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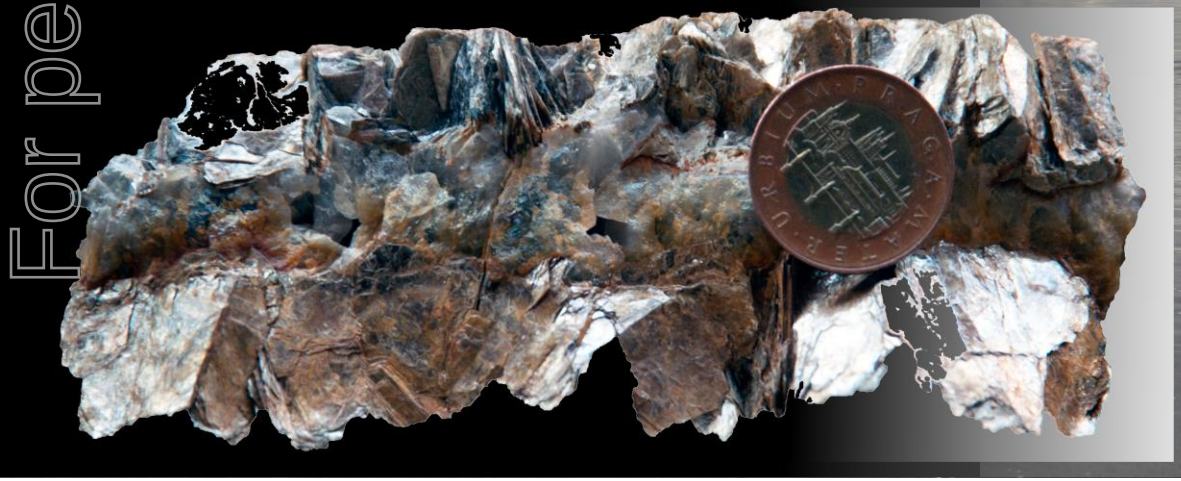
"I think you're onto something"

The history of disruptive technology in the lithium industry

Presented by

Adrian Griffin

Lithium Australia NL



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COMPETENT PERSON'S STATEMENT

The information in this report that relates to reporting of Exploration Results is based on and fairly represents information and supporting documentation prepared by Adrian Griffin, a member of the Australasian Institute of Mining and Metallurgy. Mr Griffin is a shareholder in, and managing director of, LIT and has sufficient experience relevant to the style of mineralisation and type of deposit under consideration. He is qualified as a Competent Person as defined in the 2012 edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. *Mr Griffin consents to the inclusion in this report of the matters based on information in the form and context in which it appears.*

The reporting of mineral species is generic in nature, and the term 'lepidolite' – as it is applied to mineral species, and not necessarily locality names – includes mineral species widely considered to be part of the solid solution series of polylithionite/trilithionite, of which the Competent Person considers lepidolite to be approximately a median member. It is also acknowledged that material processed from Lepidolite Hill has bulk compositions tending towards trilithionite, although the rubidium concentration is outside the range generally expected in such minerals.

Similarly, the term 'zinnwaldite' has been applied to minerals approximating the accepted composition of zinnwaldite but with variations tending towards lepidolite. This terminology is considered acceptable by the Competent Person, particularly with respect to the Cinovec deposit, the mineralization of which includes the type locality of zinnwaldite, being Zinnwald, close to the border of Germany and the Czech Republic.

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Company snapshot

LITHIUM AUSTRALIA (LIT) – A UNIQUE FOCUS ON LITHIUM

BOARD OF DIRECTORS

George Bauk (non-executive chairman)
Expert in specialty metals, particularly rare earths – project management, marketing and financing.

Adrian Griffin (managing director)
Exploration, production, mine management.

Bryan Dixon (non-executive director)
Corporate, finance, mine development.

ASX ticker: LIT
ACN 126 129 413

- 197 M Ordinary Shares
- 23 M Partly Paid Shares
- 29 M Unlisted Options
- 13 M Performance Rights
- $3.8M Cash at bank 31 Jan 2016

- **Market cap. $35 M (3 Feb 2016 – source Yahoo)**

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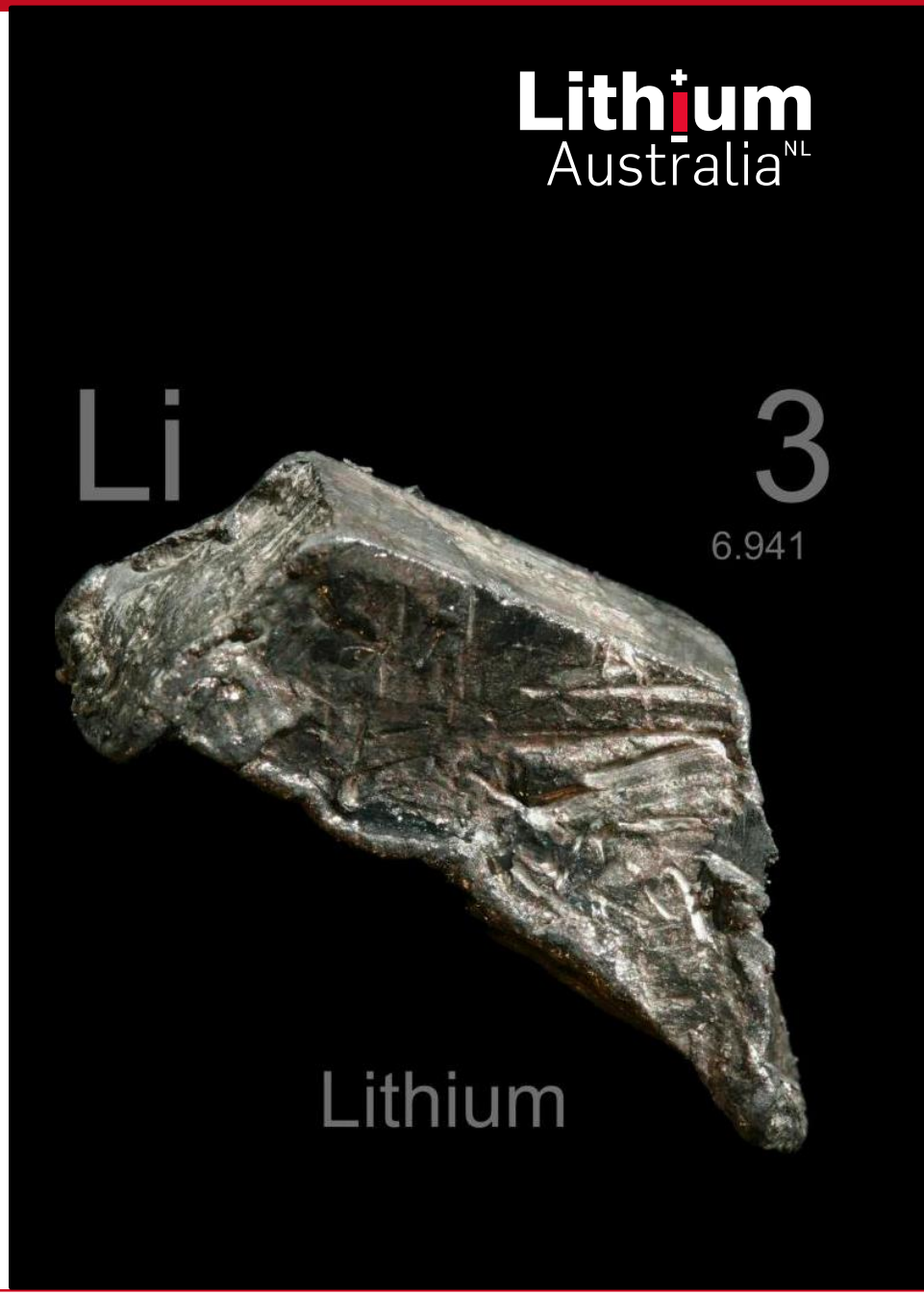
www.lithium-au.com



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Disruptive technology in the minerals industry

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WHAT IS DISRUPTIVE TECHNOLOGY?

Disruptive technology is that which creates the paradigm shift, the compelling argument for strategic change.

WHAT WERE SOME OF THE GREAT INNOVATIONS?

- Refining iron to produce steel - a revolution starting with the Eiffel Tower
- Froth flotation - a revolution starting with washing a pair of overalls in Broken Hill
- Carbon in pulp - well who knows how that started?
- High pressure acid leach – born and bred in WA (but don't forget Cuba)

NEW BATTERY TECHNOLOGY – THE BIGGEST INNOVATION SINCE THE INDUSTRIAL REVOLUTION AND IT STARTS WITH MINERALS

BUT HOW ARE WE POSITIONED TO FEED INSATIABLE DEMAND?

- The supply chain is constipated
- The most accessible lithium is expensive

THE SOLUTION

- Improved efficiency for existing lithium sources
- Technology that transforms untouchables into ore

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Fusion of thought – a retrospective

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"In terms of economic value, no Australian invention can have been of more importance to Australia than the flotation process for the separation of minerals. It had been known since the late eighteenth century that powdered ores could be made to float by generating bubbles which attached them to the ore particles and raised them to the surface. But the first person to succeed in the large scale commercial exploitation of the flotation process was Charles Vincent Potter, a Melbourne brewer and chemist. His process was patented in 1901 and shortly afterwards was put into operation at Broken Hill, where it produced over six million tons of zinc concentrate, assaying up to 42 per cent zinc. Potter's invention was the forerunner of several flotation processes to be developed and put into operation at Broken Hill." Taken from StumpJump Plough to Interscan, A. Walsh, Australian Academy of Science, 1977.

The ability to recover lithium from silicates, without roasting will again put Australia at the forefront of mineral processing technology, the importance of which may eclipse froth flotation.

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Fusion of thought – a retrospective

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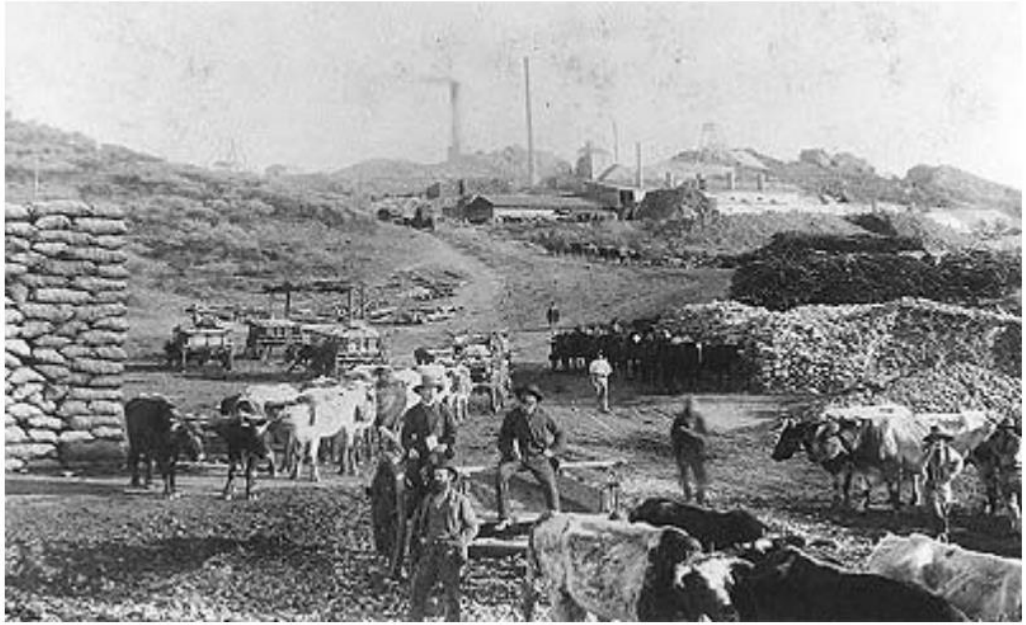

Broken Hill Proprietary Company Ltd about 1888

"Broken Hill led the world in the profitable treatment of zinc-lead sulfides. At the turn of the 20th century, three out of every four tons that came out of the mine could not be treated. It was stacked in huge dumps along the line of lode; dumps that would mark the grave of Broken Hill unless silver, zinc and lead could be separated cheaply,

In 1902 D.G. Delprat, the general manager of Broken Hill Proprietary Company Limited, invented a process that promised to extract the treasure in the dump. He added oil, salt cake and other chemicals to a tank of pulped ore, and pumped air in through a blower at the bottom. He was delighted to observe that the particles of minerals clung to the rising air bubbles and overflowed the tank which the barren particles sank to the bottom. His company erected the first efficient flotation plant in the world

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Current cost profile – we need to re-evaluate the options

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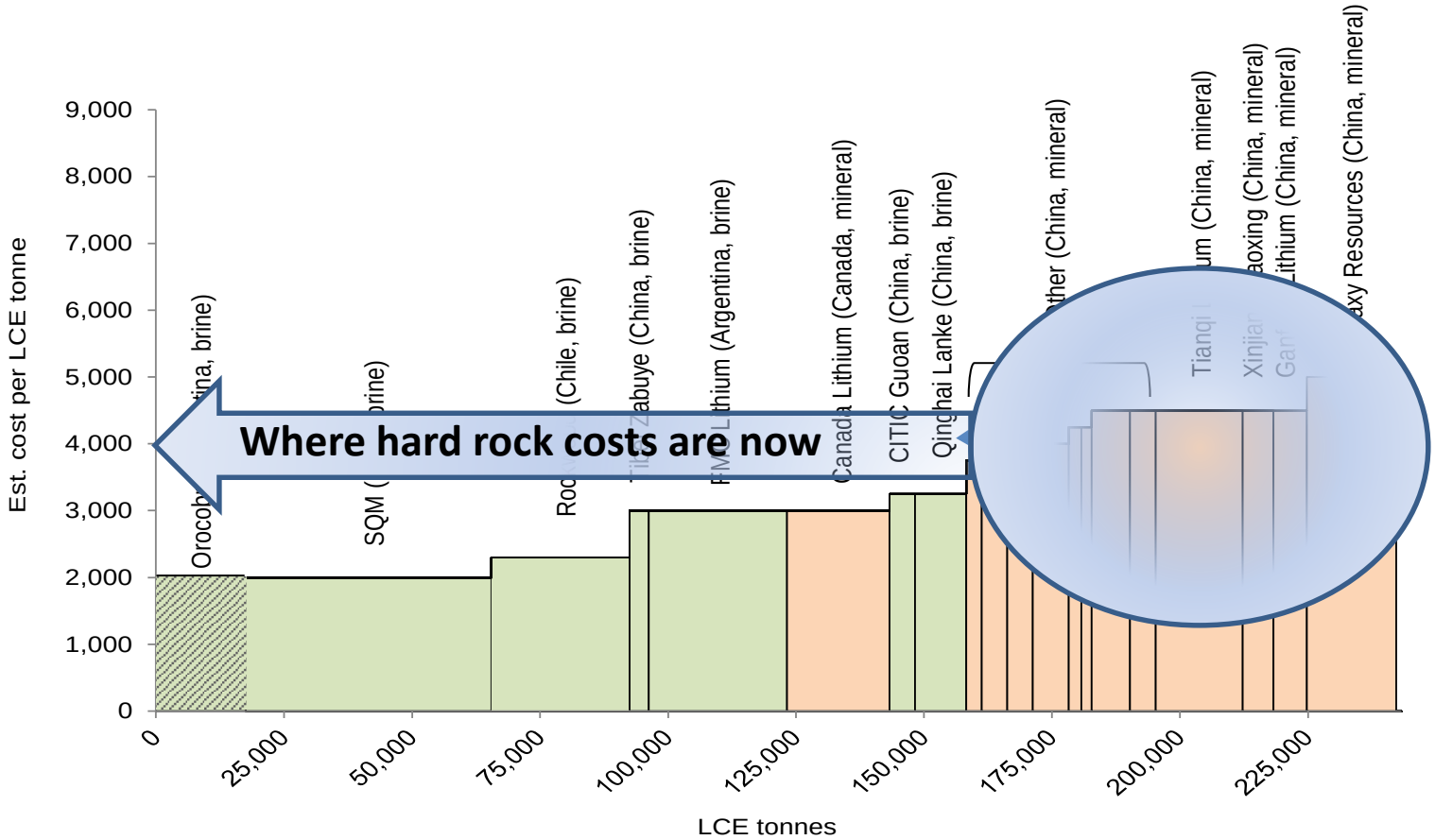

Estimated global lithium cost curve [sources: Roskill (with modifications) and Orecobre 2014 presentation].

BUT WHERE IS THE SMART MONEY INVESTING?

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What's driving the cost of hard rock lithium?

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STUBBORNESS AND TRADITION

- All commercial processes roast then leach (burning energy is burning dollars)
- To cover the energy cost ore/concentrates must be high-grade
- The starting point is spodumene at 6-7% Li_2O

THE ULTIMATE IMPACT

- High operating cost
- Reduced reserves/resources
- Relegates other ore types to waste dumps and tailings

VERY POOR UTLILIZATION OF RESOURCES

LACK OF INNOVATION

REGARDLESS THE SMART MONEY IS INVESTING IN HARD ROCK

- Anticipation of rising prices
- Awaiting the breakthrough to eliminate energy costs

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How do we fix the problem?

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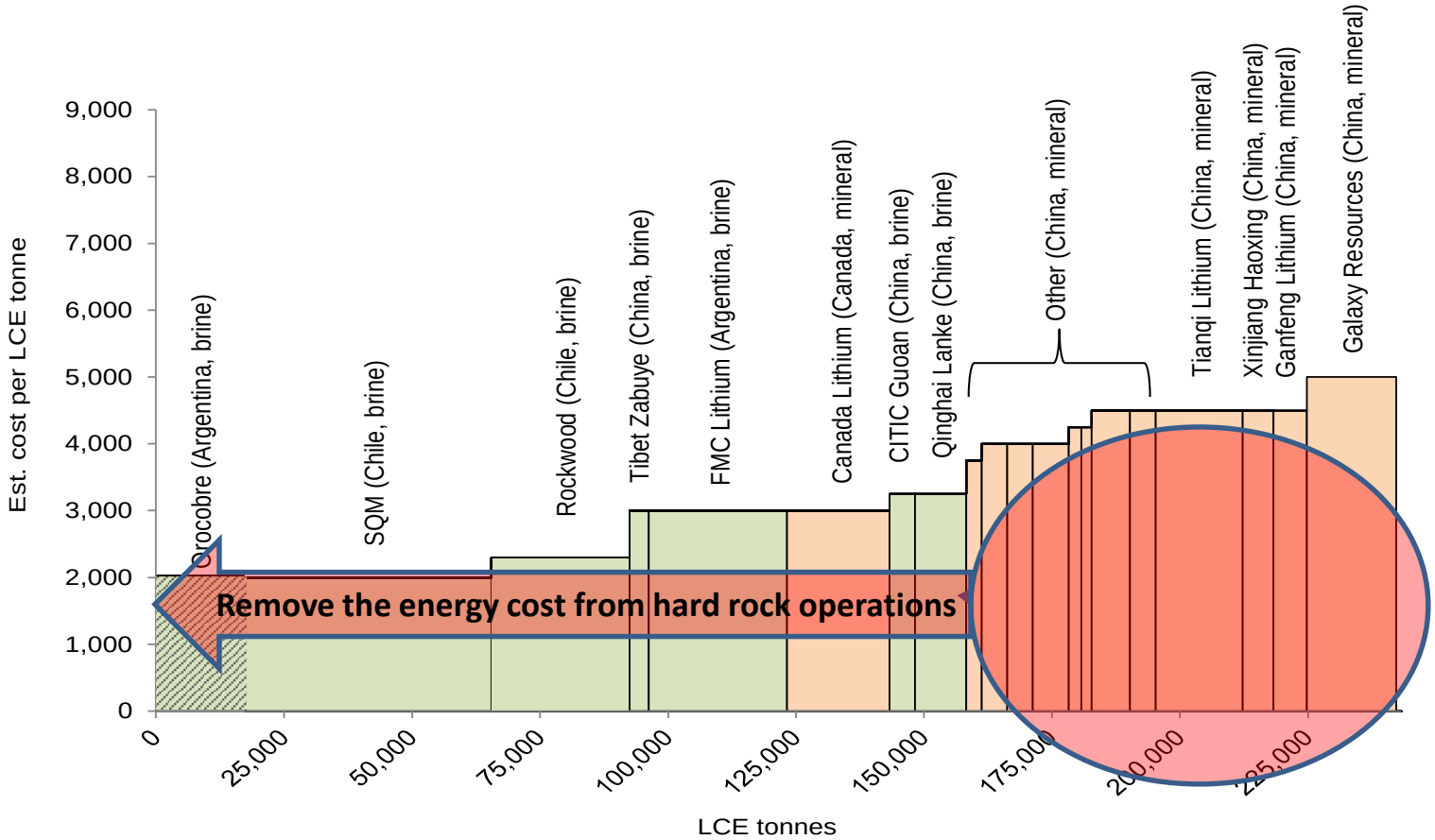

Estimated global lithium cost curve [sources: Roskill (with modifications) and Orecobre 2014 presentation].

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What are the consequences?

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EXISTING AND NEW SPODUMENE PRODUCTION COST COMPETITIVE

- Cutt-off grades can be decreased
- Resources expand with no additional capital cost
- Hard-rock production can compete with the brine deposits

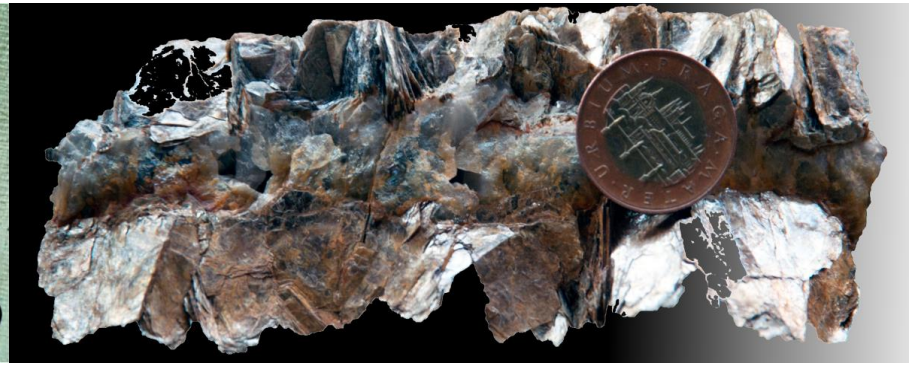
LOWER VALUE MINERALS BECOME ORE

- The “forgotten resource” the micas become ore
- Potential for tourmalines, and clays

BROWNFIELDS EXPANSION CAPACITY

EXPEDITIOUS MATCH OF GROWING DEMAND WITH EXISTING SUPPLY

OTHER LOWER GRADE MINERALS POTENTIALLY BECOME ORE



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How is it accomplished?

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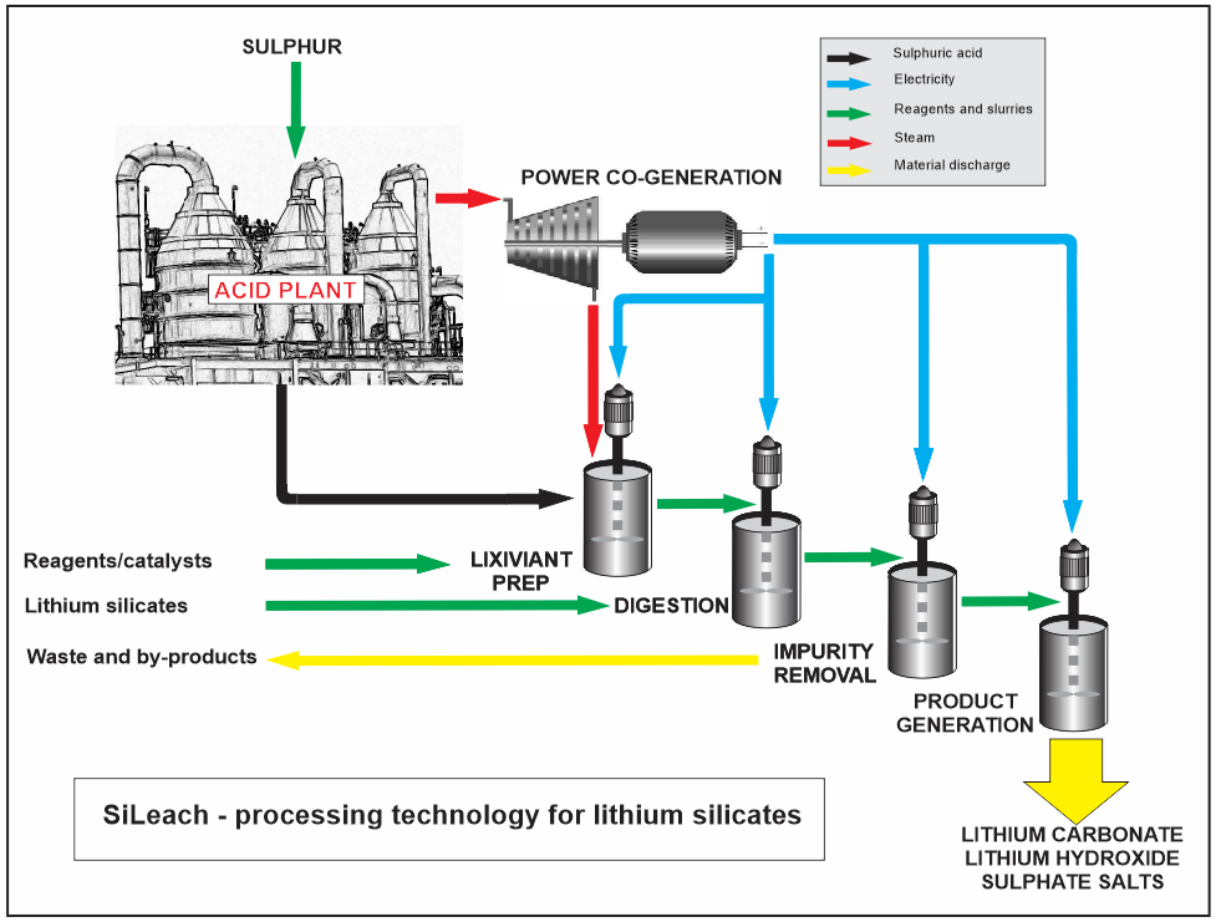
IT'S NOT ROCKET SCIENCE – IT'S CHEMISTRY

Determine the reaction mechanism and design the lexiviant
Add the catalysts
Mix in the mineral concentrate



SiLeach provides a universal process for the recovery of lithium from lithium silicates. It can process the most refractory feed materials, including spodumene, the tourmalines and jadarite without the requirement to roast before leaching. It can also process micas and clays.

The process derives all of its energy requirements from the production of the lixiviant, that has a sulphuric acid base on chemical steroids.

The lixiviant can be tailored to the mineral feed to achieve optimum results.

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The case for lithium micas

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Zinnwaldite – lithium mica
$K(Li,Al,Fe)_3(Al,Si)_4O_{10}(F,OH)_2$

Lepidolite – lithium mica
$K(Li,Al,Rb)_3(Al,Si)_4O_{10}(F,OH)_2$

19 **K** Potassium 39.0983 2 8 8 1	3 **Li** Lithium 6.941 2 1	13 **Al** Aluminium 26.8915388 2 8 1	37 **Rb** Rubidium 85.4578 2 8 18 8 1

99.6% lithium carbonate purity
to
99.9% lithium hydroxide purity

Marginal additional cost to achieve a 40% revenue uplift.

Positive results on:

- Cinovec zinnwaldite
- 2 additional European Li mica deposits
- One Chinese Li mica resource, and
- Lepidolite Hill trilithionite

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Watch this space

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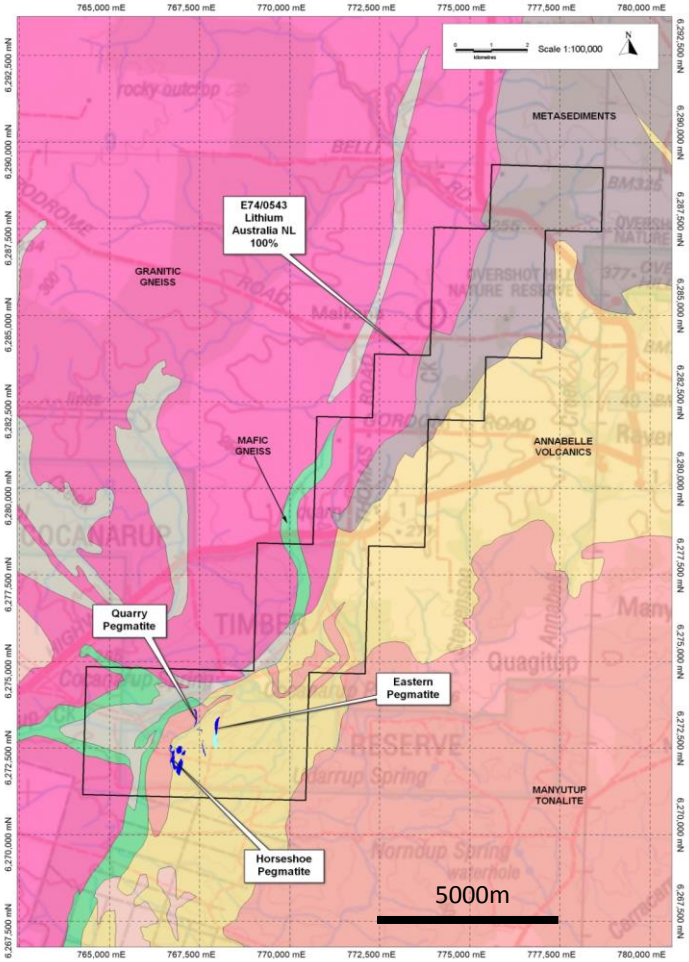
RAVENSTHORPE

Assays average 2.96% Li_2O over the mineralized zone which has an aggregate strike length of over 750m. Further concealed pegmatites are anticipated.



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The growing lithium inventory

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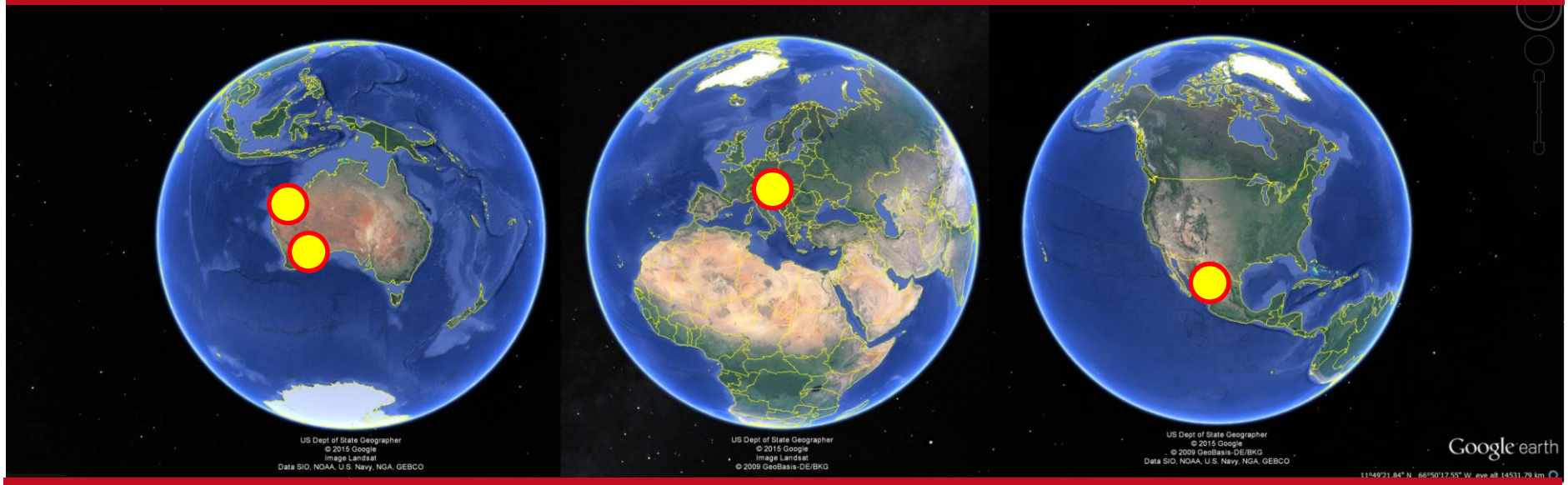
The Yilgarn Project (WA)

The Pilbara Region (WA)

Europe

Mexico



Western Australia | Europe | North America

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Changing the lithium chemical cost curve

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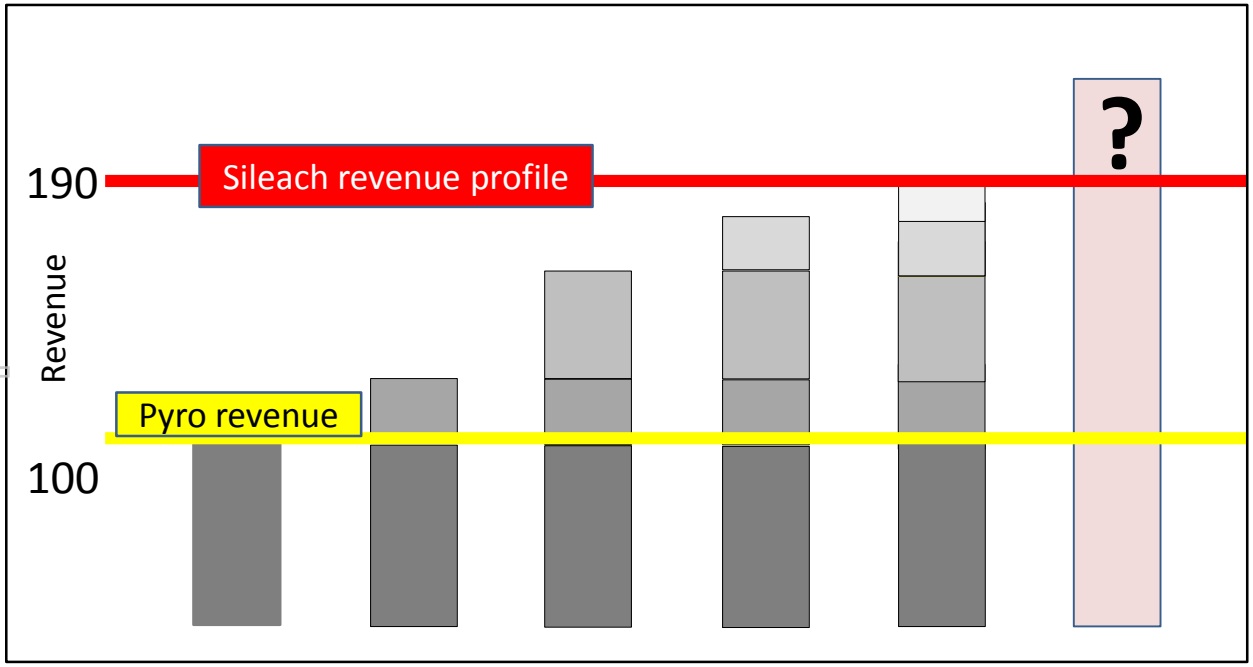
ACHIEVING THE PRODUCTION GOALS

- High feed grades
- Fast reaction time – low capital cost
- Product options include carbonate and hydroxide
- High by-product credits

A European hypothetical



- Recovery from mica
- Recovery from refractories
- Li hydroxide premium
- Potash credit
- Other credits
- The future and beyond

… and all with zero energy footprint

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Company advantages

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VALUE-ADDING FACTORS

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Proprietary lithium extraction processes
Advanced exploration techniques
Access to lithium sources

First-mover advantage

LIT is the leader in the production of battery-grade lithium carbonate and hydroxide and developer of advanced extraction processes for other silicates. Assets extend over three continents with diversification from lithium micas to a range of more conventional lithium silicates.

Alliances with Pilbara Minerals, Focus Minerals, Tungsten Mining and Venus Metals Corporation

Opportunities previously overlooked

- Tailings
- Current mine-waste discharge streams
- Primary lithium mica deposits

Escalating demand

- Revolutionary innovations in transport
- New renewable-energy storage solutions
- Emergence of smart-grid systems

Cinovec – non-binding HoA with EMH

- Giant lithium mica deposit in the Czech Republic
- Scoping study complete
- High-purity lithium carbonate produced
- Advancing to feasibility

ALiX JV

- Lithium clay evaluation
- Exploration potential
- Springboard into lithium-hungry North America

Improved economics for conventional sources
Licensing and royalty opportunities

FURTHER INFORMATION

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