where, for example, the Kwinana Strategic Industrial Estate has good access to supply chains and supporting interconnected infrastructure.

Based on the work Pilbara Minerals has done to date, including the decision to partner with POSCO to progress a lithium hydroxide plant in South Korea, the Pilbara is 30% more expensive to build and operate than alternative international locations.

Pilbara Minerals' Approach to Minerals Processing

Given this operating environment and knowing the significant inputs (water, power and reagents) required to operate a lithium chemicals refinery, Pilbara Minerals has investigated alternative ways to value-add to the lithium raw materials it produces that do not require a large volume of inputs.

This work led to Pilbara Minerals making the decision to proceed with investment in a downstream processing demonstration plant at Pilgangoora in August 2023, partnering with Australian environmental technology company Calix Ltd. on an innovative mid-stream value-added refining process (the Mid-Stream Project).

The Mid-Stream Project aims to demonstrate the benefits of producing a mid-stream lithium enriched product using Calix's patented electric kiln technology which has the potential to reduce hard-rock lithium processing carbon emission intensity if powered by renewable energy.

- Independent Life Cycle Assessment studies estimate that converting spodumene using electric calcination has the potential to reduce calcination carbon emissions intensity by >80% when using renewable energy, which would materially reduce carbon emissions in one of the most energy intensive steps of the lithium battery materials production process.
 - Delivering a more lithium-enriched mid-stream product has the potential for industry-wide benefits including reduced transport of waste, greater value creation and utilisation of the mineral resource and unlocking future assets with limited transport infrastructure.
 - Estimated construction costs of \$104.9M have been partially funded with a \$20M Australian Government grant, with Pilbara Minerals now funding \$67.4M of the remaining budgeted construction expenditure. Pilbara Minerals as manager of the JV will manage both the construction and operational phases of the Project.
 - Successful demonstration of the Project may lead to future commercialisation of the technology. Pilbara Minerals has the right to a licence to use the electric calcination technology for use in its own mid-stream or downstream commercial scale plants potentially developed either at its Pilgangoora Operation or in other locations including in joint venture with third parties.
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- As well as reducing calcination carbon emissions intensity which is one of the most energy intensive steps in the lithium battery materials supply chain, the Project also aims to enable greater value extraction from hard-rock lithium assets, by allowing spodumene producers to better utilise mineral resources and move down the battery materials value chain by producing a higher-value intermediate product on-site. This will potentially enable more value to be captured onshore at the resource.
- The strategy of producing a mid-stream product at or near the mine site also has the potential to unlock remote hard-rock assets globally that have challenges such as long distances to export infrastructure or customers.

Response to CMPTI Consultation Paper

Pilbara Minerals supports the submission made by the Chamber of Minerals and Energy WA. In addition, Pilbara Minerals offers the following comments in relation to the topic of Eligible Outputs:

- Pilbara Minerals notes that the Department of Industry, Science and Resources (DISR) will develop a list of specific outputs resulting from the refinement and processing of the 31 relevant minerals within the scope of the CMPTI. Further, Pilbara Minerals acknowledges that these will be subject to separate consultation with the sector to ensure their appropriateness for users and producers of Australian-processed critical minerals.
 - In generating a list of specific outputs that will represent the eligible end state for critical minerals based on purity requirements, Pilbara Minerals understand that DISR is seeking feedback on the following purity requirements for lithium:
 - *Converted to lithium carbonate or lithium hydroxide; or*
 - *Purified to a minimum purity of 99.9 percent lithium by mass.*
 - ***As an industry participant actively investing in Australian downstream processing opportunities, Pilbara Minerals strongly advocates for a broader definition of eligible lithium products, ie: lithium phosphate.***
 - Under the definitions described above, our innovative mid-stream product produced utilising Calix's electric calcination technology would not be eligible, as the product to be produced from is lithium phosphate.
 - The lithium content of pure lithium phosphate is 18.0% by mass, which compares favourably with that of lithium carbonate (18.8% lithium by mass) or lithium hydroxide monohydrate (16.5% lithium by mass) – all of which significantly increase the contained lithium content when compared to spodumene concentrate (2.8% lithium by mass for a SC6 concentrate).
 - Lithium phosphate has the added benefit of being completely utilised in the production of lithium iron phosphate (LFP), a leading and growing lithium-ion battery chemistry. This makes lithium phosphate a potentially zero-waste feedstock into the supply chains of world-leading LFP lithium-ion battery manufacture.
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- Lithium phosphate is considerably more stable and less hazardous than lithium hydroxide, making lithium phosphate safer to produce and easier to transport.
- Market engagement with participants in the battery and chemicals supply chain has encouraged the pursuit of lithium phosphate and confirmed that it has strong potential to be an improved lithium feedstock for the lithium chemicals industry.
- Life Cycle Assessment studies commissioned by Pilbara Minerals conclude that on-site renewable-powered electric calcination of spodumene could materially reduce carbon emissions intensity by more than 3 kg CO₂ eq. per kg LiOH·H₂O compared to conventional rotary kiln calcination using coal as the fuel source.
- Reductions in carbon emissions are also anticipated from producing a mid-stream product by avoiding the transport of waste associated with spodumene concentrate.
- As well as reducing calcination carbon emissions intensity, which is one of the most energy intensive steps in the lithium battery materials supply chain, the Project also aims to enable greater value extraction from hard-rock lithium assets, by allowing spodumene producers to better utilise mineral resources and move down the battery materials value chain by producing a higher-value intermediate product in Australia. This will potentially enable more value to be captured onshore at the resource.
- **It would be inconsistent with the Government's policy objectives of encouraging domestic producers to move further down the value chain and to support decarbonisation technologies if Pilbara Minerals' mid-stream product were to be considered ineligible for the CMPTI.**
- Eligibility for CMPTI is likely to be a material consideration for any future investment decision to progress the application of this mid-stream technology to commercial scale production.

Pilbara Minerals' potential to develop further value-adding projects

Pilbara Minerals is actively considering the potential to do further downstream processing in Australia. To explore supply options enabled by our current P1000 expansion, Pilbara Minerals has commenced a joint feasibility study with Ganfeng Lithium to evaluate the construction of a ~32ktpa LCE spodumene conversion plant. This study is progressing and will consider the construction of the conversion plant in Australia, as well as a range of international locations.

The Feasibility Study will consider location, fiscal incentives, flowsheet, sustainability and economics. The location evaluation will focus on emerging battery materials hubs with an aim to diversify respective businesses geographically and ensure emerging markets for lithium demand are efficiently served. The feasibility study is targeted for completion in the March Quarter 2025.

The Government's decision to introduce the CMPTI is a necessary policy measure to support downstream processing of critical minerals in Australia but needs to be supported by other measures including streamlined federal-state approvals, land and infrastructure availability in strategic industrial areas, low emission and cost-competitive energy, and the availability of a skilled workforce. These factors will all be relevant considerations for Pilbara Minerals' future investment decisions on downstream processing.

Once again, thank you for the opportunity to provide this feedback. We would welcome an opportunity to discuss these matters with you directly and will contact you to confirm a time. In the interim, please don't hesitate to get in touch.

Yours sincerely,



Dale Henderson
Managing Director and Chief Executive Officer

12 July 2024
