



AMG Advanced Metallurgical Group N.V.

Project Update December 2017

# AMG Lithium & Tantalum

---



## Table of Contents

Project Update	4
Spodumene II	12

# CAUTIONARY NOTE



This document is strictly confidential and is being provided to you solely for your information by AMG Advanced Metallurgical Group N.V. (The “company”) and may not be reproduced in any form or further distributed to any other person or published, in whole or in part, for any purpose. Failure to comply with this restriction may constitute a violation of applicable securities laws.

This presentation does not constitute or form part of, and should not be construed as, an offer to sell or issue or the solicitation of an offer to buy or acquire securities of the Company or any of its subsidiaries nor should it or any part of it, nor the fact of its distribution, form the basis of, or be relied on in connection with, any contract or commitment whatsoever.

This presentation has been prepared by, and is the sole responsibility of, the Company. This document, any presentation made in conjunction herewith and any accompanying materials are for information only and are not a prospectus, offering circular or admission document. This presentation does not form a part of, and should not be construed as, an offer, invitation or solicitation to subscribe for or purchase, or dispose of any of the securities of the companies mentioned in this presentation. These materials do not constitute an offer of securities for sale in the United States or an invitation or an offer to the public or form of application to subscribe for securities. Neither this presentation nor anything contained herein shall form the basis of, or be relied on in connection with, any offer or commitment whatsoever. The information contained in this presentation has not been independently verified. No representation or warranty, express or implied, is made as to, and no reliance should be placed on, the fairness, accuracy or completeness of the information or the opinions contained herein. The Company and its advisors are under no obligation to update or keep current the information contained in this presentation. To the extent allowed by law, none of the Company or its affiliates, advisors or representatives accept any liability whatsoever (in negligence or otherwise) for any loss howsoever arising from any use of this presentation or its contents or otherwise arising in connection with the presentation.

Certain statements in this presentation constitute forward-looking statements, including statements regarding the Company's financial position, business strategy, plans and objectives of management for future operations. These statements, which contain the words “believe,” “expect,” “anticipate,” “intends,” “estimate,” “forecast,” “project,” “will,” “may,” “should” and similar expressions, reflect the beliefs and expectations of the management board of directors of the Company and are subject to risks and uncertainties that may cause actual results to differ materially. These risks and uncertainties include, among other factors, the achievement of the anticipated levels of profitability, growth, cost and synergy of the Company's recent acquisitions, the timely development and acceptance of new products, the impact of competitive pricing, the ability to obtain necessary regulatory approvals, and the impact of general business and global economic conditions. These and other factors could adversely affect the outcome and financial effects of the plans and events described herein.

Neither the Company, nor any of its respective agents, employees or advisors intend or have any duty or obligation to supplement, amend, update or revise any of the forward-looking statements contained in this presentation.

The information and opinions contained in this document are provided as at the date of this presentation and are subject to change without notice.

This document has not been approved by any competent regulatory or supervisory authority.



AMG Advanced Metallurgical Group N.V

# Project Update



	AMG Lithium & Tantalum		
Division	AMG Oxides	AMG Tantalum	AMG Lithium
Location	São João del Rei, Brazil	Mibra Mine, Brazil	Mibra Mine, Brazil
Products	<ul style="list-style-type: none"> <li>Tantalum Oxide</li> <li>Niobium Oxide</li> </ul>	Tantalum Concentrate	Lithium Concentrate*
Current Production Capacity	<ul style="list-style-type: none"> <li>140k lbs tantalum oxide / year</li> <li>600 MT high purity niobium oxide / year</li> </ul>	300,000 lbs / year	90,000 MT / year (Plant I)
Planned Capacity Expansion	n/a	600,000 lbs / year	180,000 MT / year (Plant I & II)
Status	Fully operational	Fully operational (expansion underway)	<b>Spodumene I:</b> approved, under construction <b>Spodumene II:</b> approved, detailed engineering <b>Lithium carbonate downstream:</b> under analysis

\* Future approval (H1 2018) of Phase III of the lithium project will result in production of lithium carbonate from lithium concentrate

# AMG LITHIUM – PROJECT STRENGTHS



Existing management and mining infrastructure – not a new mine project

Strong understanding of the mine geology

Mining infrastructure already in place and operational

Ore extraction and crushing costs absorbed by profitable tantalum operation

Spodumene plant will be fed via lithium deposits in existing tailings, as well as incremental lithium-bearing tailings generated via tantalum production

- 2.8 million metric tons of spodumene plant feed stock already extracted in the form of on-site tailings

AMG has operated a spodumene pilot plant since 2010

Strategic flexibility to further develop operational scope

**AMG HAS OPERATED THE MIBRA MINE FOR 38 YEARS**

# LITHIUM PROJECT PHASES



## PHASE I & PHASE II

### LITHIUM CONCENTRATE PRODUCTION

#### LITHIUM CONCENTRATE PLANT I

Construction of a lithium concentrate plant to produce 90,000 MT of spodumene per year

***APPROVED CAPEX: \$50M***

#### LITHIUM CONCENTRATE PLANT II

Construction of second lithium concentrate plant, resulting in capacity expansion from 90,000 MT to 180,000 MT per year

***APPROVED CAPEX: \$110M \****

## PHASE III

### LITHIUM CHEMICAL PRODUCTION

#### LITHIUM CHEMICAL PLANTS

Construction of lithium chemical plants for the downstream conversion of lithium concentrate into lithium carbonate

**\* Phase II capex includes investments related to the expansion of the existing tantalum operations in addition to the development and expansion of the existing mining infrastructure**

# LITHIUM INDUSTRY BASICS & BATTERY VALUE CHAIN




Note: LG Chem, BYD and Panasonic produce both cathode paste and batteries.

# MIBRA MINE – LOCATION



AMG's mining operation in Brazil is located in Minas Gerais State, near the city of Nazareno

Approximately 225 km Northwest of Rio de Janeiro and 130 km Southwest of Belo Horizonte

Approximately 300 km from Port of Santos, most important port in Brazil together with Rio de Janeiro

# MIBRA MINE – MINERAL RESOURCES



AMG's Mineral Resource Statement for the Mibra mine was updated in March 2017, and states 20.3 million tonnes of measured and indicated resources, an increase of approximately 38% compared to the previous Mineral Resource Statement completed in 2013.

***Further exploration and drilling is ongoing to identify additional resources***

Domain	Quantity ( <sup>'000s tonnes</sup> )	Grade					
		Li (ppm)	Li <sub>2</sub> O (%)	Ta (ppm)	Ta <sub>2</sub> O <sub>5</sub> (ppm)	Nb (ppm)	Sn (ppm)
<b>Measured Mineral Resources</b>							
A	3,224	4,685	1.01	289	353	52	267
C	-	-	-	-	-	-	-
F	197	3,670	0.79	377	461	45	565
<b>Total Measured</b>	<b>3,421</b>	<b>4,626</b>	<b>1.00</b>	<b>294</b>	<b>359</b>	<b>52</b>	<b>284</b>
<b>Indicated Mineral Resources</b>							
A	11,989	5,130	1.10	293	358	46	258
C	4,842	4,545	0.98	228	278	64	685
F	37	4,179	0.90	428	523	49	773
<b>Total Indicated</b>	<b>16,868</b>	<b>4,960</b>	<b>1.07</b>	<b>275</b>	<b>335</b>	<b>51</b>	<b>382</b>
<b>Total Measured &amp; Indicated</b>	<b>20,289</b>	<b>4,904</b>	<b>1.06</b>	<b>278</b>	<b>339</b>	<b>51</b>	<b>365</b>
<b>Inferred Mineral Resources</b>							
A	2,434	4,714	1.01	309	377	45	204
C	1,787	4,895	1.05	231	282	63	842
F	-	-	-	-	-	-	-
<b>Total Inferred</b>	<b>4,222</b>	<b>4,790</b>	<b>1.03</b>	<b>276</b>	<b>337</b>	<b>53</b>	<b>474</b>

Based upon AMG's targeted production level of 180k MT of lithium concentrate from 2020 onwards, AMG estimates that the current life of the mineral resource is approximately 20 years

For further updates on the project, AMG will be updating the AMG lithium website to include:

**PROJECT STATUS**

**PHOTOGRAPHS &  
PROGRESS UPDATES**



[www.amglithium.com](http://www.amglithium.com)



AMG Advanced Metallurgical Group N.V

# Spodumene II

Outotec  
LIFE  
METALS

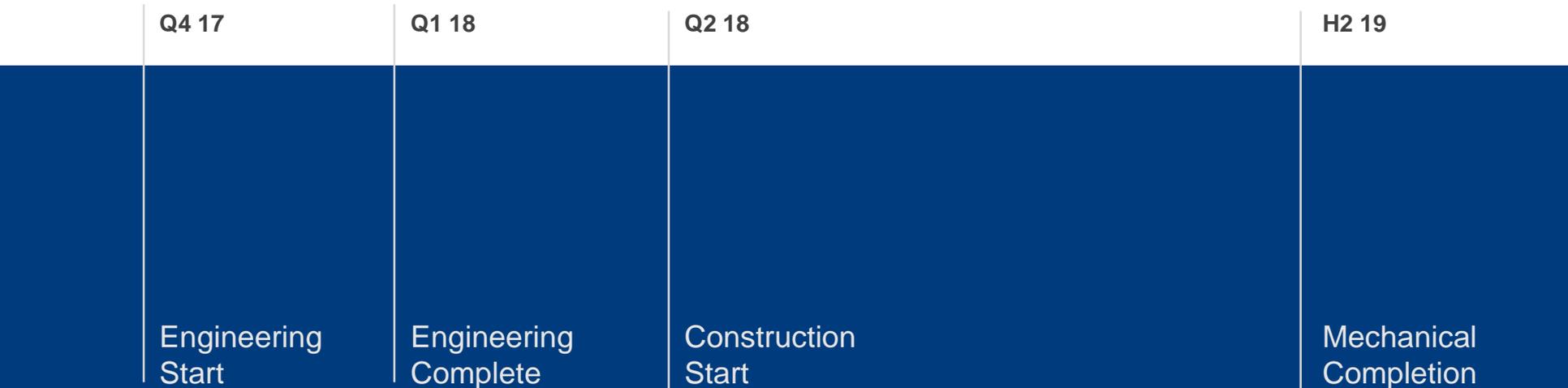
# SPODUMENE II VALUE PROPOSITION



<b>Goal</b>	Fully-leverage a world-class lithium/tantalum asset via expansion of Mibra's mining and processing operations, doubling both spodumene and tantalum concentrate volumes	<b>Financial Impact</b>	Highly accretive project: <ul style="list-style-type: none"><li>• Estimated operating cost of \$134/MT</li><li>• Current market price of spodumene approximately \$900/MT - \$1,000/MT</li></ul>
<b>Investment</b>	Capex of approximately \$110M, inclusive of: <ul style="list-style-type: none"><li>• Second spodumene concentrating plant</li><li>• Additional tantalum processing assets</li><li>• Mine development</li><li>• Additional crushing and grinding infrastructure</li></ul>	<b>Timeline</b>	Detailed engineering currently underway, with construction to begin in FY18  Mechanical completion targeted for H2 2019



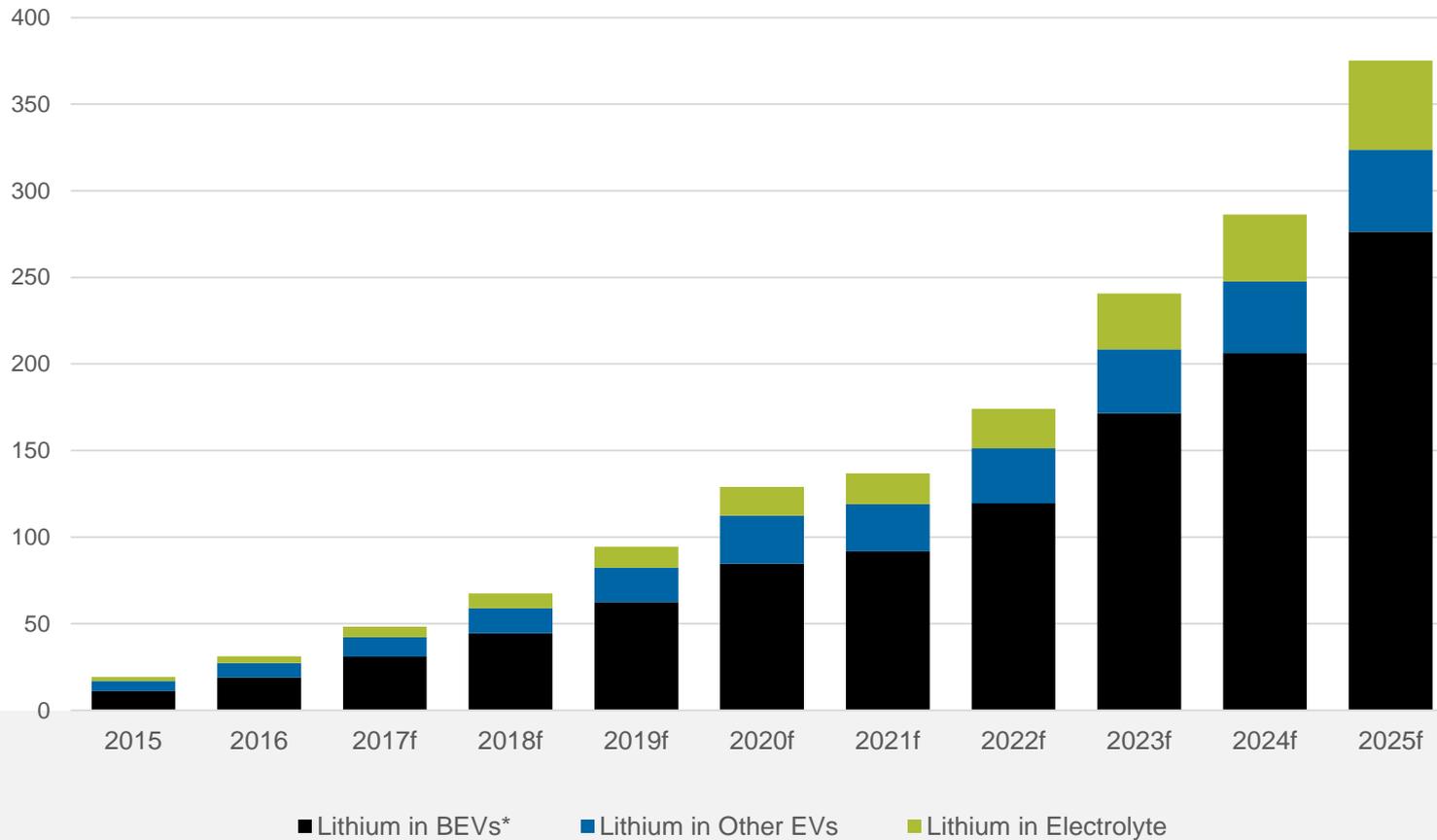
# SPODUMENE II TIMELINE



# LITHIUM IN ELECTRIC VEHICLES FORECAST



Lithium in Electric Vehicles  
(000t LCE)



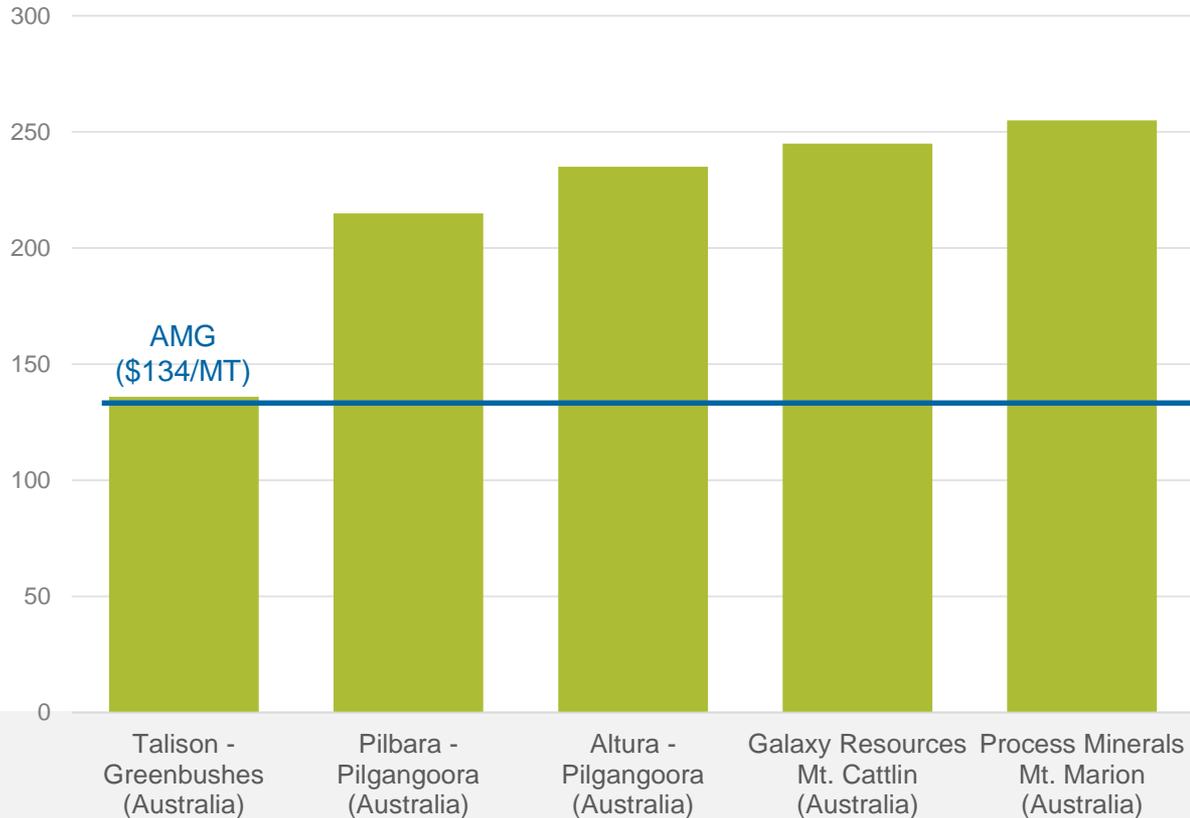
Source: Morgan Stanley - Tianqi Lithium (2017-07-27), pg. 10

\*BEVs = Battery Electric Vehicles; run exclusively on electricity via onboard batteries

# OPERATING COSTS FOR SPODUMENE PRODUCTION, 2017



Operating costs for spodumene production (\$/MT)



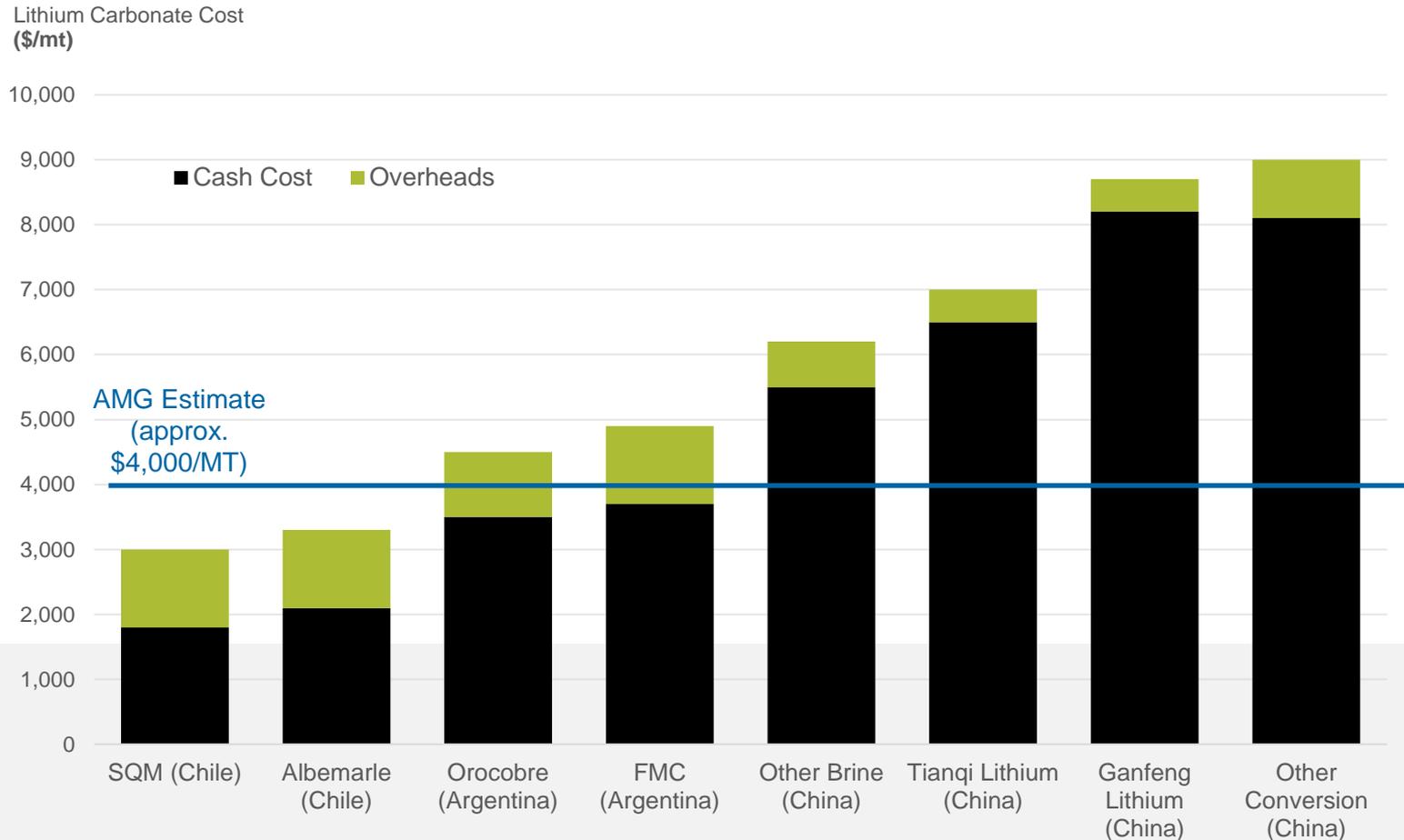
**AMG's objective is to be the low-cost producer of spodumene globally**

- AMG's spodumene operating costs benefit from the production of tantalum concentrate, which absorb the costs of mining and initial ore processing (crushing and grinding)

# LITHIUM CARBONATE COST CURVE, 2017



**Subject to the approval of Phase III of the lithium project, AMG's fully integrated cost of production of lithium carbonate would be approximately \$4,000/MT**



Source: Roskill 2017

Notes: Battery and technical grades; Includes direct carbonate production from raw materials (brine and minerals); SQM & Rockwood costs assume potash cost share methodology; Tianqi mineral conversion assumes US\$560/t spodumene concentrate price; Other China and Ganfeng assumes US\$750/t spodumene concentrate price