

## ASX ANNOUNCEMENT



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## LieNA<sup>®</sup> lithium extraction technology advancing to commercialisation

### HIGHLIGHTS

- Expressions of interest sought to advance LieNA<sup>®</sup> commercialisation.
- LieNA<sup>®</sup> improves the sustainability of lithium production.
- LieNA<sup>®</sup> can recover lithium from spodumene that would otherwise report to waste streams.
- Lithium Australia's refining technology provides direct feed for the production of lithium-ferro-phosphate ('LFP') batteries – the fastest growing sector of the battery industry.
- Pilot-plant construction supported by the Australian federal government.

### Background

Since 2014, Lithium Australia NL (ASX: LIT, 'the Company') has been actively researching lithium extraction from hard-rock sources, expending over \$12 million during that period. The research led to the development of the LieNA<sup>®</sup> process. Designed specifically to cope with low-specification spodumene (spodumene being the principal lithium ore mineral) that is otherwise difficult to process, LieNA<sup>®</sup> therefore offers access to vast quantities of lithium currently discarded by producers of spodumene concentrate because it cannot be processed commercially via conventional techniques.

The Company's drive for battery-material sustainability, security of supply chains and development of a processing option that accords with high ESG standards has earned it government recognition, evidenced by federal co-funding – through a Co-operative Research Centres Projects (CRC-P) grant – for the construction and operation of a pilot plant for the LieNA<sup>®</sup> process.

Many spodumene concentrate producers operating in Australia are taking a keen interest in the process.

### LieNA<sup>®</sup>

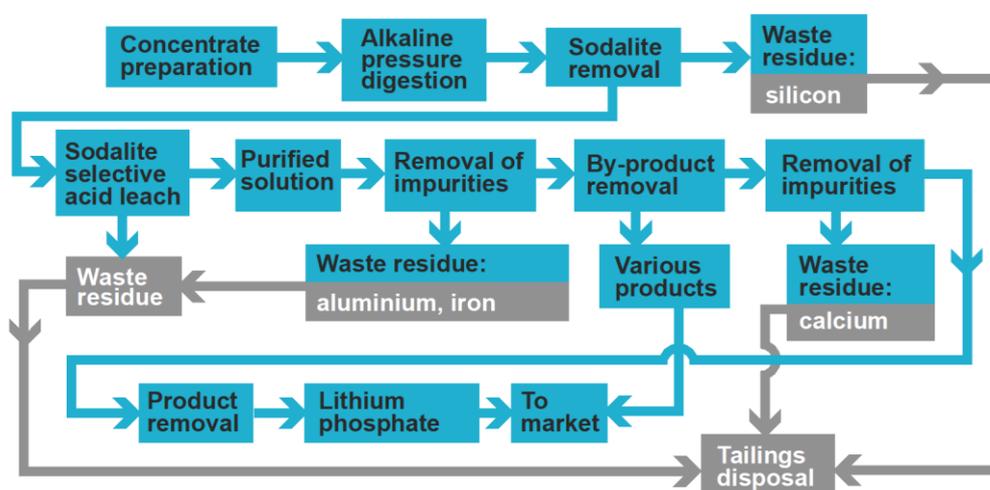
LieNA<sup>®</sup>, which was designed and developed by Lithium Australia with the assistance of the Australian Nuclear Science and Technology Organisation (ANSTO), is a caustic conversion process that recovers lithium from fine and/or low-quality spodumene. Bench-scale tests have demonstrated its ability to process material that cannot be handled by conventional 'converters' that rely on roasting and acid leach. Unlike LieNA<sup>®</sup>, such conventional processes are neither amenable to fine feed material nor tolerant of impurities.

### From 'waste' spodumene to battery chemicals

At present, recovery of spodumene to commercial concentrates in a form suitable for conventional converters may result in 30-50% (or more) of mined lithium being discharged into tailings dams. Production of lithium chemicals for the battery industry from such waste material – the focus of LieNA<sup>®</sup> – could significantly reduce mining costs, as well as the environmental footprint of such operations.

### Overview of the process

LieNA<sup>®</sup> has strong parallels with the processing of bauxite to produce alumina. It involves caustic conversion at an elevated temperature, the process steps of which are summarised below.



### The path to commercialisation

As with all such technology, commercialisation relies on advancing from laboratory studies to the operation of a production facility, and that involves incrementally increasing operating scale to reduce process risk as capacity expands. The transition from bench-scale to first-generation pilot plant is vital to that de-risking process.

The Company is in discussions with a number of spodumene concentrate producers and lithium chemical manufacturers who understand the gap that LieNA<sup>®</sup> could fill, as well as the potential if it was commercialised. Lithium Australia will seek formal expressions of interest to participate in its LieNA<sup>®</sup> pilot-plant programme in return for equity in the process. For further information, email [adrian.griffin@lithium-au.com](mailto:adrian.griffin@lithium-au.com).

### Other advantages of LieNA<sup>®</sup>

LieNA<sup>®</sup> can produce a range of lithium chemicals as its final product. This is important in terms of the variations in lithium-ion battery ('LIB') chemistries, since a particular lithium chemical precursor may be preferred in the manufacture of a specific type of LIB. LFP LIBs, for example, now power many electric vehicles in China (the Tesla Model 3 being a notable example), a choice driven by the inherent safety of that battery type. The risk to safety of nickel-based LIBs (e.g. NCM) is thermal runaway, with expensive and space-

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consuming fire-mitigation measures required to ensure their compliance with stringent European, North American and now (tightened) Chinese standards. LFP batteries are safe for use without such requirements.

LieNA<sup>®</sup> can produce lithium phosphate direct from spodumene, for use as feed in the production of LFP cathode powders; in other words, it can reduce the number of process steps converters require to produce LFP, the safest type of LIB.

## Comment from Lithium Australia MD Adrian Griffin

"Adoption of LieNA<sup>®</sup> for mainstream lithium production potentially offers the owners of that technology greater control of costs in the lithium chemical supply chain. Through the ability to recover additional lithium from waste streams, the mining cost is spread over significantly higher production tonnages.

Moreover, the ability of LieNA<sup>®</sup> to produce lithium phosphate from spodumene as direct feed for the fastest growing sector of the LIB LFP market, without the need for further chemical conversion, makes it highly desirable in light of ESG considerations including a smaller mining footprint, greater sustainability, superior safety and an absence of conflict metals. There are good reasons why the Tesla Model 3 is going for LFP batteries in China ... and LieNA<sup>®</sup> is aimed at servicing the fast growing LFP battery market."

Authorised for release by the Board.

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## About Lithium Australia NL

Lithium Australia aims to ensure an ethical and sustainable supply of energy metals to the battery industry (enhancing energy security in the process) by creating a circular battery economy. The recycling of old lithium-ion batteries to new is intrinsic to this plan. While rationalising its portfolio of lithium projects/alliances, the Company continues with R&D on its proprietary extraction processes for the conversion of *all* lithium silicates (including mine waste), and of unused fines from spodumene processing, to lithium chemicals. From those chemicals, Lithium Australia plans to produce advanced components for the battery industry globally and for stationary energy-storage systems within Australia. By uniting resources and innovation, the Company seeks to vertically integrate lithium recycling, extraction and processing.

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