

12 February 2019

# Independent market study places Sconi in the 1<sup>st</sup> quartile of cost curve for global cobalt sulphate and nickel sulphate production

## HIGHLIGHTS:

- Sconi Project expected to take up the position of one of the most competitive cobalt-producing nickel projects in the world according to independent Market Study by CRU International<sup>1</sup>
- Market Study confirms clear need for new suppliers to enter cobalt sulphate and nickel sulphate markets due to prolific demand growth from battery industry, surging on the back of electric vehicle adoption
- Demand for cobalt sulphate expected to exceed 362,000 tonnes of contained cobalt by 2035, representing almost a 15-fold volume increase from the 2018 basis
- Market Study estimated a nickel sulphate supply gap of 1.3 million tonnes of contained nickel metal in 2035
- Premium paid by off-takers for direct delivery of a nickel sulphate end-product anticipated to increase from 2025

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<sup>1</sup> CRU International Limited - CRU offers business intelligence on the global metals, mining and fertilizer industries through market analysis, price assessments, consultancy and events. CRU employs over 280 experts and has more than 11 offices around the world, in Europe, the Americas, China, Asia and Australia. [www.crugroup.com](http://www.crugroup.com)

Australian Mines Limited (“**Australian Mines**” or “**the Company**”) (Australia ASX: AUZ; USA OTCQB: AMSLF; Frankfurt Stock Exchange: MJH) is pleased to announce that its Sconi Cobalt-Nickel-Scandium Project in North Queensland, once developed, has been forecast to be one of the most competitive cobalt-producing nickel operations in the world by an independent nickel and cobalt sulphate Market Study commissioned by the Company<sup>2</sup>.

The Market Study, undertaken by commodity research specialist CRU International, forecasts that the 2025 value-adjusted business costs<sup>3</sup> of the Sconi Project would place it in the 1<sup>st</sup> quartile compared to other existing and proposed analogous operations globally (see Figures 2 and 3), based on the outcomes of the financial modelling that was released in Australian Mines’ base case Bankable Feasibility Study (BFS)<sup>4</sup>.

As it currently stands<sup>5</sup>, Sconi is a late-stage, laterite-hosted cobalt-nickel-scandium project with payable metals expected to be produced annually, on average (based on an 18-year mine life), of 8,500 tonnes of cobalt sulphate and 53,300 tonnes of nickel sulphate.

Australian Mines completed a Mineral Resource extension drilling program in late 2018<sup>6</sup> and expects to be in a position to release an updated Mineral Resource Estimate for Sconi in the March quarter, which will feed into an optimised BFS on the project.

Due to modelled demand growth for both cobalt and nickel sulphate from the lithium-ion battery industry, on the back of global vehicle fleets transitioning to a greater variety and volume of electric vehicles, the Market Study found there was a clear need for new supply of these crucial battery chemicals.

Australia is emerging as a strategic new supplier of cobalt (and lithium) given its reputation as a world-class mining and investment jurisdiction as well as its proximity to high volume battery manufacturers in South Korea, Japan and China.

In terms of the prevailing opportunity for future nickel production, the Market Study described the planned nickel sulphate production additions out to 2023 and identified a 1.3 million tonne (contained nickel basis) unallocated supply gap beyond this to meet demand in 2035. This clearly necessitates a large number of new projects and expansions to come online.

The Study found similar conclusions for cobalt production, where a lack of visibility on new production allocations beyond 2023 should see supply remain tight until at least 2029, when the Study expects improving economics of recycling and increased battery scrap to have a significant impact on the supply curve.

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<sup>2</sup> The Nickel & Cobalt Sulphate Market Study was commissioned by Australian Mines Limited and completed by commodities research specialist CRU International Limited. The study forms part of current commercial-in-confidence negotiations with off-take partner SK Innovation and has been supplied to the ASX for their confidential reference in regard to this announcement

<sup>3</sup> Value-adjusted business costs take into account all non-capital costs associated with producing and delivering a product to its natural market, as well as adjusting for by-product credits and value-in-use premia/discounts.

<sup>4</sup> Australian Mines Limited, BFS supports strong commercial case for developing Sconi, released 20 November 2018

<sup>5</sup> Australian Mines Limited, December Quarterly Activities Report, released 30 January 2019

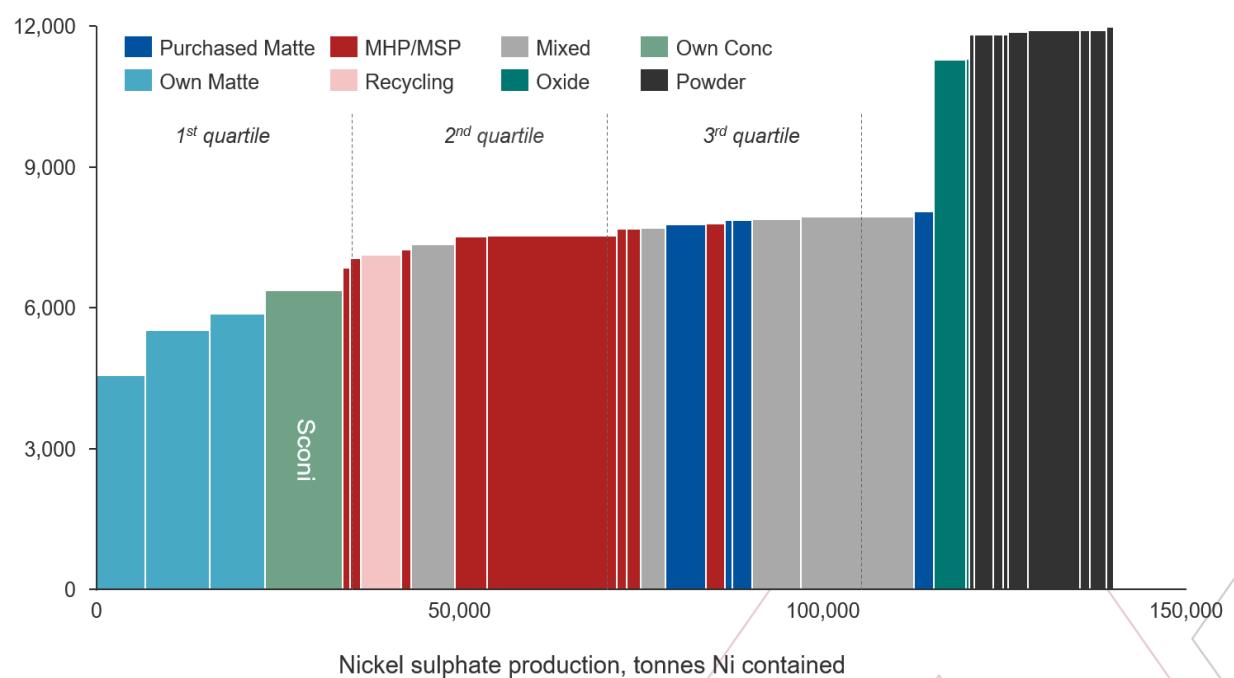
<sup>6</sup> Australian Mines Limited, Growth potential of Sconi Cobalt-Nickel Project continues, 21 January 2019

According to the Market Study, Australian Mines' decision to process Sconi ore into a battery grade nickel sulphate product via the construction of a 2 million tonne per annum processing plant at Greenvale will be further rewarded in the longer term as the premium anticipated to be paid by off-takers for direct delivery of a sulphate end-product will increase beyond 2025 as higher cost processing routes begin to be factored in to meet growing demand.

The Market Study included a comparison of sulphate producers, via all processing routes, using 2017 and 2025 cost curves, with the nickel sulphate-based cost for Sconi, were it in production in 2017, estimated to be US\$6,368 per tonne contained nickel, rising to US\$7,455 per tonne in 2025. This estimate represents the weighted average of the costs of processing the cobalt and nickel streams and delivering these products to market, and includes by-product credits in order to showcase the competitiveness of the project as whole.

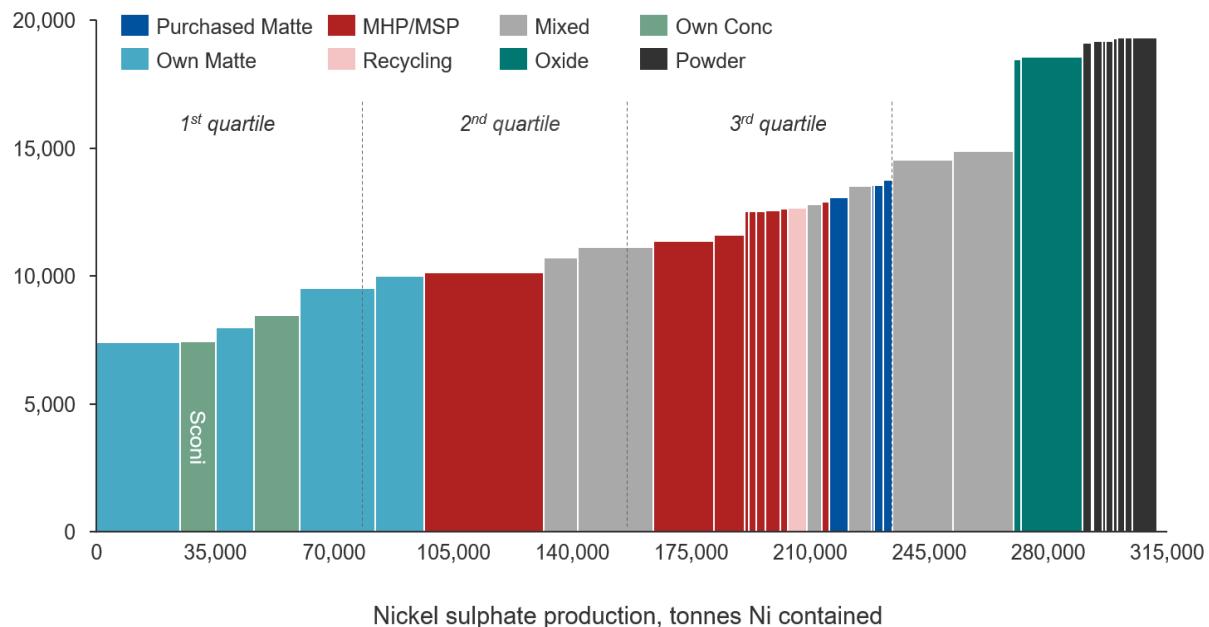
Based on that analysis, Sconi would have been a first quartile (low cost) producer were the project operational in 2017 (See Figure 1).

According to the Study, projects utilising end-to-end processes such as Australian Mines' Sconi Project have a cost advantage compared to nickel oxide and nickel powder operations, as they benefit from by-product credits and do not have an additional conversion cost from the final nickel products to sulphate.



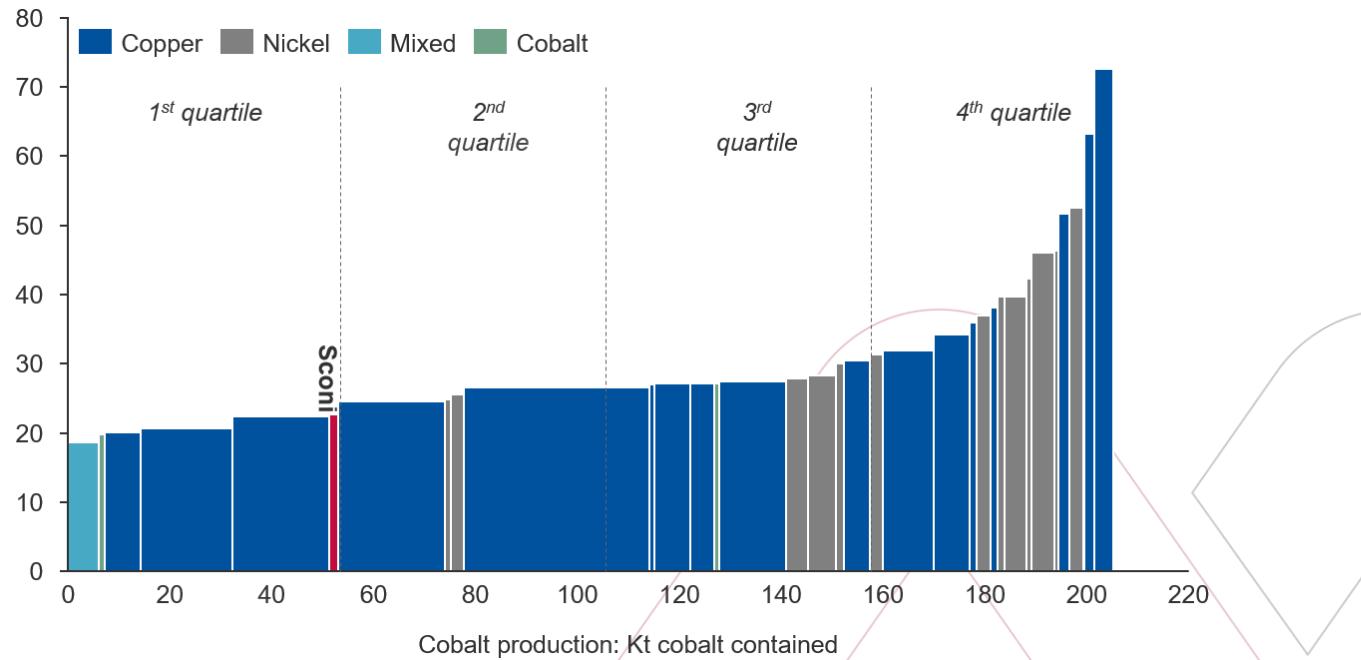
**Figure 1:** Nickel sulphate cost curve 2017, nominal USD per tonne of nickel contained

New projects and capacity expansions of existing plants were forecasted to come online during 2017 to 2025, including the Sconi Project where mining is scheduled to commence in 2021. Other project developers include GEM, Huayou, Sumitomo, Clean TeQ and Umicore. These additional capacities are mostly low-cost and are expected to smooth out the global cost curve, and Sconi remains first quartile (lowest cost bracket) in the 2025 comparison (See Figure 2).



**Figure 2:** Nickel sulphate cost curve 2025, nominal USD per tonne of nickel contained

Sconi's cost position in the forecast 2025 pro-rata cobalt sulphate cost curve<sup>7</sup> is demonstrated in Figure 3 below. This modelling reinforces the fact as older mines deepen the operating expenditure increases, and also shows the potential for costs to rise in developing nations more rapidly and unpredictably than in more stable mining jurisdiction of Australia.



**Figure 3:** Pro rata cost curve of cobalt producers 2025, Nominal USD per lb cobalt

<sup>7</sup> The pro rata cost estimation includes all costs of a project, main product or by-product, and distribute the total cost to each product by the weight of sales revenue of each product. A pro rata cost curve informs as to the cost competitiveness of each cobalt project.

Some new low-cost, high-volume projects were forecasted to come online in the period analysed by the Market Study. However, a number of higher cost producers will emerge as well to satisfy the significantly higher demand. Based on Australian Mines' BFS<sup>8</sup> cost information, Sconi is expected to take up the position of one of the most competitive cobalt-producing nickel projects in the world.

**Australian Mines' Managing Director, Benjamin Bell, commented:** *"We felt it was prudent to get an updated expert view of the medium and long-term market forecasts for nickel and cobalt, and confirm our BFS modelling that pointed to Sconi being a 1<sup>st</sup> quartile low-cost producer, hence giving Australian Mines a competitive advantage if commodity prices do fluctuate in the medium term."*

*"CRU International is a respected commodity research firm when it comes to detailed analysis of battery and technology metals in particular, and provided deep insight into the forecast supply, demand and pricing dynamics for cobalt and nickel sulphate products."*

*"The Market Study serves to demonstrate that there will be a very significant opportunity for new nickel sulphate and cobalt sulphate market entrants, including Australian Mines, and the price environment is expected to be very favourable for low-cost producers."*

*"Sconi is on track for first production in 2021 and CRU International's modelling of our operating expenditure versus likely competitors based on the base case BFS for Sconi is highly encouraging at a critical time for the Project as we work to progress project financing arrangements."*

*"The characteristics of the Sconi Resources, being able to produce a high-value cobalt sulphate product alongside the larger scale nickel sulphate production, places our Project firmly at the bottom of the cost curve, which of course translates to greater future profitability and insulates us from potential nickel sulphate price shocks."*

\*\*\*ENDS\*\*\*

#### For further information:

##### Shareholders contact:

Sophia Bolhassan  
Investor Relations Manager  
Ph: +61 488 022 944  
E: [sbolhassan@australianmines.com.au](mailto:sbolhassan@australianmines.com.au)

##### Media contact:

Michael Cairnduff  
Cannings Purple  
Ph: + 61 406 775 241  
E: [mcairnduff@canningspurple.com.au](mailto:mcairnduff@canningspurple.com.au)

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<sup>8</sup> Australian Mines Limited, BFS supports strong commercial case for developing Sconi, released 20 November 2018