

## ASX ANNOUNCEMENT



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## Lithium Australia establishes potential for new supply stream in recycled battery products

### HIGHLIGHTS

- **Lithium Australia develops processes to recover metals from spent lithium-ion batteries ('LIBs').**
- **Proprietary refining generates lithium phosphate ('LP') of >99.9% purity.**
- **Lithium recoveries of around 85% achieved.**
- **Nickel and cobalt recoveries estimated at >90%.**
- **Discussions with consumers of lithium, nickel and cobalt advancing.**

In test work undertaken with the Australian Nuclear Science and Technology Organisation ('ANSTO'), including the proprietary refining technology developed by Lithium Australia NL (ASX: LIT, 'the Company') has successfully recovered critical battery metals from spent LIBs<sup>1</sup>.

Based on the Company's internal process modelling, the technologies generate:

- LP of 99.9% purity, with expected lithium recoveries of >85%, and
- overall process recoveries for nickel and cobalt of >90%.

Lithium Australia aims to produce high-purity LP as a precursor for the production of cathode materials. This will be accomplished using the Company's proprietary LP refining process.

In addition, commercial investigation by Lithium Australia has confirmed the potential to develop a nickel/cobalt concentrate as an alternate feed source for conventional refining.

Lithium Australia believes that establishing a supply stream based on recycled battery products will:

- facilitate LIB sustainability;
- avoid batteries being consigned to landfill;
- pave the way for the re-birthing of battery materials; and
- provide an ethical source of battery materials, cobalt in particular.

### Process optimisation heralds better battery re-birthing

Optimisation of the Company's proprietary LP refining technology for the generation of LIB cathode precursors has exceeded quality requirements for their incorporation into cathode active materials. This process step is significant not only in terms of the purity of the cathode precursors produced but also in demonstrating the potential for commercial recovery of lithium from spent battery material.

<sup>1</sup> [LIT announcement 13 August 2019](#)



Lithium Australia's ability to recover and refine the lithium in spent LIBs puts it in a unique position, since few current commercial recycling processes do this; rather, the lithium is generally discharged to flue gas or slag during smelting processes. Lithium Australia's process is based on lower heat inputs and retention of the lithium which is recovered hydrometallurgically.

The composition of the Company's refined LP is shown in Table 1 below.

Table 1. Analysis of LP produced from spent LIBs.

	Li <sub>3</sub> PO <sub>4</sub> %	K % w/w	Na % w/w	Ca % w/w	S % w/w
Refined LP (optimisation impacts)	>99.9%	0.002	0.02	0.004	0.09

### A complete recycling package

Based on Lithium Australia's internal process modelling, overall process recoveries for nickel and cobalt (>90%) result in a concentrate suitable for use as feed for conventional refining. It is estimated that lithium recovery to a refined LP product will exceed 85%.

The spent batteries the Company employed during process development were collected, shredded and separated by Envirostream Australia Pty Ltd, of which Lithium Australia owns 18.9%. Subsequent physical processing of those spent battery materials recovered a mixed metal dust ('MMD'). The MMD was then processed by ANSTO and the lithium recovered as LP. The LP was further refined using a proprietary hydrometallurgical extraction and purifying process.

### LIB re-birthing

The refined LP generated at ANSTO has been shipped to Lithium Australia's wholly owned VSPC cathode material pilot plant in Brisbane, Australia. There, it will be converted to lithium-ferro-phosphate ('LFP') for testing in coin-cell LIBs manufactured at the plant.

Significantly, Lithium Australia's combined flow sheet simplifies the steps required to transition from lithium materials to batteries without the need for a costly and energy-intensive roasting process.

To summarise, the Company intends to rebirth the lithium from spent LIBs by incorporating it into new LFP batteries. In addition, the Company plans to sell the nickel and cobalt recovered from those same spent LIBs to off-takers for further refining.

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## A circular battery economy

Lithium Australia has demonstrated its ability to create a closed battery production cycle by regenerating cathode active battery materials from waste battery materials.

Developing a local industry to recover battery metals will pave the way for more sustainable use and disposal of LIBs. Further, such recycling will promote the delivery of ethically sourced battery materials; in particular, cobalt.

## Comment from Lithium Australia managing director Adrian Griffin

“Successfully recovering a precursor of such high purity for the production of new LIBs from material otherwise destined for landfill is a huge step forward for the battery industry. Lithium Australia, together with its partner Envirostream Australia, is investigating the commercial potential of this breakthrough. Right now we're in discussion with consumers of lithium, nickel and cobalt – both within Australia and overseas – and we see huge potential for a local battery recycling industry.”

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## About Lithium Australia NL

Lithium Australia aspires to 'close the loop' on the energy-metal cycle in an ethical and sustainable manner. To that end, it has amassed a portfolio of projects and alliances and developed innovative extraction processes to convert *all* lithium silicates (including mine waste) to lithium chemicals. From these chemicals, the Company plans to produce advanced components for the lithium-ion battery industry. The final step for Lithium Australia involves the recycling of spent batteries and e-waste. By uniting resources and the best available technology, the Company aims to establish a vertically integrated lithium processing business.

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