Transforming the battery industry

ASX: LIT

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Contents

The Company –
Overview

Lithium Australia NL ('Lithium Australia' or 'the Company') aims to ensure an ethical and sustainable supply of energy metals to the battery industry by creating a circular battery economy that enhances energy and resource security.

Reprocessing spent lithium-ion batteries ('LIBs') to create new ones is intrinsic to this plan, and the Company operates Australia's only fully integrated, mixed-battery (including LIBs) recycling business.

Having rationalised its portfolio of lithium projects/alliances, Lithium Australia continues its research into, and the development of, proprietary extraction processes for the conversion of all lithium silicates (including mine waste), and of unused fines from spodumene processing, to lithium chemicals, which will be used to produce advanced battery cathode materials for the battery industry globally.

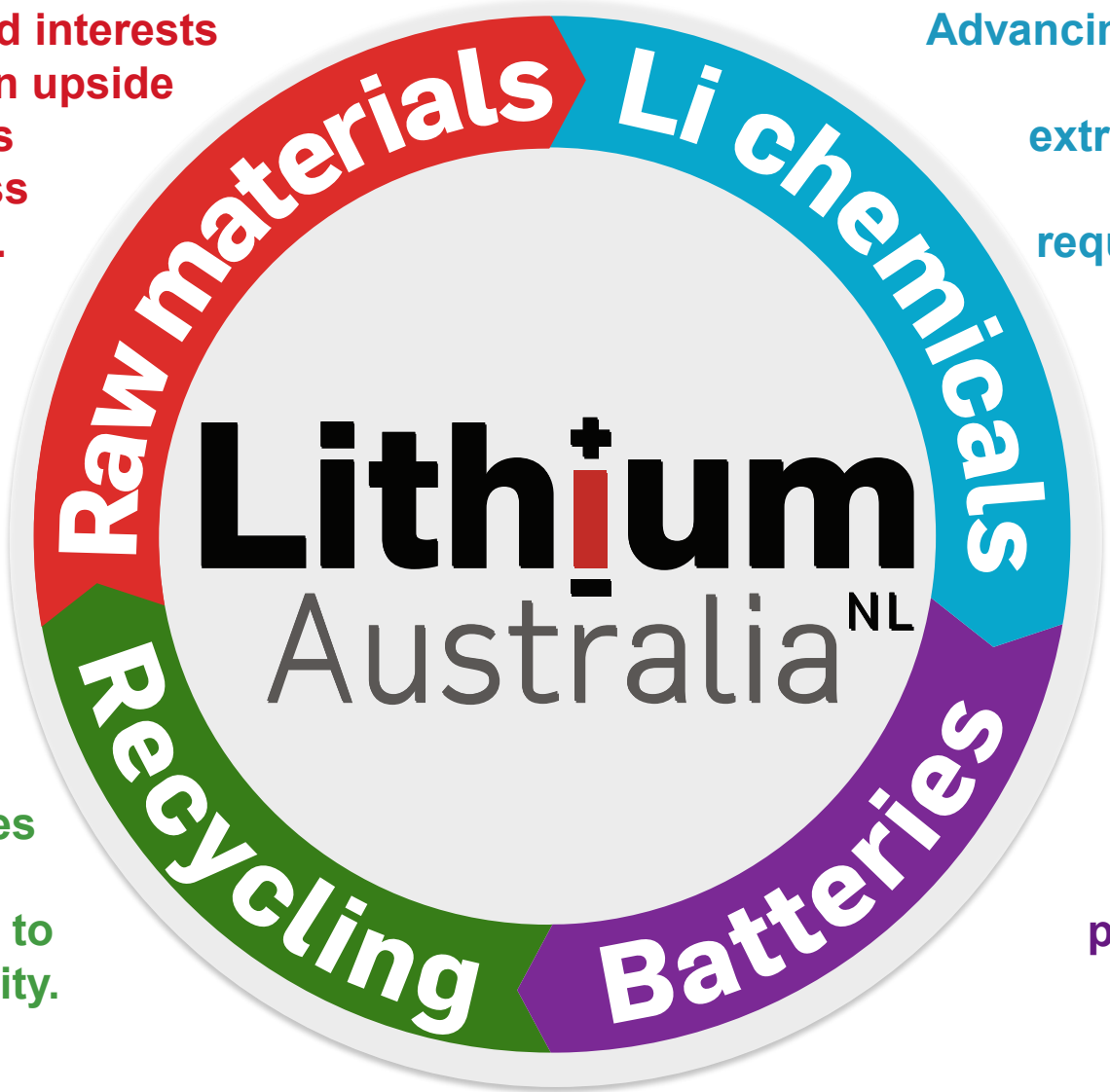
The Company's progress has been recognised by the Australian federal government through the awarding of substantial research grants designed to progress the nation's advanced battery capabilities.

By uniting resources and innovation, the Company seeks to vertically integrate lithium extraction, processing and recycling.

The Company –
Promoting a circular battery economy

Strategic free-carried interests designed to maintain upside while reducing costs and providing access to lithium feedstock.

Advancing LieNA® technology to deliver low-energy extraction of lithium from spodumene with no requirement for roasting.



Recycling of batteries and re-birthing of battery components to enhance sustainability.

Production of next-generation cathode powders for the global battery market.

The Company –
Experienced leadership

Adrian Griffin
(Managing director)
Industry expert with more than 40 years' experience in mining and mineral processing.

George Bauk
(Non-executive chairman)
Specialist in battery metals, project management, stakeholder engagement, marketing and financing.

Kristie Young
(Non-executive director)
Expertise in engineering, project evaluation, strategy, growth, marketing, human resources, commerce and governance.

Phil Thick
(Non-executive director)
More than 30 years' experience in oil and gas, mining and chemical processing, specifically with lithium.

Andrew Mackenzie
(Recycling)

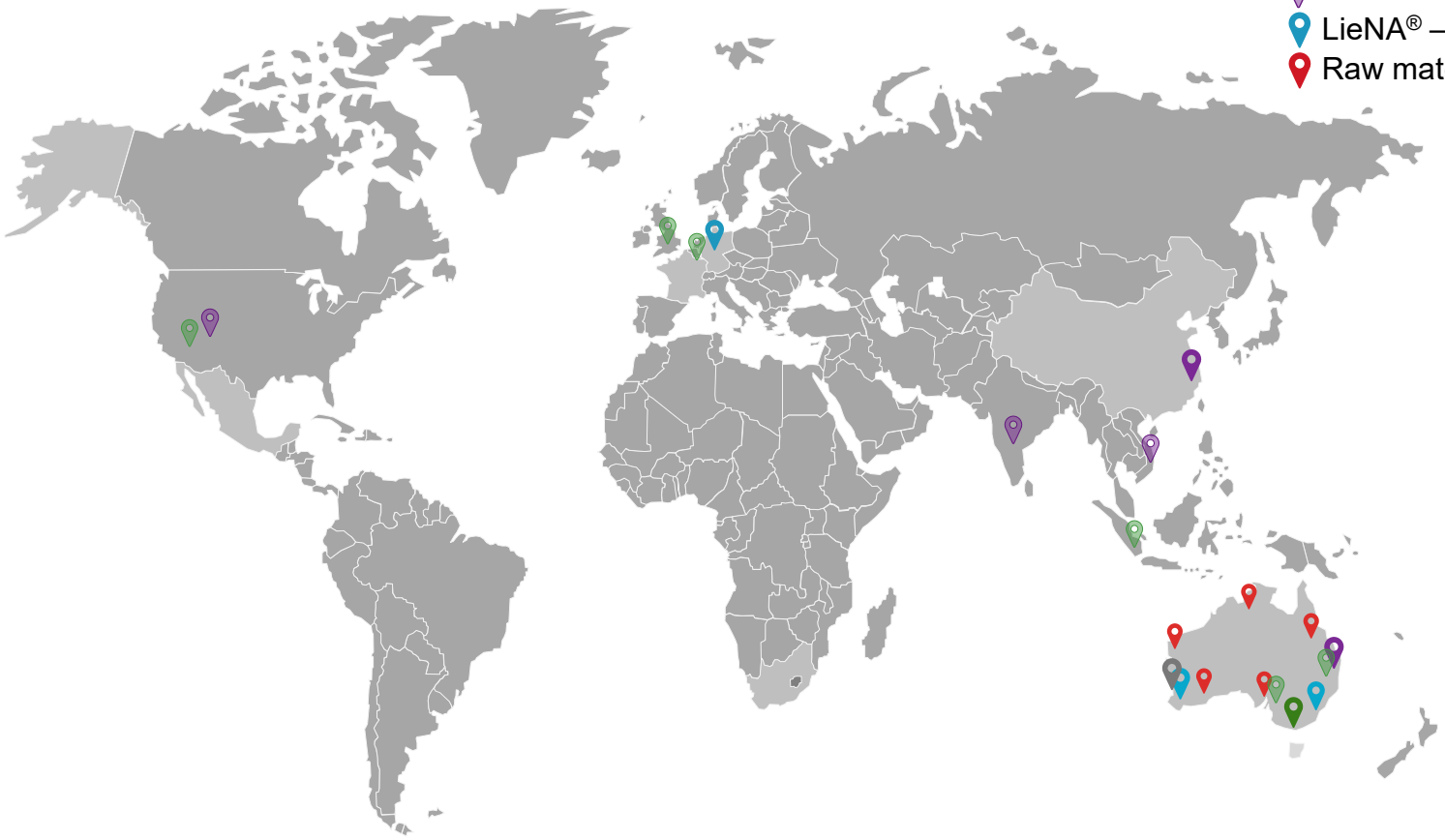
Merrill Gray
(Batteries)

Andrew Skalski
(Lithium chemicals)

Stuart Tarrant
(CFO)

Barry Woodhouse
(Company secretary)

The Company –
Footprint and global potential



The Company's recycling activities – via its subsidiary Envirostream Australia Pty Ltd – were initially based wholly in Victoria; however, the battery collection network is now being rolled out Australia-wide. Energy metals extracted from spent LIBs by Envirostream Australia Pty Ltd will ultimately be fed back into the battery supply chain, thereby improving battery industry sustainability and reducing environmental impacts.

Lithium Australia's head office is in Perth, Western Australia ('WA'). It undertakes research and development ('R&D') programmes in WA, as well as in Victoria, New South Wales and Queensland.

In Queensland, wholly-owned Company subsidiary VSPC Ltd is designing next-generation battery cathode materials, some of which are currently being tested in both Japan and China.

Lithium Australia has formed strong partnerships in China and is having LIB cells manufactured there for testing purposes only.

The Company –
Focus on commercialisation

	envirostream Recycling	VSPC Battery materials	Chemicals
Trading name	▪ Envirostream Australia Pty Ltd	▪ VSPC Ltd	▪ LieNA®
Company ownership	▪ 90%	▪ 100%	▪ 100%
Positive environmental aspects	▪ Reduces disposal of spent batteries to landfill. ▪ Increases availability of battery metals to meet future demand.	▪ Lowering of global carbon emissions through the provision of high-quality, next-generation battery cathode materials.	▪ Potential to significantly improve resource utilisation and sustainability in the lithium industry. ▪ Potential to increase the availability of battery metals to meet future demand.
Stage	▪ Recycling plant operational in Melbourne. ▪ Anticipated support from Battery Stewardship Scheme in 2022.	▪ Pre-feasibility study ('PFS') done and definitive feasibility study ('DFS') underway for LFP* cathode material. ▪ LMFP** cathode material being assessed in parallel.	▪ Pilot plant under construction. ▪ PFS to follow construction.
Growth potential	▪ Possible replication of Melbourne plant in other locations internationally.	▪ Potential to produce cathode materials for LFP- and LMFP-type LIBs globally.	▪ First licence sold; potential for further licensing/consolidation of chemical processing.

*Lithium ferro phosphate **Lithium manganese ferro phosphate

The Company –
Intellectual property underpins focus on commercialisation

Lithium Australia is focused on commercialising the delivery of its sustainable processing and production solutions, in order to enhance supply-chain security and reduce the environmental footprint of the battery industry.

Intellectual property ('IP') underpins that focus. IP generated by Lithium Australia's R&D activities is an extremely valuable asset incorporating trade secrets and patent protection. The latter takes the form of patent applications and grants within Australia and internationally. IP protection is fundamental to the longevity and growth of the Company.

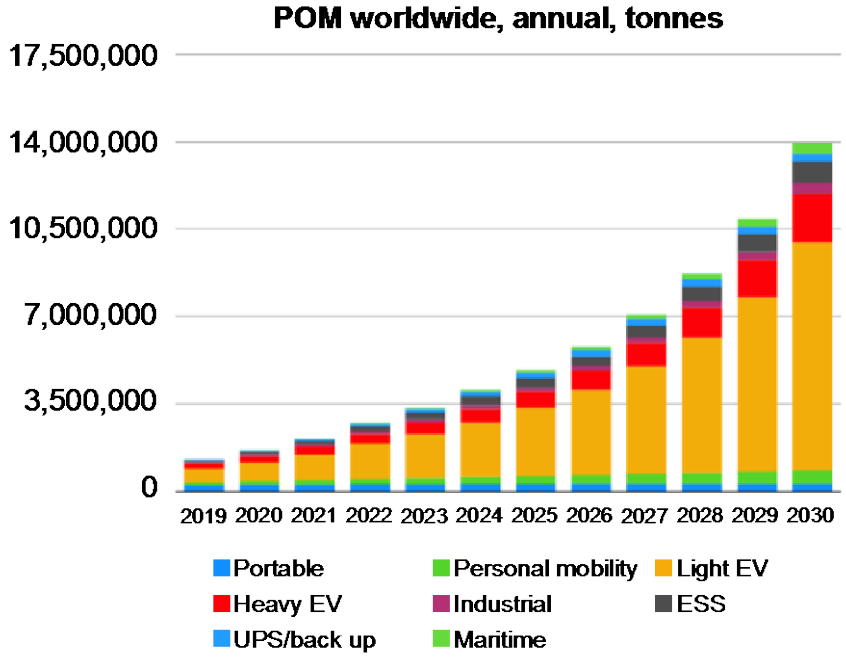
Lithium Australia's IP covers the following.

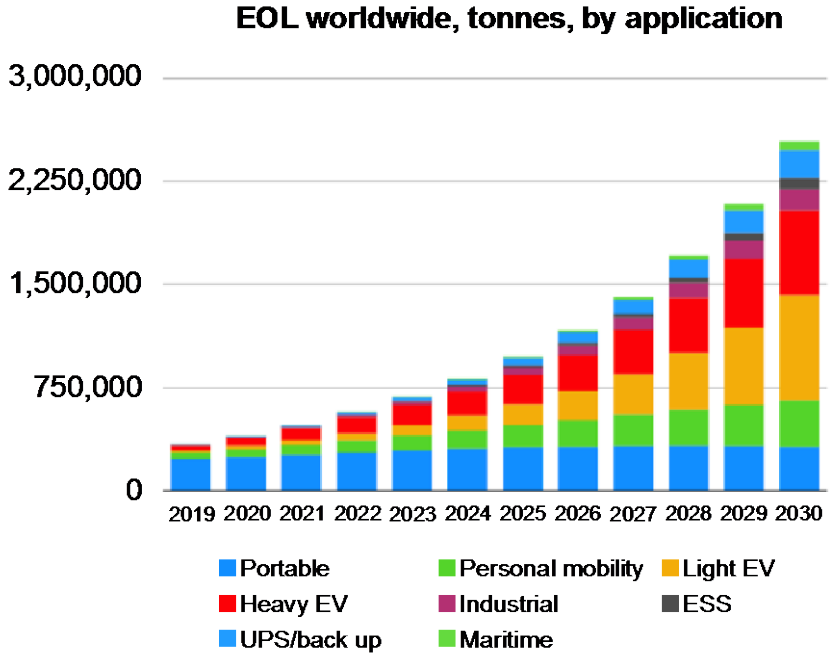
- Low-energy processes for the recovery of lithium from silicates without roasting.
- The recovery of lithium from low-tenor solutions.
- The recovery and refining of lithium to produce direct feed for LFP cathode materials.
- Proprietary methods for the production of nanopowders.
- The production of high-performance LFP cathode materials.
- The production of high-energy-density LMFP cathode materials.
- The recovery of critical metals from spent LIBs.

Recycling –
Potential for global reach in battery recycling

By 2030, the quantity of end of life ('EOL') batteries, spent LIBs in particular, to be dealt with globally is likely to rise from the present amount of about 400,000 tonnes per annum ('tpa') to more like 2.5 million tpa. If recycling rates remain as low as they are at present, then, depending on the method of disposal used, there is the potential for an environmental disaster. Further, given the amounts of critical materials used in their production, LIBs should never be considered single-use commodities.

As an adjunct to its current business, Envirostream is investigating new markets for other recycled battery products while applying the technology currently in operation to satisfy local requirements. This will increase battery re-birthing and improve environmental outcomes globally.





Circular Energy Storage
Research and Consulting

[Source: Circular Energy Storage, 2020.]

POM = placed on market, UPS = uninterrupted power supply, ESS = energy storage systems.

Recycling –
Company subsidiary Envirostream Australia Pty Ltd

The Company owns 90% of mixed-battery recycler Envirostream Australia Pty Ltd ('Envirostream'), Australia's only facility of this kind.

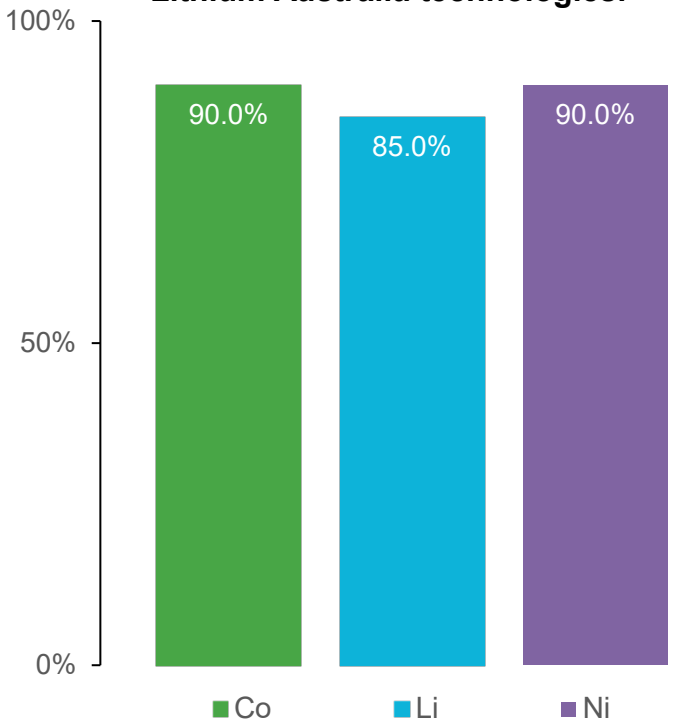
Envirostream shreds and recycles all types of batteries, including spent LIBs, at its plant near Melbourne in Victoria. Its proprietary process for recycling spent LIBs involves recovering the energy metals they contain as mixed metal dust ('MMD), which is then exported for further refining. Importantly, Envirostream achieves higher yields from spent LIBs than any of its global competitors, with more than 90% of the battery mass recycled.

Presently, only about 10% of spent LIBs in Australia are made available for recycling rather than being consigned to landfill. This situation will change in January 2022, with the implementation of a national battery stewardship scheme that provides a strong financial incentive to recycle spent batteries.

As Envirostream advances its spent LIBs-to-MMD recovery business and Lithium Australia refines its process development for battery recycling, both will progress an integrated plan to collect, sort and shred spent LIBs, recover the MMD and refine that product locally.

Together, Lithium Australia and Envirostream plan to close the loop on the energy-metals cycle in Australia.

Process metal recoveries via Lithium Australia technologies.



Overall process recoveries (Co = cobalt, Li = lithium, Ni = nickel).

Recycling –
Envirostream collection, logistics, recovery and processing

Collection

Scaleable collection solutions

Pail to pallet

BESS, EVs & waste transfer

Consolidation depots

Logistics

Dangerous goods

National compliance

- National – federal compliance
- State – six state environment agencies
- Local – 500+ local government entities

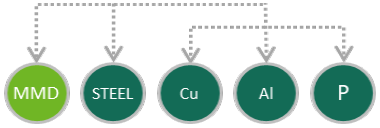
Sorting & recovery

Discharging & disassembly

Mechanical processing

Semi-automated sorting

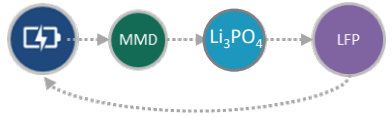
LIB saleable products



Processing & upgrading (commercialisation programmes)

Refining & recoveries

LFP recycling



Micronutrients upcycling

Electrolyte & graphite recovery

BESS = battery energy storage systems, EVs = electric vehicles, Li_3PO_4 = lithium phosphate, Cu = copper, Al = aluminium, P = phosphorus.

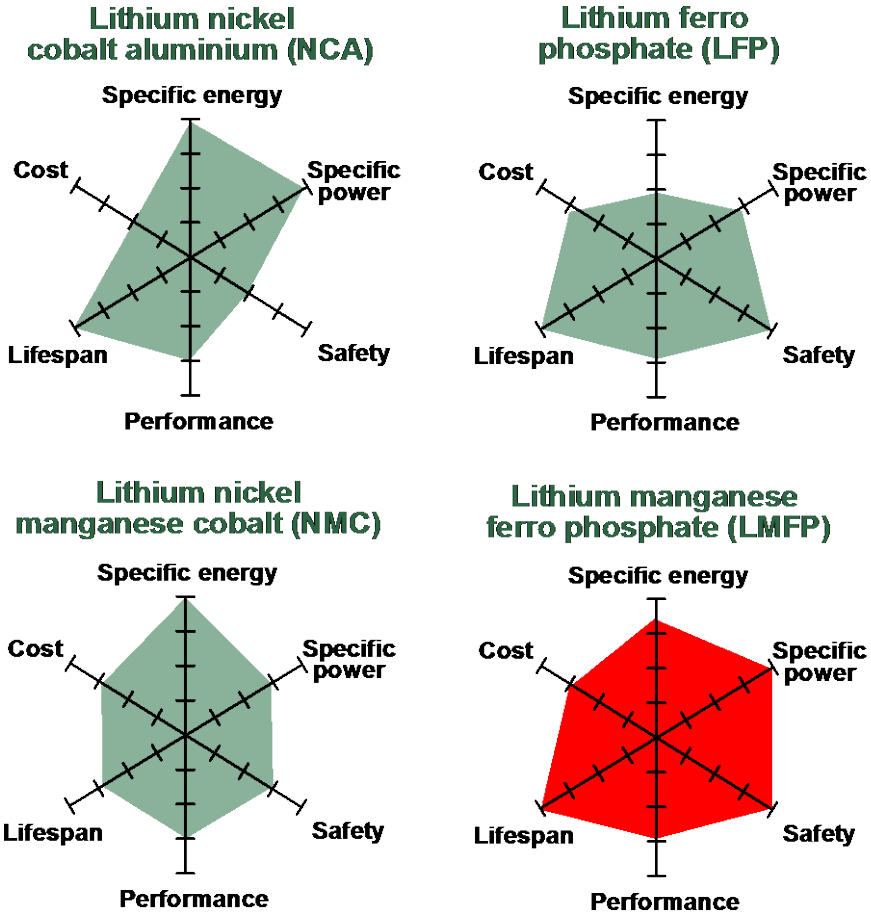
Battery materials –
Benefits of LFP and LMFP

LFP cathode powder outperforms nickel-based cathode materials in terms of cost, as well as thermal and chemical stability – it is cheaper, safer and offers a longer service life. Currently, LFP is experiencing strong demand and growth relative to nickel-based cathode alternatives.

In terms of resource utilisation too, LFP is advantageous – it uses 20% less lithium than nickel-based cathode alternatives per kWh (kilowatt hour) of storage capacity and is manufactured using common iron and phosphate raw materials, with no dependence on critical materials that may be in short supply and experiencing volatile pricing.

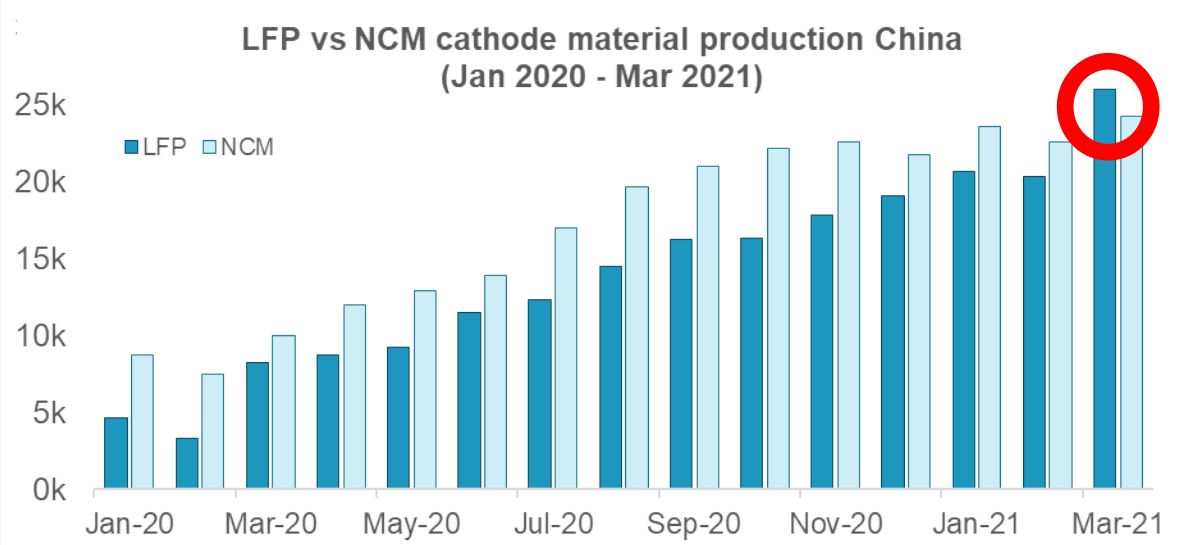
Although LFP battery cells have a lower specific energy density compared to nickel-based alternatives, in recent years leading LFP cell makers have achieved energy densities above 200 Wh/kg (watt-hour per kilogram), thereby closing the energy-density gap between LFP and nickel-based battery chemistries (250 Wh/kg).

LMFP battery cells share all the benefits of LFP cells but, significantly, deliver an increase in energy density of up to 25% when compared with LFP.



Source: Boston Consulting Group.

Battery materials –
Production of LFP versus NCM



Source: ICCsino Apr 2021

"Global trends in LFP production are expected to follow what is occurring in China, where rising LFP demand, as forecast by Roskill, is likely to see LFP become the dominant [LIB] chemistry in the next few years, due to its greater safety characteristics, environmental, social and governance (ESG) values and more positive cost structure."

[From announcement dated 14 April, 2021: 'Lithium Australia PFS vindicates high-value potential of LFP battery materials'.]

Battery materials –
Company subsidiary VSPC Ltd

VSPC Ltd ('VSPC') is a 100% Company-owned developer of advanced battery materials, including LFP and LMFP cathode powders. Its assets include the following.

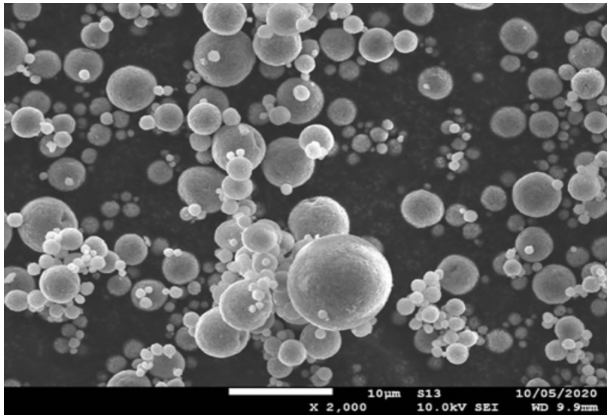
- An R&D facility (pilot plant) in Brisbane, Queensland.
- An integrated, laboratory-scale battery production and testing facility.
- IP that includes three families of patents.
- Agreements to produce/commercialise cathode materials in China.

VSPC has spent nearly 20 years developing its proprietary battery materials nanotechnology – a unique process for producing LIB cathode powders that is the subject of international patents. The process is broadly applicable to most LIB chemistries, since VSPC's intellectual property covers *how* the powders are made, not *of what*.

Moreover, the technology can harness lithium phosphate as a cathode powder precursor, potentially reducing the number of process steps required to progress from recovered lithium chemicals to the production of cathode materials and, ultimately, new LIBs.

VSPC's cathode powders are being tested by battery manufacturers in China and Japan.

VSPC pilot plant, located in Brisbane, Queensland.



Finished LFP produced by VSPC (bar = 10 microns).

Battery materials –
Company subsidiary VSPC (cont.)

VSPC has completed a positive PFS for the annual production of 10,000 tonnes of LFP battery cathode materials. That study indicated the following.

- A net present value (NPV) of US$253 million (13 years' operation).
- An internal rate of return (IRR) of 33%.
- A payback period of five years.
- Annual sales revenue of US$140 million for LFP.
- Earnings before interest, taxes, depreciation and amortisation (EBITDA) of US$66 million per annum.
- A free cash flow of US$56 million per annum.
- A plant investment of US$113 million.

VSPC's focus has now shifted to the completion of a DFS for LFP production.

VSPC's progress is well demonstrated by the following.

- A federal government AMGC (Advanced Manufacturing Growth Centre) grant to investigate the use of lower-cost materials – including recycled battery products – in the manufacture of new LIBs.
- A federal government Cooperative Research Centres Projects ('CRC-P') grant to develop an "[a]dvanced nano-engineered battery for fast-charging catenary-free trams."

The CRC-P grant is aimed at developing a new generation of battery-powered, catenary-free trams that will negate the need for unsightly and potentially hazardous overhead power lines.

Lithium chemicals –
The Company's LieNA® process

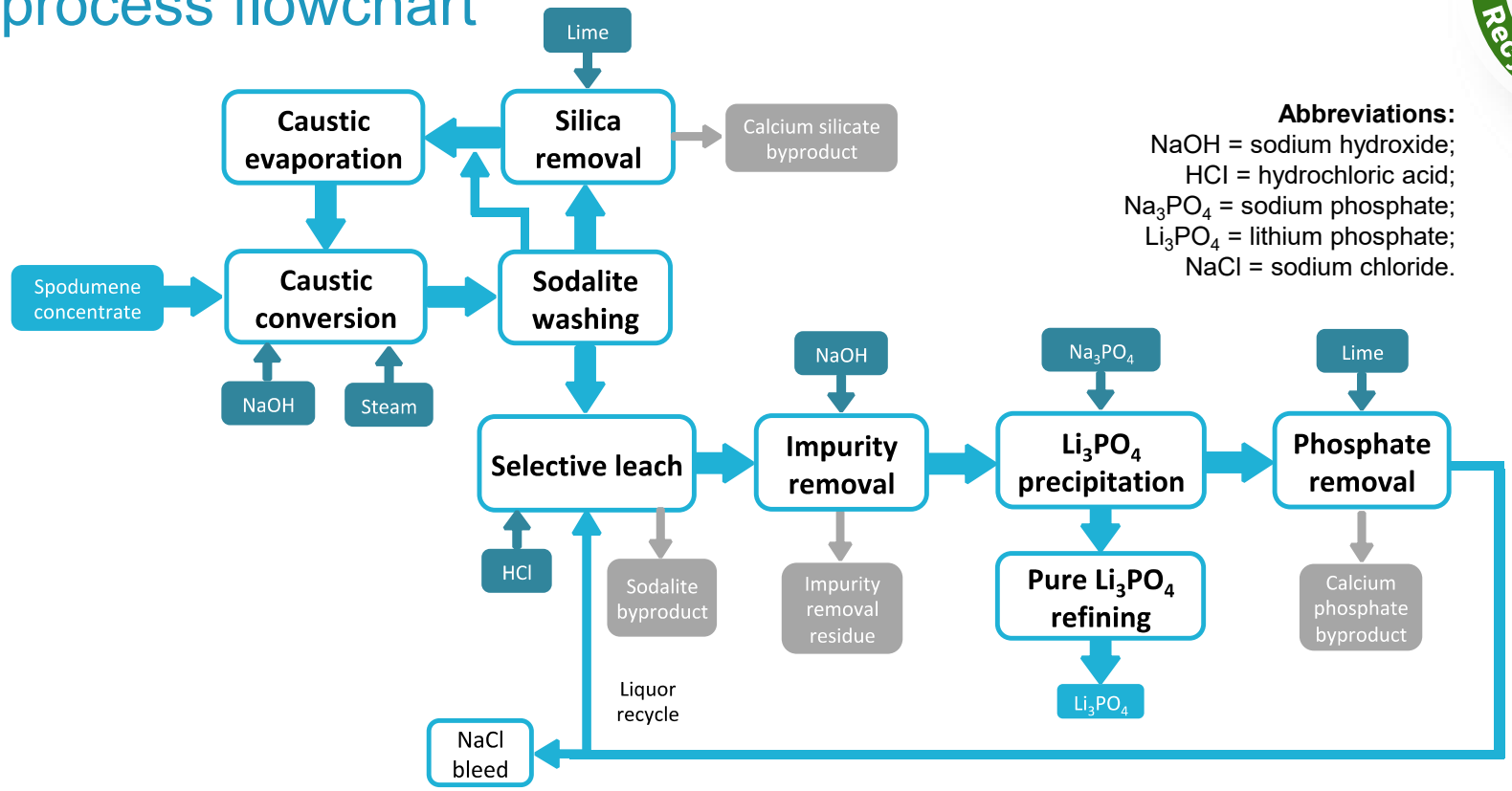
Hard-rock lithium mining.

Lithium Australia's proprietary LieNA® process is designed for low-energy processing of all lithium minerals. The aim is to provide the battery industry with critical chemicals produced in an ethical and sustainable manner, an approach with the potential to not only improve the viability of existing mining operations by extending resource life but also enhance energy security in jurisdictions in which the usual sources of critical battery minerals are either scarce or non-existent.

Conventional mineral processing of spodumene (the primary lithium mineral concentrated from hard-rock operations) involves comminution, heavy-media separation and flotation. Although this type of physical processing is relatively simple, spodumene recovery is low, ranging from 50% to 75% at the mineral concentrator.

To address this low rate of recovery, the Company – in collaboration with ANSTO (the Australian Nuclear Science and Technology Organisation) – has developed LieNA®, a process that targets lower-grade, fine spodumene feed and in so doing has the potential to significantly increase the lithium recovery of spodumene mineral-concentrate producers.

Lithium chemicals –
LieNA® process flowchart



Abbreviations:
NaOH = sodium hydroxide;
HCl = hydrochloric acid;
Na_3PO_4 = sodium phosphate;
Li_3PO_4 = lithium phosphate;
NaCl = sodium chloride.

For lithium producers, boosting process recovery is one of the greatest challenges. If recovery of spodumene to concentrate can be improved from the existing level of around 60% to, say, 90% using LieNA®, then mine life could be extended by 50% with little extra operating cost. Clearly, this would enhance resource utilisation and reduce environmental impacts.

LieNA® has been recognised by the federal government with the awarding of a significant CRC-P grant for the construction and operation of a LieNA® pilot plant. The plant – constructed at ANSTO's Lucas Heights facility on the outskirts of Sydney, New South Wales – will process spodumene fines recovered from exploration drilling by Essential Metals Ltd (formerly Pioneer Resources Ltd) in WA.

Raw materials –
Free-carried interests maintain upside potential

In July 2021, Charger Metals obtained 70% of the interests in Lithium Australia's Coates, Lake Johnston and Bynoe projects, in exchange for a 19% equity interest issued to the Company by Charger Metals and a 30% free-carried project interest to completion of definitive feasibility.

The Company also holds direct equity in ASX-listed Galan Lithium Ltd. The latter manages the Greenbushes joint venture in which Lithium Australia is 20% free carried to completion of a DFS.

These transactions:

- allow Lithium Australia to focus on providing an ethical and sustainable supply of energy metals to the battery industry and developing a circular battery economy;
- provide economic returns on investments held by the Company, and
- have the potential to provide the Company with ready access to raw materials.

The case for investment

An investment in Lithium Australia provides exposure to the exponential growth in the LIB industry worldwide. That exposure is achieved by way of a suite of technologies – underpinned by IP, including international patents – that creates a circular economy for battery materials.

The Company's key resources include the following.

- The world's most advanced technologies for processing lithium ores.
- The world's most advanced LFP cathode powders.
- Research into and development of LMFP, the next generation of high-energy-density cathode material (now undergoing commercial testing).
- Australia's only onshore, mixed-battery recycling facility (first-mover advantage).
- Expansion of battery recycling, both domestically and offshore.
- Free carried interests in raw materials.

Lithium Australia is itself a circular economy for battery materials and, as such, meets the ESG requirements that potential investors now expect.

Corporate snapshot 2021

Top shareholders (%) as at 26 July 2021	13.86
BNP Paribas Nominees Pty Ltd, ACF Clearstream	5.56
BNP Paribas Nominees Pty Ltd, Six Sis Ltd <DRP A/C>	2.63
Citicorp Nominees Pty Ltd	2.26
Adrian Griffin	1.81
Acuity Capital	1.60

Price (AU$) as at 28 July 2021	0.115
Market capitalisation (AU$)	**105 M**
Shares outstanding (LIT)	912 M
Partly paid shares (unpaid $0.0499)	114 M
Unlisted $0.055 options expiring 2023	8 M
Cash position at 30/06/21 (AU$)	**11.5 M**

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