

HANNANS

Lithium-ion Battery Recycling in the Nordics

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ASX:HNR

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Summary

Hannans Ltd (ASX: HNR) has secured a significant opportunity to recover high purity metals from scrap and spent lithium-ion batteries (**LiB**) in Norway, Sweden, Denmark and Finland (**Nordics**) – the region with the highest electric vehicle (**EV**) penetration rates in the world.



Introduction

- Memorandum of Understanding (**MoU**) contemplates a joint venture agreement providing Hannans with rights to recover high purity metals from LiB using a LiB recycling technology that:
 - ▶ is safe, sustainable, low energy and low CO₂ when compared to incumbent technologies; and that
 - ▶ has been the subject of comprehensive pilot plant and validation test work programs.
- Hannans shareholders are poised to benefit from long term R&D investment into the LiB recycling technology and the high quality strategic partnerships entered into by the technology owner.
- Growing volumes of scrap and spent LiB contain significant nickel, cobalt, lithium and manganese content. The LiB recycling technology the subject of the MoU unlocks that embedded value.
- Hannans' pursuit of sustainable methods to produce metals for consumption will ensure it meets the high environmental, social and governance (**ESG**) standards society has set for the resources industry.

Transaction Summary

- An exclusive license to commercialise the LiB recycling technology in the Nordics was granted to Critical Metals Ltd (**Critical**) by a wholly owned subsidiary of ASX listed Neometals Ltd (**Neometals**) in 2019. Critical must pay a gross revenue royalty to the Neometals subsidiary.
- Critical has provided Hannans with the right to earn a 50% interest in each and every LiB recycling plant developed in the Nordics pursuant to the exclusive license by funding activities through to a final investment decision (**FID**) with respect to each plant.
- Hannans needs to secure LiB feedstock to create a sustainable operation; obtain social licences to operate; assess the social, environmental and financial feasibility of establishing each plant; and arrange debt and equity funding.
- Hannans alone has the right to decide whether to make a positive FID. If Critical elects not to contribute Hannans has the right to 100% of that particular plant.
- Refer Appendix for transaction details.

LiB in Europe

- Electrification in Europe is creating enormous demand for LiB for EV and stationary energy storage.
- Europe does not produce enough metals to meet its massive growth ambitions.
- European Union (**EU**) wants to be net zero carbon by 2050 and is legislating to reduce waste.
- The recovery of metals from scrap and spent LiB is imperative because:
 - ▶ the volumes of flammable toxic scrap and spent LiB are forecast to grow exponentially as a result of government policies designed to increase LiB uptake; and
 - ▶ European LiB and EV manufacturers need to reuse metals recovered from scrap and spent LiB within their own ecosystems to meet their legal, social, environmental and financial obligations.

LiB in the Nordics

- Hannans agreement covers Norway, Sweden, Denmark and Finland – a European sweet spot for EV.
- Take-up of EV in the Nordics is the highest in the world – there are more EV per capita in Norway than anywhere else globally.
- Four Giga factories in construction or planned in the Nordics.
- Immediate and growing need for industrial scale, safe, sustainable and low CO₂ processes to recover metals from scrap and spent LiBs and reduce waste stockpiles.
- EU is focussed on circular economy and recycling to ensure supply chain resilience.

Very high EV penetration in the Nordics

Market	EV (000s)	EV mix (%)
Germany	368	23
France	163	16
UK	153	15
Italy	80	8
Norway	78	83
Sweden	76	40
Denmark	30	28
Finland	18	28
Total	202	

Table: West European new plug-in passenger car registrations January – July 2021.
Combines both battery EVs (BEV) and Plug-in hybrid EVs (PHEV)

LiB Recycling Technology

- LiB recycling technology developed over 5 years and owned by ASX listed Neometals Ltd. Neometals and SMS Group each own 50% of Primobius GmbH, the commercialisation vehicle for the technology.
- The shredding and sorting (**Stage 1**) and refining (**Stage 2**) components of the technology are capable of processing multiple LiB chemistries, formats and types.
- Stage 1 products include mixed cathode and anode “black mass” plus steel, plastic and foil. Stage 2 products include high purity battery chemicals including nickel, cobalt, lithium and manganese sulphates.
- Primobius to deploy Stage 1 in commercial operation early 2022, processing 10 tonnes per day of LiB feedstock. Primobius to complete current demonstration plant trial in November 2021 as part of a feasibility study into construction of a 50 tonne per day (20,000 tpa) operation.
- Click [here](#) for a fly through of the Primobius demonstration plant flowsheet.

Competitive Advantages

- The competitive advantages of the LiB recycling technology are that it:
 - ▶ has a patent pending flowsheet;
 - ▶ has been proven safe during commissioning at Stage 1 demonstration plant scale;
 - ▶ is sustainable; and
 - ▶ is low energy, low CO₂ and has higher recoveries when compared to incumbent technologies.
- Barriers to entry into LiB recycling are high when considering:
 - ▶ the time and resources required to develop an industrial scale, fully integrated, safe and compliant LiB recycling process;
 - ▶ the permits required to operate a Stage 1 and Stage 2 plant;
 - ▶ the need for a steady stream of consistent LiB feedstock to underwrite capital investment decisions; and the
 - ▶ means to fund and build plants to the high standard required by original equipment manufacturers.

Hannans Commercialisation Strategy

- Subject to securing a feedstock source of scrap and or spent LiB, Hannans aims to establish Stage 1 plants in Sweden, Norway, Denmark and Finland.
- Revenue from the Stage 1 plant would comprise sales of “black mass”. Hannans decision on a Stage 1 plant location is expected 1st Quarter 2022.
- Subject to securing sufficient “black mass”, Hannans aims to establish a Stage 2 plant to refine black mass into high purity nickel, cobalt, lithium and manganese chemicals for LiB cell production.
- Revenue from the Stage 2 plant will comprise sales of high purity battery chemicals to the cathode supply chain supporting new LiB with recycled content. Hannans decision on Stage 2 plant location expected 2nd half 2022.

Competition

- There is strong competition in the Nordics to:
 - ▶ offer an industrial scale, safe, reliable, sustainable and profitable fully integrated LiB recycling process;
 - ▶ secure scrap LiB from the cell production lines of Giga factories, the most likely early consistent feedstock source of LiB for recycling; and
 - ▶ access the increasing volumes of LiB once they have reached end of life (note many LiB are being repurposed prior to being recycled).
- Primobius is commercialising the LiB recycling technology globally other than in the Nordics and the Balkans however, companies currently offering LiB recycling solutions in the Nordics, and those potentially planning entry into the Nordics include:
 - ▶ Fortum
 - ▶ Hydro Volt
 - ▶ Northvolt Revolt
 - ▶ Li-Cycle
 - ▶ Stena Recycling
 - ▶ AkkuSer
 - ▶ Redwood Materials

Proposed News Flow*

Deliverable	Date
Memorandum of Understanding	3 September 2021
Critical Metals shareholder vote on transaction	28 September 2021
Substantive Agreement	31 October 2021
Neometals Ltd announce completion of fully integrated shredding, sorting and refining demonstration plant trials in Germany – validation of technology	November 2021
Hannans shareholder vote on transaction	November 2021
Satisfaction of conditions	November - December 2021
Primobius commencement of 10 tpd LiB disposal service – further validation of technology and business model	1 st Quarter 2022
Post satisfaction of conditions precedent, Hannans to source LiB feedstock	1 st Quarter 2022
Obtain permits to operate 1 st Plant	4 th Quarter 2022
Make final investment decision	4 th Quarter 2022
Commence construction of 1 st Plant	4 th Quarter 2022
Start-up 1 st Plant	2 nd Quarter 2023

* Subject to change

Next Steps

- For the proposed transaction to complete successfully:
 - ▶ Critical shareholders must approve the transaction at their Annual General Meeting to be held on 28 September 2021;
(note that Neometals as Critical's largest shareholder will voluntarily abstain from voting)
 - ▶ Hannans shareholder must approve the transaction at its Annual General Meeting to be held in November 2021; and
(note that Neometals as Hannans' largest shareholder will voluntarily abstain from voting)
 - ▶ Hannans must complete a capital raising of not less than AU\$5 Million prior to 31 December 2021.

Directors



Jonathan Murray, Independent Non-Executive Chairman

- Director of Hannans Ltd (2010).
- Partner of Steinepreis Paganin
- Principal legal practice areas include equity capital markets, takeovers, project acquisitions and divestments, corporate governance, commercial law and strategy.
- Currently Non-Executive Chairman of Critical Metals Ltd and Errawarra Resources Ltd.



Damian Hicks, Executive Director

- Director of Hannans Ltd (2002).
- Financial, legal and compliance qualifications.
- Principal responsibilities includes strategy formulation, team development, deal origination & execution, stakeholder relationships and capital raising.
- Active developing opportunities in Sweden and Norway since 2008. Currently Executive Director Critical Metals Ltd and all group subsidiary companies.



Markus Bachmann, Non-Executive Director

- Director of Hannans Ltd (2012) residing in Switzerland.
- Corporate finance professional.
- Founding partner of Craton Capital (cratoncapital.com)
- Currently Non-Executive Chairman of Critical Metals Ltd.



Amanda Scott, Non-Executive Director

- Director of Hannans (2016) residing in Sweden.
- Exploration Manager for Hannans Group (2008-2016).
- Consulting Geologist with 13 years experience.
- Extensive experience in the Yilgarn and Pilbara regions of Western Australia and the Caledonides and Kiruna regions of Scandinavia exploring for gold, copper, nickel, PGEs, iron and manganese.



Clay Gordon, Non-Executive Director

- Director of Hannans (2016).
- Bachelor of Applied Science (Geology) and a Master of Science (Mineral Economics). Member of the AusIMM and AIG.
- +25 years' experience in senior roles (operational, management and corporate) within large and small resource companies active in a range of commodities within Australia, Africa and Southeast Asia.

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Definitions

- **Battery chemicals** are high purity chemicals that are used to produce the anode and cathode in a battery.
- **Battery chemistries** refers to the different types and ratios of metals used in the manufacture of a LiB cell. For example an NMC811 battery contains nickel, manganese and cobalt in the ratio of 8 parts nickel, 1 part manganese and 1 part cobalt. Batteries come in many shapes, sizes and chemistries.
- **Scrap batteries** are LiB that don't meet the required quality when they are produced and therefore are "scrapped" and return to the production process.
- **Spent batteries** are LiB that no longer retain a charge, or enough of a charge that enables them to be repurposed.
- **Giga watt (GW)** is a unit of energy equal to 1 billion watts.
- **Giga factory** is a plant capable of producing LiB cells holding billions of watt hours per annum. For example a 35 GWh / annum plant can produce enough cells to hold 35 billions watts of energy each year.

Transaction Details

- A. Hannans Ltd (**Hannans**) is an ASX listed company.
- B. LiB Recycling Pty Ltd (**LiB Recycling**) is a subsidiary of unlisted Australian registered company Critical Metals Ltd (**Critical Metals**).
- C. ACN 630 589 507 Pty Ltd (**ACN630**) has developed a proprietary technology to safely recover several metals from spent and off-specification lithium-ion batteries (**Technology**). ACN630 is a wholly owned subsidiary of ASX listed Neometals Ltd (**Neometals**).
- D. ACN630 granted LiB Recycling an exclusive right to commercialise the Technology in Sweden, Norway, Denmark, and Finland (**Territory**) via a Technology Licence Agreement on 8 March 2019 (**Licence**).
- E. Hannans and LiB Recycling have entered a Memorandum of Understanding (**MoU**), which sets out the terms upon which the parties agree to work together on an exclusive basis to maximise the value of the Licence for both parties (**Purpose**), initially, via an unincorporated joint venture. Under this arrangement, LiB will also grant Hannans a co-right to utilise its rights to the Technology under the Licence, for the Purpose (most likely via a sub-licence arrangement).
- F. Hannans will manage and fund all tasks and activities in the Territory through to a final investment decision (**FID**) with respect to the construction of each plant for the processing or recycling of feedstock batteries using the Technology (refer to appendix A for the proposed budget for these 'Feasibility Stage' activities). A plant may comprise a shredding and sorting plant (Stage 1) or a refining plant (Stage 2) (each, a **Plant**).
- G. Subject to Hannans re-complying with Chapters 1 and 2 of the ASX Listing Rules (assuming the current ASX position remains unchanged), if Hannans makes a FID and enters a binding engineering, procurement, and construction agreement for a Plant, LiB Recycling will be required to either (1) co-contribute to all future construction costs of the new Plant (capital and operating costs), in which case, each party would have a 50% equity interest in the Plant, or (2) its equity interest in the Plant will be diluted pro-rata to its relative funding contribution.
- H. To be able to make an FID, Hannans will need to have secured enough feedstock to justify the economics of a Plant and obtained the required permits to operate the Plant. Under the proposed joint venture arrangement, the costs of permitting and sourcing and marketing the business in the Territory will always be borne by Hannans (i.e. Hannans will fund all activities up to each FID for a given Plant, at which point, LiB will have the option to contribute or dilute).
- I. LiB Recycling has been actively seeking to establish relationships with potential providers of battery feedstock and engineering, procurement, and construction firms. LiB will pass to Hannans the benefit of these relationships, discussions and initiatives and responsibility for the carriage of these matters will be the sole responsibility of Hannans.
- J. The MoU and entry into further substantive agreement (to be consistent with the above terms) (**Substantive Agreement**) is conditional on receipt of shareholder approval to the transaction from both Critical Metals and Hannans and completion of a capital raising of not less than \$5 Million by Hannans prior to 31 December 2021.
- K. The MoU will terminate if (1) a Substantive Agreement is not executed by 31 October 2021, (2) Hannans has not made a positive FID by 30 June 2023 or (3) the Licence is terminated for whatever reason.