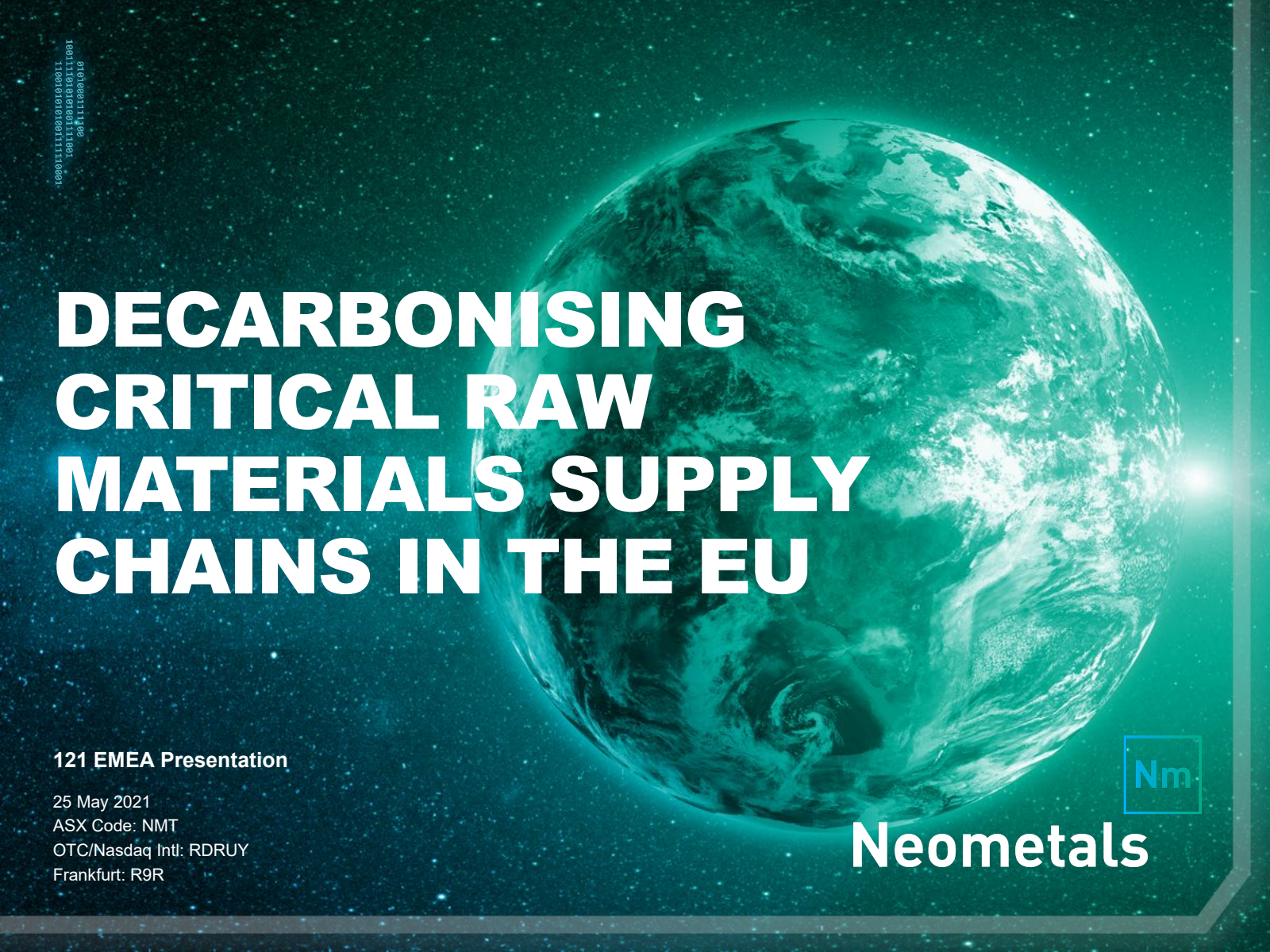

# DECARBONISING CRITICAL RAW MATERIALS SUPPLY CHAINS IN THE EU

**121 EMEA Presentation**

25 May 2021
ASX Code: NMT
OTC/Nasdaq Intl: RDRUY
Frankfurt: R9R

Neometals

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**Financial data:** All figures in this document are in Australian dollars (AUD) unless stated otherwise.

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**Investment risk:** An investment in securities in Neometals is subject to investment and other known and unknown risks, some of which are beyond the control of Neometals. The Company does not guarantee any particular rate of return or the performance of Neometals. Investors should have regard to the risk factors outlined in this document.

# EXECUTIVE SUMMARY

**“Neometals innovatively develops opportunities in minerals and advanced materials essential for a sustainable future”**

- Innovative ASX-listed project developer
- Focus on integrated minerals/materials for EV and ESS sectors
- 4 core projects with partners
- Pivoting from traditional hard-rock mining to eco-friendly materials recovery
- EU projects supporting resource efficiency, circularity and domestic supply chains
- Team with growing track record in delivering project outcomes – Mt Marion
- Future-proof balance sheet to fund all projects through to FID’s ~ A$82M* in cash and investments – no debt
- Paid A$55M in dividends in last 5 financial years

** As at 31 March 2021*

# OPERATIONAL FOCUS ON ADVANCED PROJECTS

**Lithium-Ion Battery Recycling Project**
*(Feasibility / Demo Plant Stage, 50:50 Incorporated JV)*

**Vanadium Recovery Project**
*(Pre-Feasibility Stage, option to form 50:50 Incorporated JV)*

**Lithium Refinery Project**
*(Feasibility Stage, MOU for 50:50 Incorporated JV)*

**Barrambie Titanium and Vanadium Project**
*(Pilot-stage, 100% NMT, MOU for 50:50 Operating JV);*

**Mt Edwards Nickel and Lithium Project**

# OUR PEOPLE

## NE Board Members

**Steve Cole**
Chair

**David Reed**

**Dr Natalia Streltsova**

**Doug Ritchie**

**Dr Jennifer Purdie**

**Les Guthrie**

## Management Team

**Chris Reed**
Managing Director / CEO

**Jason Carone**
Company Secretary / CFO

**Michael Tamlin**
COO

**Darren Townsend**
CDO

**Irena Ivanova**
GM - Engineering

**Paul Wallwork**
GM – Marketing and Product Development

**Jeremy Mcmanus**
GM – Commercial and Investor Relations

**Gavin Beer**
GM – Lithium Processing

**Matthew Read**
GM – Lithium Projects

**David Robinson**
GM – Metallurgy and R&D

**Greg Hudson**
GM – Geology

# CORPORATE DASHBOARD

| ASX: NMT OTC:RDRUY FRA:R9R | | |
|---|---|---|
| Shares on Issue[1] | m | 545.4 |
| Share Price (24-May-21) | A$ | 0.485 |
| Market capitalisation (24-May-21) | A$m | **264** |
| Cash (31-March-21)[2] | A$m | 67.5 |
| Debt | A$m | - |
| Investments (31-Mar-21)[3] | A$m | 14.1 |

| **Major Shareholders (24-May-2021)** | |
|---|---|
| David Reed (Non-Executive Director) | 7.3% |
| Westoz Funds Management | 2.8% |
| Top 20 | 36.8% |
| No of Shareholders | ~8,700 |
| ***Average Daily Volume (FY)*** | **1.15M** |

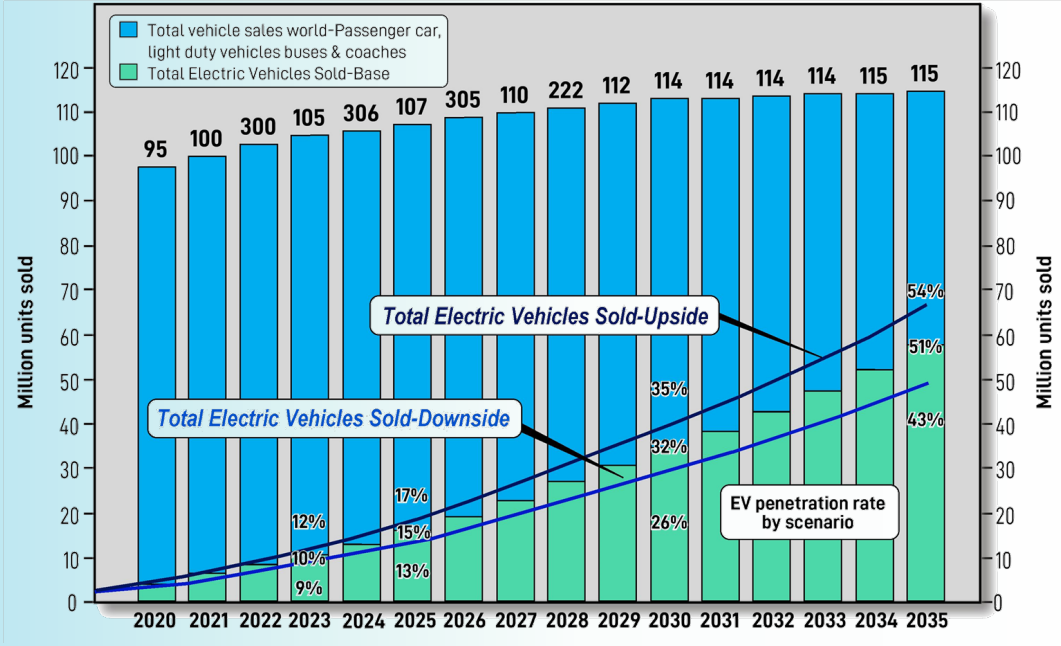
*Note 1: Excludes 10.26M performance rights.*
*Note 2: incl A$4.3M restricted term deposits*
*Note 3: Loan receivables and investments*

# BATTERY ENERGY STORAGE

## MARKET BACKDROP

# EV DEMAND FORECAST

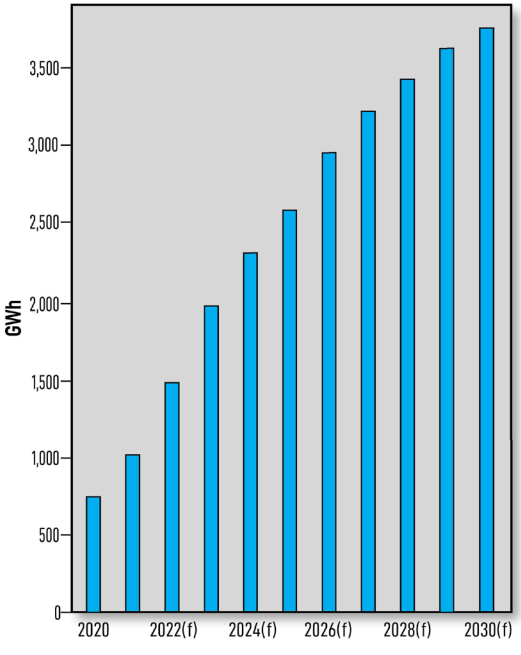
## Global EV Sales and Penetration Rate Forecast, 2020-35




Source: rho motion

# SUPPLY CANNOT MEET 5X DEMAND GROWTH FROM LIB MEGAFACTORIES

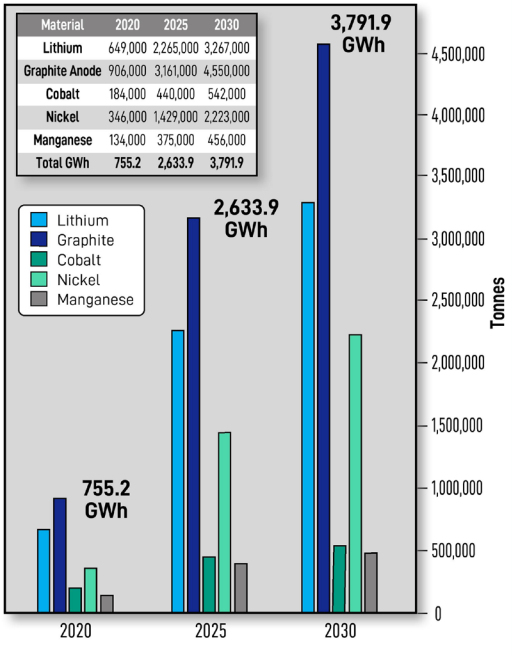
## World Lithium Ion Megafactory Capacity 2020-2030




## Megafactory Impact on Raw Materials

### Raw Materials Demand vs Global Lithium Ion Cell/Megafactory Capacity

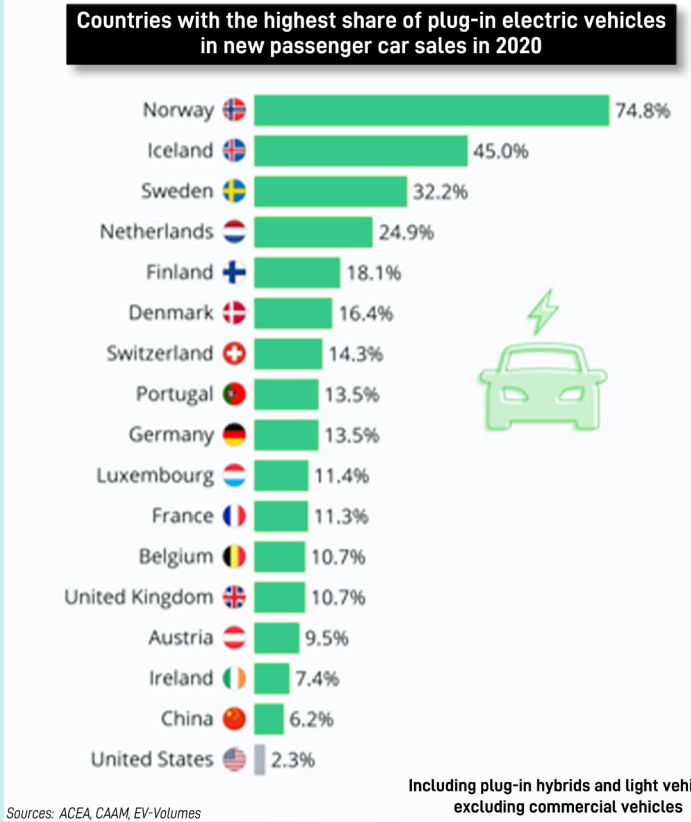
| Material | 2020 | 2025 | 2030 |
|---|---|---|---|
| Lithium | 649,000 | 2,265,000 | 3,267,000 |
| Graphite Anode | 906,000 | 3,161,000 | 4,550,000 |
| Cobalt | 184,000 | 440,000 | 542,000 |
| Nickel | 346,000 | 1,429,000 | 2,223,000 |
| Manganese | 134,000 | 375,000 | 456,000 |
| Total GWh | 755.2 | 2,633.9 | 3,791.9 |




*Source: Benchmark Minerals Intelligence - March 2021*

*The data in this chart does not constitute a forecast, and assumes 100% utilisation rates*

# EU LEADING THE WORLD IN ADOPTION OF EV'S



# RECYCLING IS NOT OPTIONAL

## Significant ‘need’ (Hazardous, $CO_2$ friendly & Valuable) driving regulation:

### Fire Risk

Storage, transport and disposal

### Landfill

Hazardous materials

### Pollution (GHG)

Decarbonisation and GHG targets. Reduces footprint of OEMs

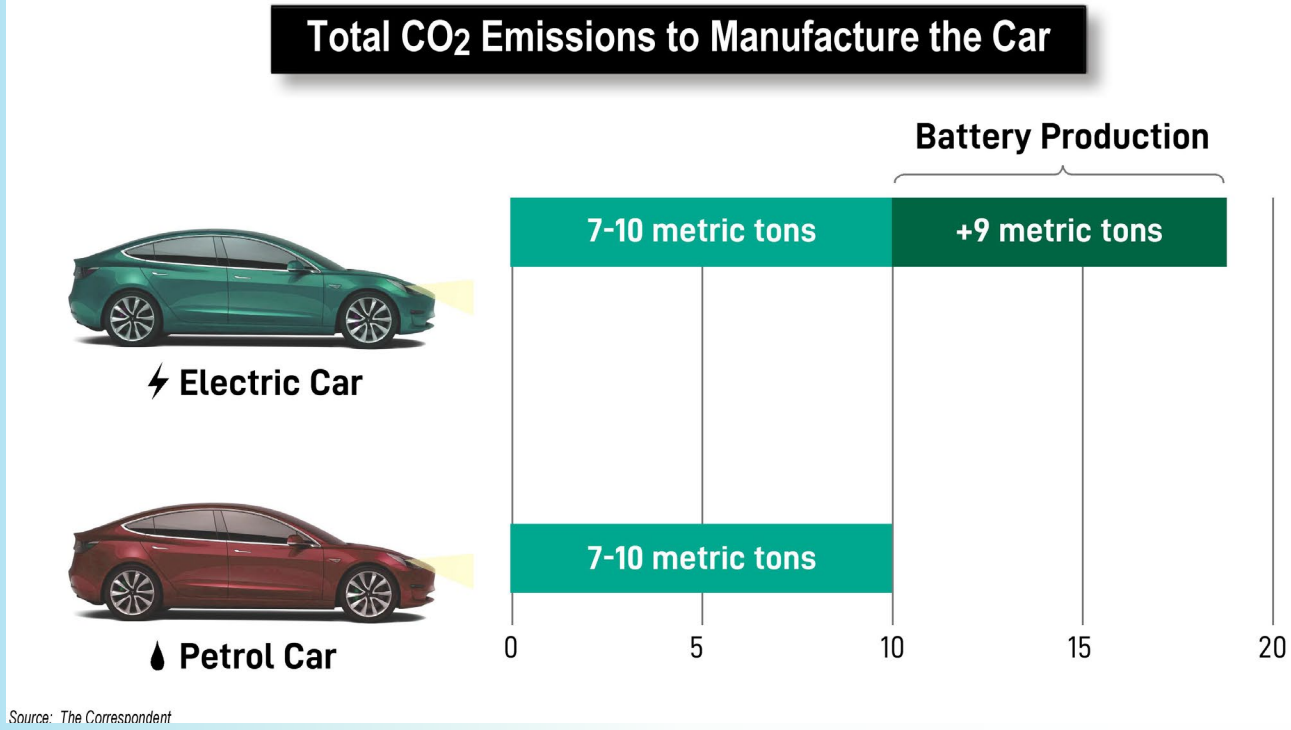
### Material Shortages

Recycling complements virgin sources. Ethical supply certainty

### Circular Economy

Closing the loop, cradle to grave. Significant $ value

# NEED TO ADDRESS THE EMERGING ‘CARBON SHOCK’ OF EV’S



# ECO-FRIENDLY LIB RECYCLING IS A KEY SUSTAINABLE SOLUTION

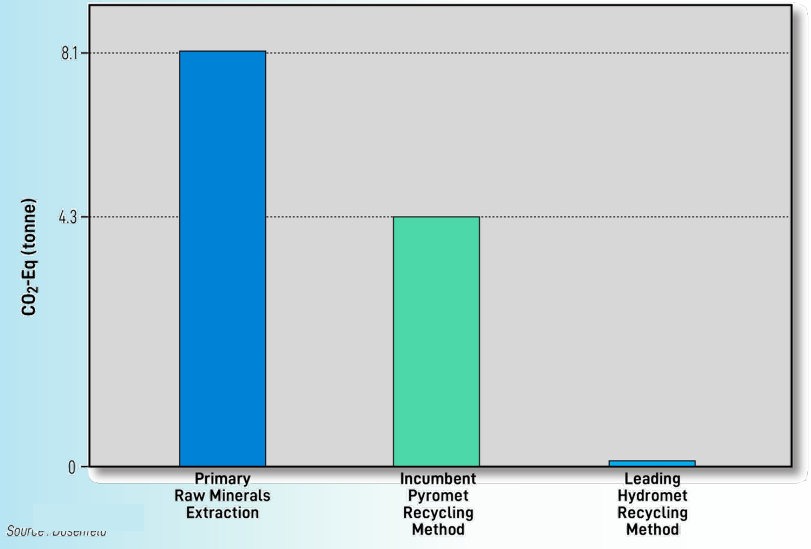
**HYDROMETALLURGICAL**

**RECYCLING**

**HAS THE LOWEST**

**CARBON FOOTPRINT**

## Raw Material $CO_2$ Savings – Traditional Mining vs Pyromet and Hydromet Battery Recycling



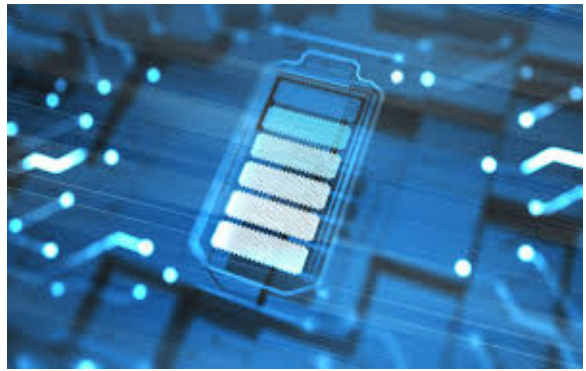

Source: Duesenfield

# NEW EU BATTERY REGULATIONS

- Legislation update to ensure more sustainable batteries
- Regulations focus on:
  - Transparency;
  - Ethical raw materials;
  - $CO_2$ cell footprint; and
  - Recycling

- Staggered implementation:
  - 100% collection target - industrial and EV
  - $CO_2$ footprint declaration from 2024
  - Recycling efficiency to 65% from 2025 then 70% by 2030
  - Carbon intensity labelling by 2026
  - $CO_2$ footprint threshold by 2027
  - Recycled content declarations 2027
  - Minimum recycled content from 2030

European Commission



# EU FORECAST TO BE 2ND LARGEST LIB PRODUCTION HUB GLOBALLY IN 2030

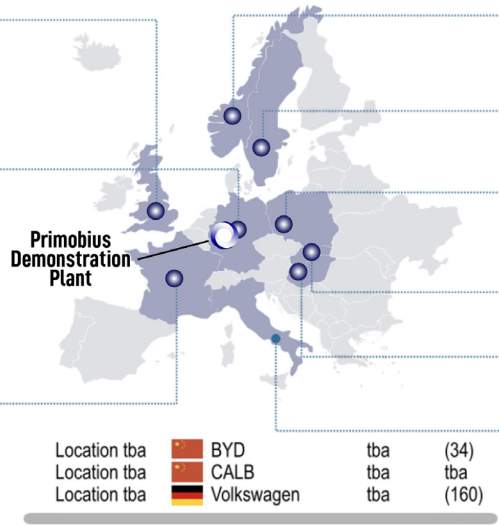
**In Europe alone, more than 1,000GWh of cell manufacturing capacities are announced** (as of end of March 2021)

Announced Cell Production capacity (GWh/a) - By country before 2030, by companies[1])

| UK | | >80 |
|---|---|---|
| EnivisionAESC | 2010 | 2,5 (14) |
| BRITISHVOLT | 2023 | 10 (35) |
| Amte | 2023 | 10 (-35) |

| Germany | | >340 |
|---|---|---|
| Northvolt & VW | 2024 | 16 (40) |
| CATL | 2022 | 14 (100) |
| ACC (PSA/SAFT) | 2023 | 8 (32) |
| Leclanche | 2020 | 1 (2,5) |
| Farasis | 2022 | 16 |
| Microvast | 2021 | 1,5 (8-12) |
| SVOLT | 2023 | 20 (-24) |
| TESLA | 2021 | >20 (100) |
| Varta | 2022 | 16 |

| France | | >80 |
|---|---|---|
| ACC (PSA/SAFT) | 2023 | 8 (32) |
| Verkor | 2023 | 16 (50) |




| | | | |
|---|---|---|---|
| Location tba | BYD | tba | (34) |
| Location tba | CALB | tba | tba |
| Location tba | Volkswagen | tba | (160) |

| Norway | | > 110 |
|---|---|---|
| Freyr | 2023 | -40 |
| Morrow | 2024 | 8 (32) |
| Panasonic | | tbd |

| Sweden | | > 40 |
|---|---|---|
| Northvolt | 2021 | 32 (40) |

| Poland | | >60 |
|---|---|---|
| LG Chem | 2018 | 15 (65) |

| Slovakia | | >10 |
|---|---|---|
| InoBat | 2024 | 10 |

| Hungary | | >40 |
|---|---|---|
| Samsung | 2018 | 10 (15) |
| SK Innovation | 2022 | 10 (30) |
| GS YUasa | | tbd |

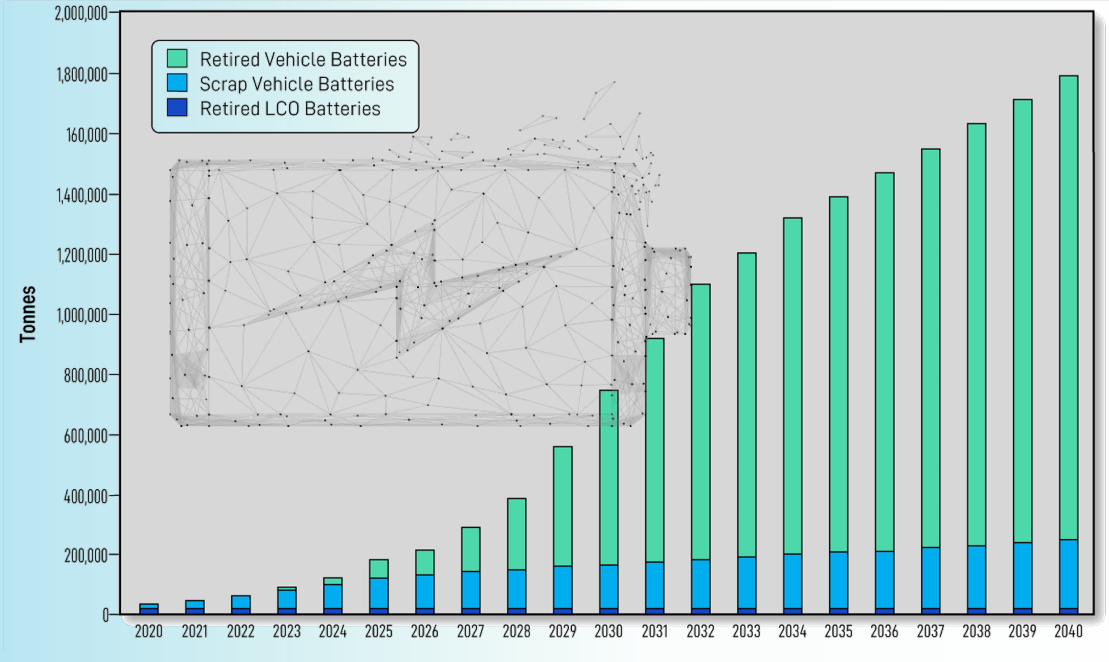
| Italy | | >80 |
|---|---|---|
| FAAM | 2021 | 10 (-15) |
| Italvolt | 2024 | -70 |

Source: Press releases, expert interviews, company announcements, Roland Zenn, 16/4/2020

1) Flags show HQ of company / country of origin

# AND GENERATE 2ND LARGEST VOLUME OF SCRAP AND END-OF-LIFE BATTERIES

## Potential European LiB Recycling Feed Volumes




*Source: Benchmark Minerals Intelligence (Battery Cell Capacity) and Neometals Management (Utilisation rate 75%, Scrap Rate 10% and Cell Weight 45g/Wh)*

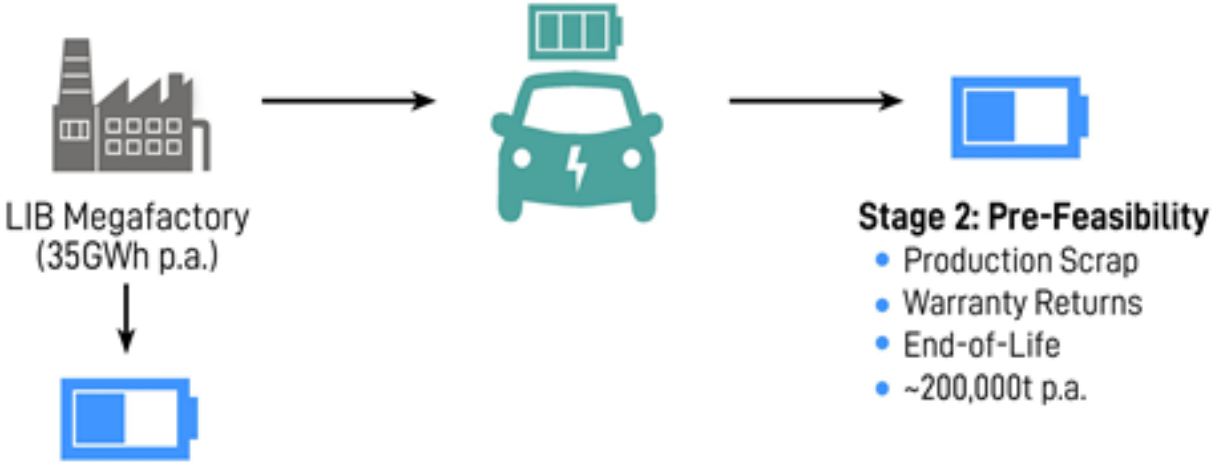
# Primobius

**Battery recycling without limits**

## LI ION BATTERY RECYCLING PROJECT

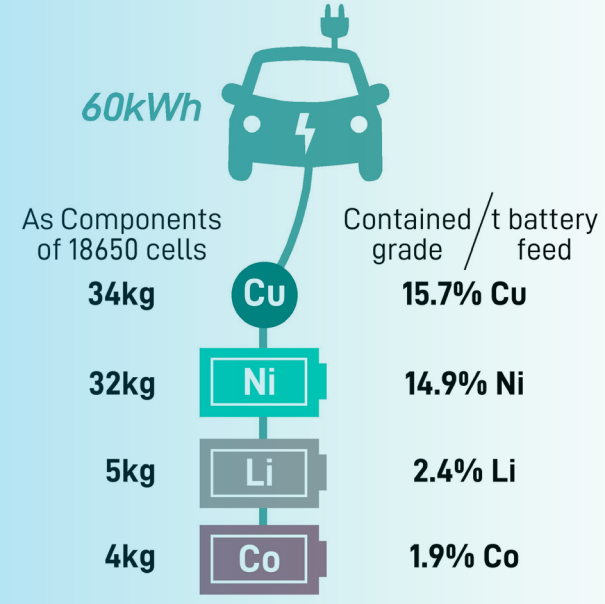
50:50 JV with SMS group – ‘Primobius GmbH’

# AIMING TO BE RECYCLER OF CHOICE FOR CELLMAKERS AND CARMAKERS

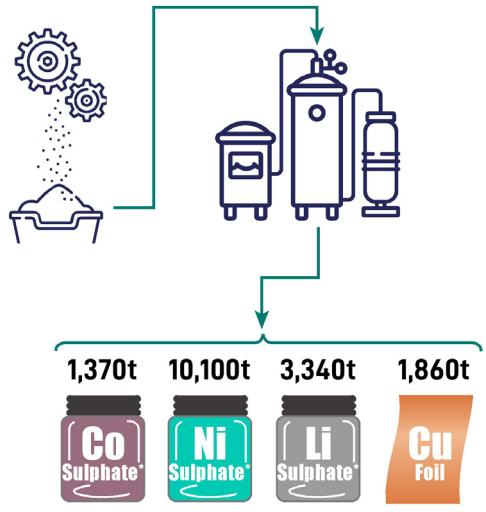


# DEVELOPING EU'S LARGEST HYDROMET REFINERY FOR LIB CATHODE PRECURSORS

## Typical BEV Battery Composition
### Using NCM 811 Chemistry




## Annual Primobius Production
### @ 50 Tonnes per Day of Battery Cells

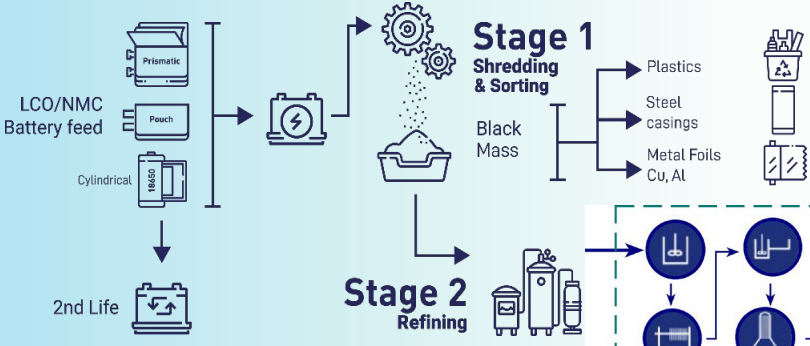


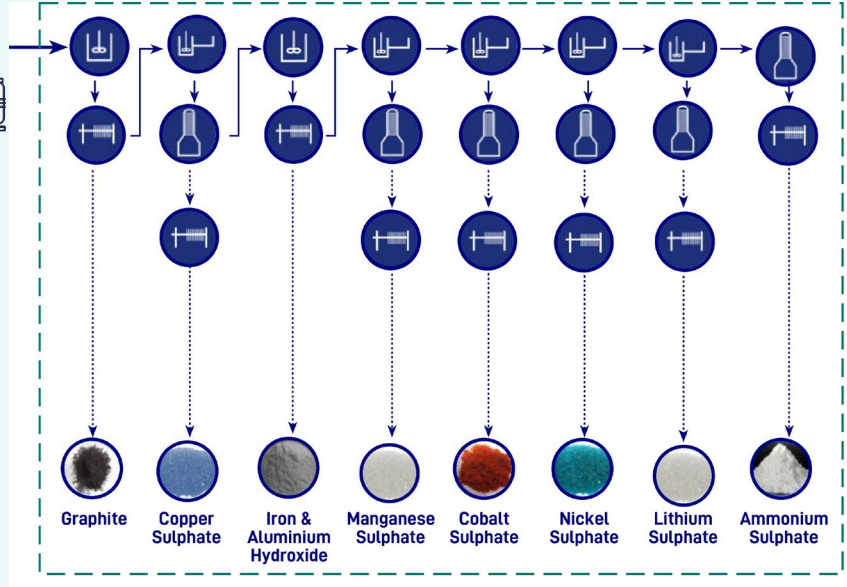

*$CoSO_4$, $7H_2O$, $NiSO_4$, $6H_2O$, $LiSO_4$. $H_2O$

*Source: Benchmark Minerals Intelligence*

# OUR PROPRIETARY RECYCLING PROCESS

**Successfully Piloted at SGS Canada in 2019/20**





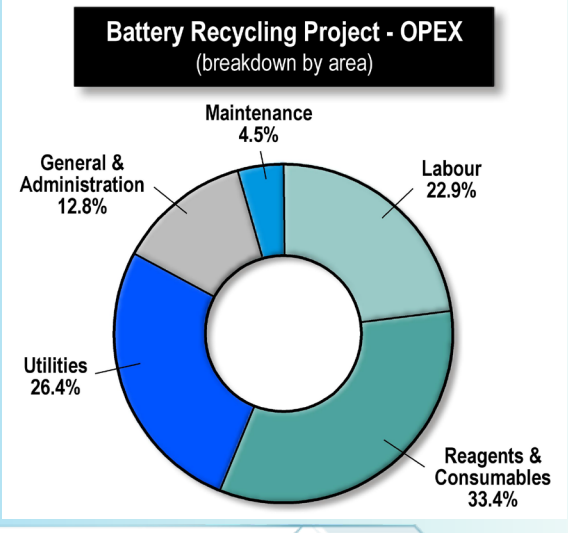

- **85% Recycling Efficiency**
- **Ni+Co Sulphates (+80% Rev$) meet Chinese cathode specs**
- **Tailings is fertiliser feedstock**

# ENGINEERING COST STUDY ESTIMATES MAY 2021 - AACE CLASS 4 (±25%)

**Based on Pilot Plant at SGS Canada in 2019/20**

## Operating Costs

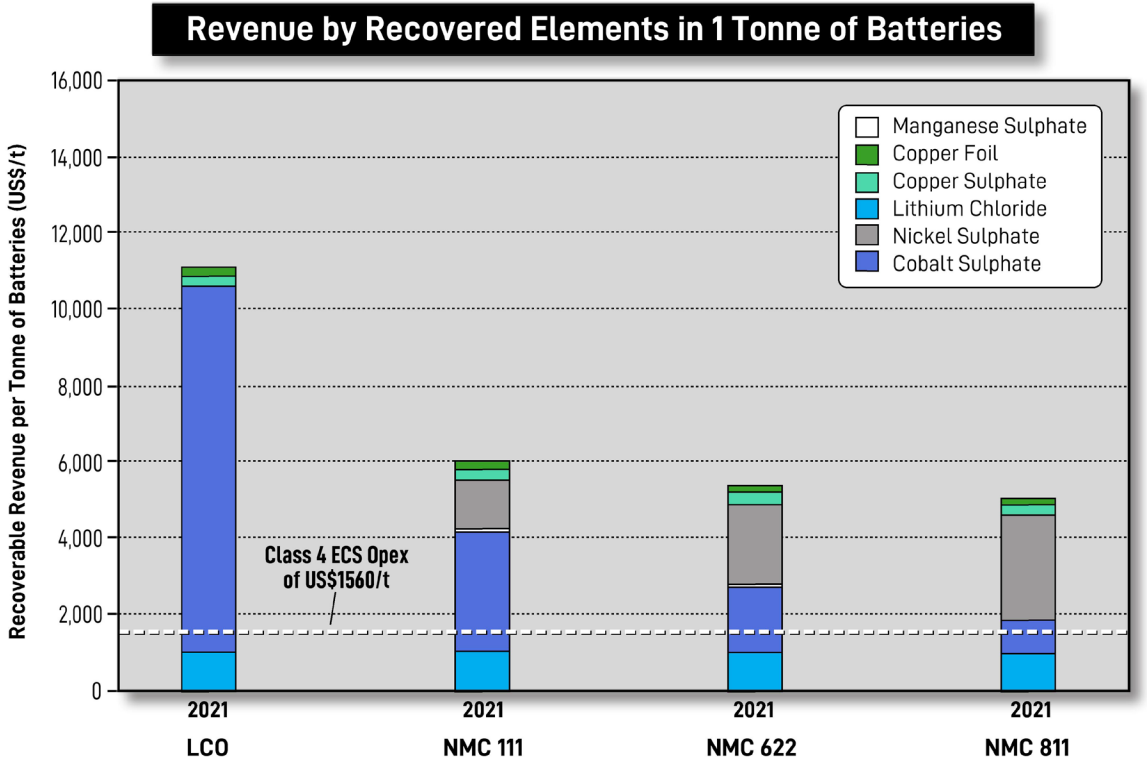
**US$ 1,560/t Feed**




| CAPITAL | US$M |
|---|---|
| DIRECTS | |
| Infrastructure Civil | 9 |
| Land and Buildings | 34 |
| Front End | 6 |
| Hydromet | 24 |
| Utilities | 12 |
| Installation | 11 |
| Sub-Total Directs | 96 |
| INDIRECTS | |
| Engineering, Project Management and Owner's Costs | 45 |
| Insurance, Freight, Taxes and Interest | 9 |
| Sub-Total Indirects | 54 |
| CONTINGENCY (10%) | 15 |
| TOTAL | 165 |

*Source: Neometals ASX Announcement:- Lithium Battery Recycling – Outstanding Cost Estimates (7 May 2021)*
*Note: total numbers may not sum due to rounding*

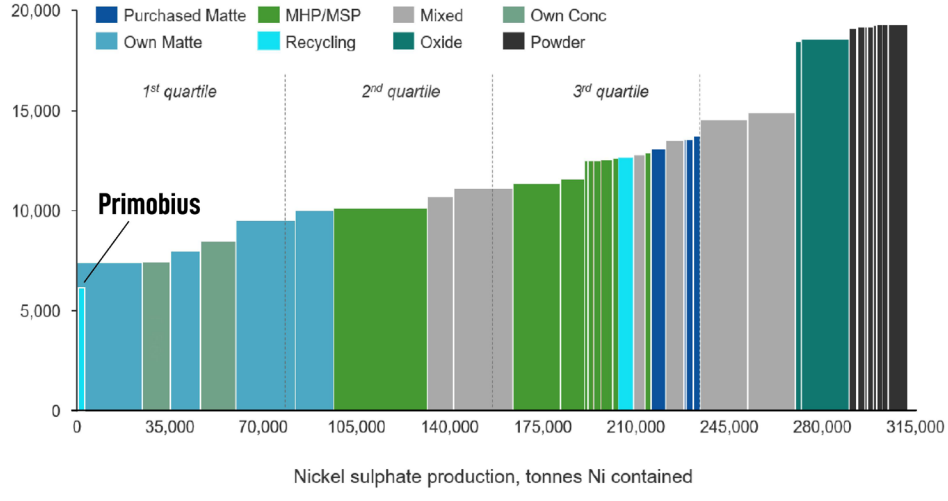
# ROBUST ECONOMICS ON MAJOR EV BATTERY CHEMISTRIES




*Source: Pricing - Fastmarkets (Cobalt, Nickel, Manganese - Spot), HIS Markit Trade Data (Lithium - Spot), Neometals Management (Copper Products - Forecast)*
*Battery Cell Composition and Product Recoveries: Cobalt-82%, Nickel-83%,*
*Lithium-82%, Copper-88% combined, Manganese-78% (Neometals Management)*

# POTENTIAL LOWEST COST NICKEL SULPHATE PRODUCER

## Nickel Sulphate Cost Curve 2025




*Source: Cost Curve – Australian Mines/CRU (2019), Primobius Cost/Production – Neometals Management (2021) based on ASX Announcement:- Lithium Battery Recycling – Outstanding Cost Estimates (7 May 2021)*

# OUR COMMERCIALISATION PARTNER

SMS group

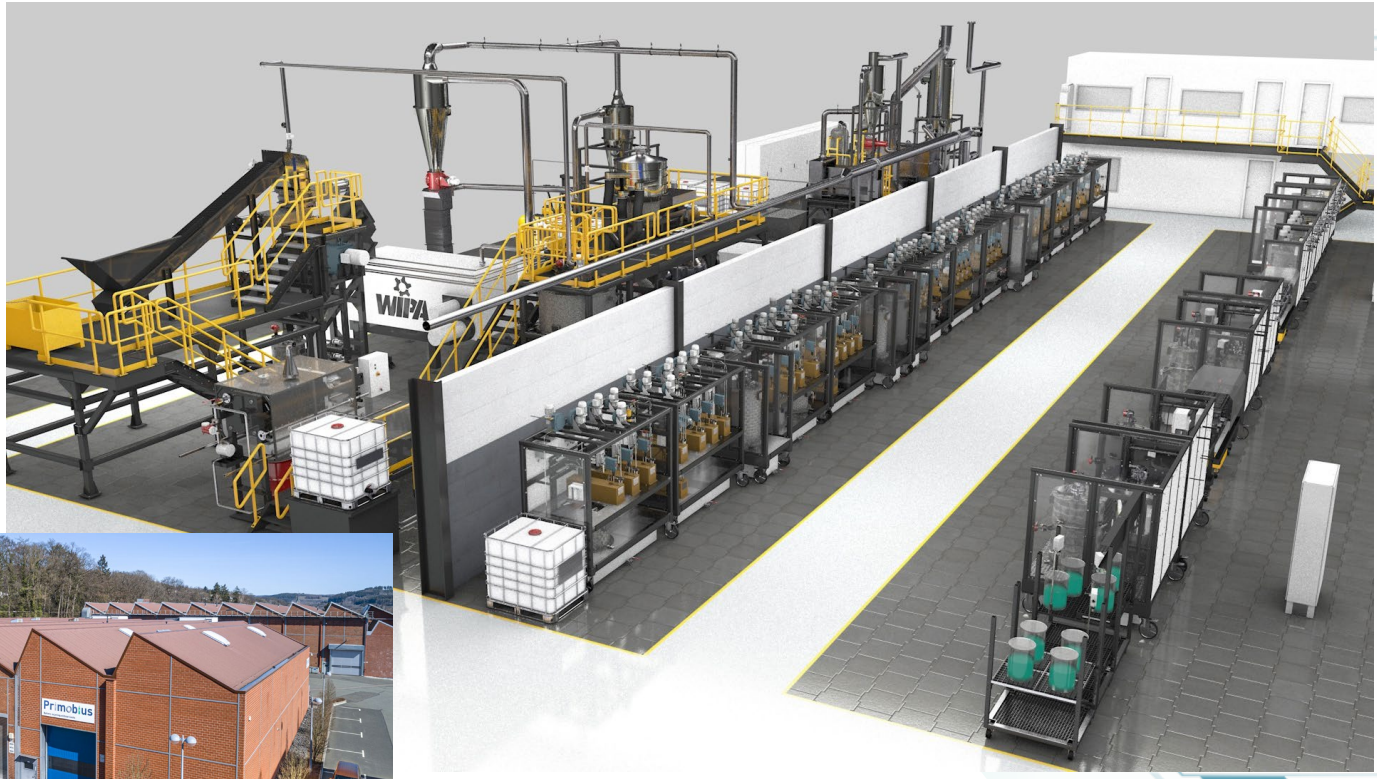
## 50:50 JV WITH SMS group GmbH

- Incorporation of Primobius GmbH to commercialise recycling technology
- Constructing a showcase demonstration plant in Germany, complete feasibility study and FID consideration MarQ22
- Evaluating both 20ktpa and 200ktpa plants
- SMS will build, operate and procure debt financing* on behalf of JV
- Global commercial roll out capitalising on the SMS global footprint / reputation (140 years old, 14,500 employees at 95 sites)

*for 50:50 debt:equity on a best endeavours basis

# DEMONSTRATION PLANT

**Demonstration Trial Feed secured from EV maker and ESS maker (Itochu)**



**Dedicated facility at SMS Manufacturing Headquarters Hilchenbach, Germany**

# PRIMOBIUS OFFERS A CLEAR USP AND WILL PROVIDE THE BEST POSSIBLE RECYCLING SOLUTION

1 **Safe process according to regulations**
High share of recycled materials to high purity chemicals meeting the current regulations with a safe process

2 **Flexible and robust technology**
In contrast to competitors' multiple battery chemistries, formats and types can be processed without prior discharging

3 **Environmentally friendly**
In contrast to incumbent pyromet. processes our technology generates less $CO_2$ production and less transportation of hazardous wastes

4 **Ethical sourced high purity products**
JV will produce high purity chemicals not intermediates intended for the ethical re-supply to the cathode producer supply chains

5 **Continuous improvement**
We continuously optimize our existing processes with regards to product yield, quality and efficiency

USP = Unique selling proposition
JV = Joint Venture

# FLEXIBLE BUSINESS MODELS

## Service agreement

- Primobius to responsibly process production scrap or EOL batteries for a fee. Option to purchase all products under offtake agreement

## Partnership

- Primobius to build and operate recycling plant(s) both share economic returns – JV etc. Option to purchase all products under offtake agreement

## License

- License IP you the IP directly and BOOT/supply-only recycling plant(s)

# MOU WITH ITOCHU CORPORATION OF JAPAN

Primobius

Battery recycling without limits

ITOCHU

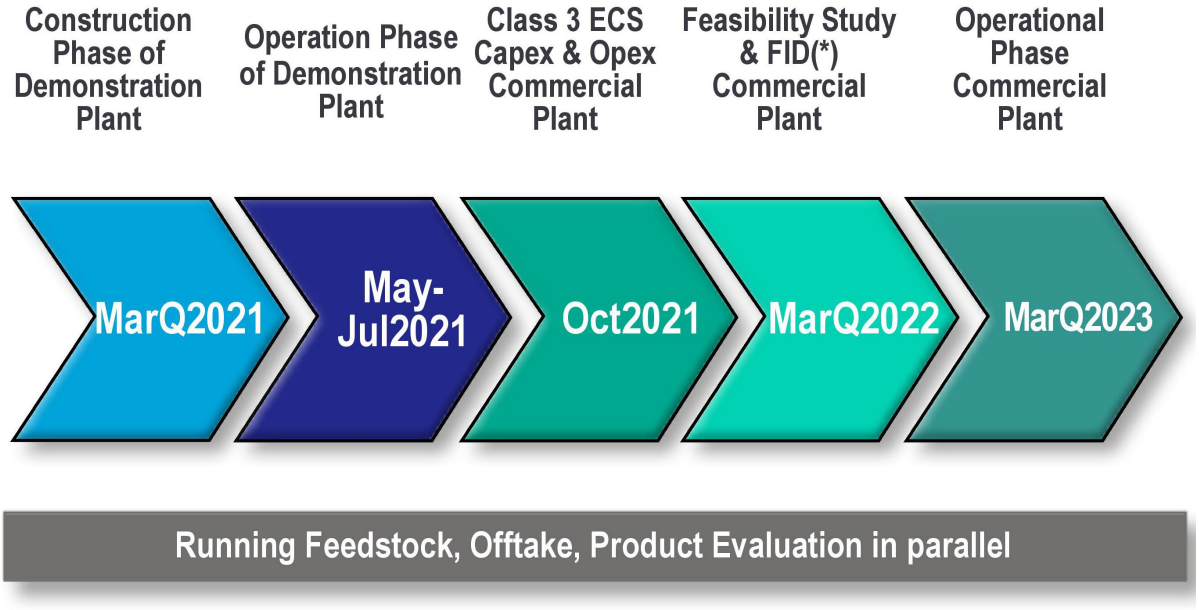
SmartStar

Itochu's stationary energy storage brand

- Itochu is one of Japan's largest trading houses (market cap +US$50B
- Itochu strong footprint in the lithium-ion battery supply chain
- Itochu produces cathode and anode materials, also its own stationary storage battery systems (ESS)
- Itochu will supply second demonstration trial which will process solely ESS batteries
- Evaluating hub and spoke model, centralised hydromet circuit fed by multiple shredding/beneficiation plants not only in Japan but throughout Asia.

*Full details refer to Neometals ASX Announcement entitled: "Lithium Battery Recycling – MoU with Itochu Corporation" released on 5 March 2021.*

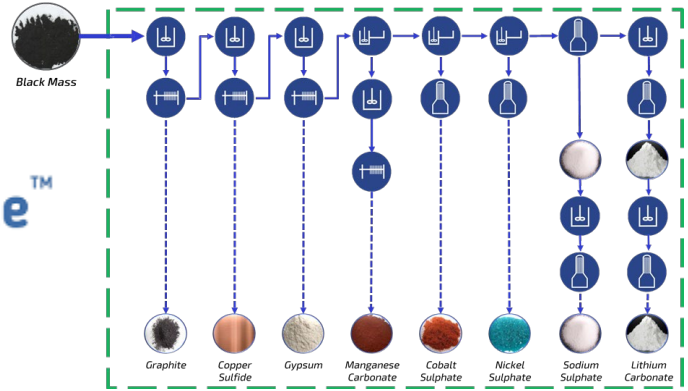
# OUR INDICATIVE TIMELINE




*Source: Neometals Management (*) Subject to NMT and JV Board Approval.*

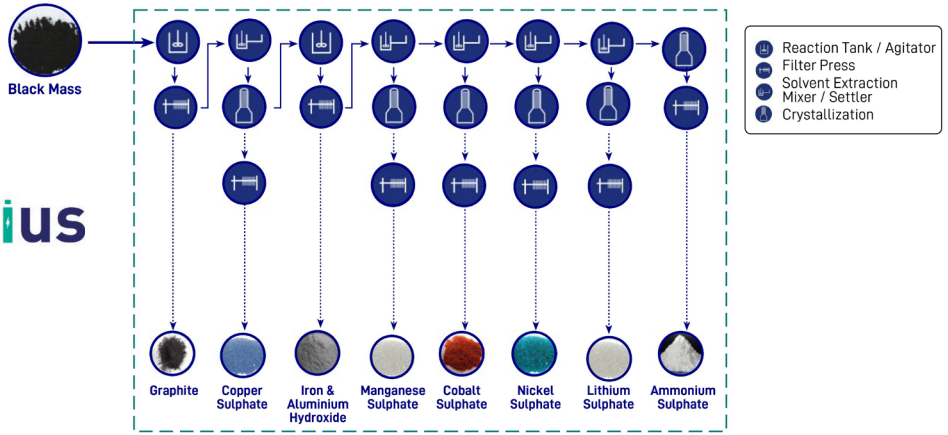
# FIRST PUBLIC PEER METRIC FROM HYDROMET RECYCLING DEVELOPER PURCHASED FOR US$975M IN SPAC DEAL

Li-Cycle™




Primobius

Battery recycling without limits



# RECYCLING AND RECOVERY

## VANADIUM RECOVERY PROJECT

Earning into 50:50 JV with Critical Metals Ltd

# THE OPPORTUNITY

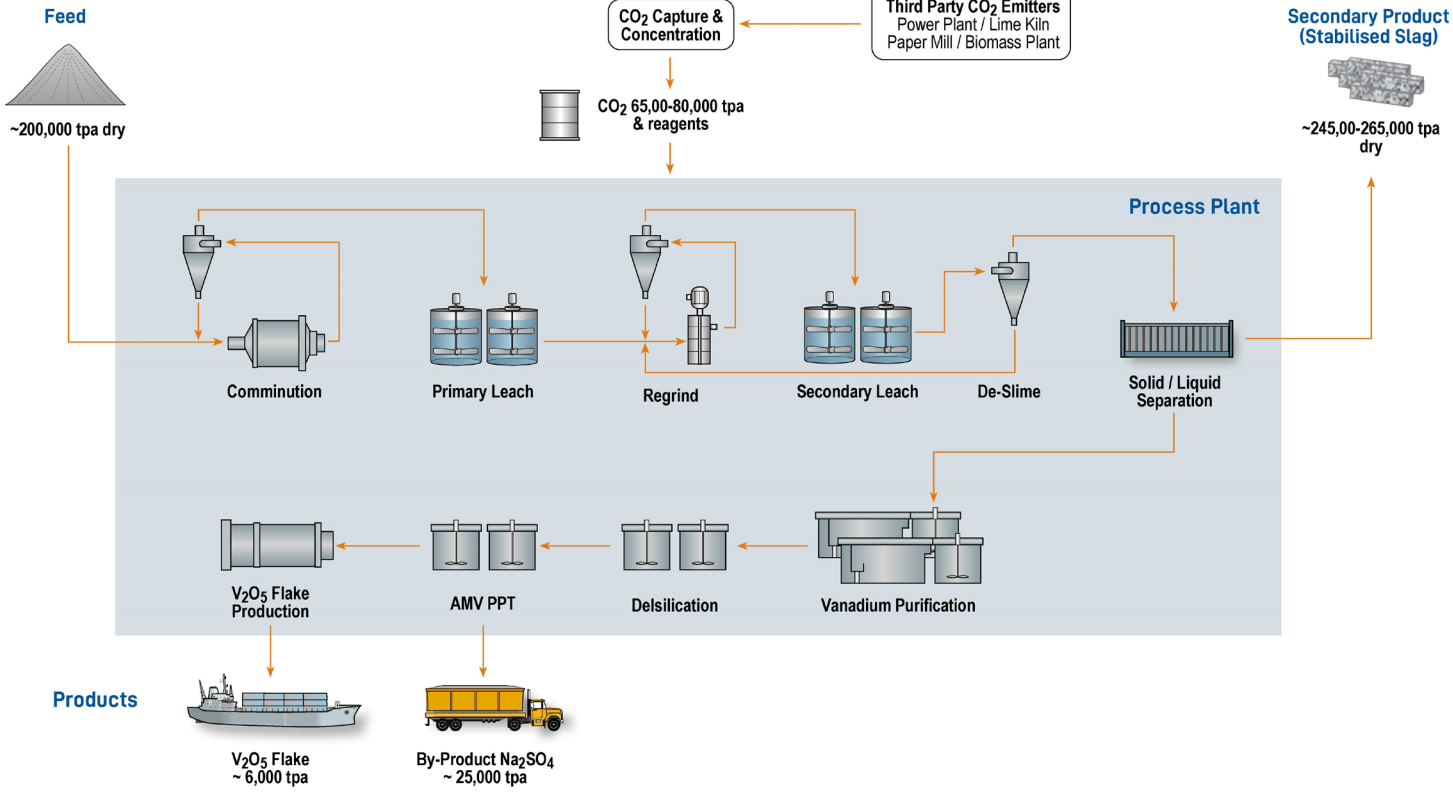
SSAB Luleå Steel Mill

- Scandinavian steel giant SSAB has +2Mt of high-grade vanadium-bearing by-product ("Slag") stored at 3 steel mills in Sweden and Finland.
- Secured by Critical Metals Ltd (19.9% NMT) under supply agreement (*)
- Neometals earning into 50:50 Incorporated JV by funding evaluation to FID and licensing proprietary hydromet process (*)
- Eco-friendly process captures and sequesters more than 65,000t $CO_2$ per annum – zero carbon footprint
- Latest Class 4 Cost Study confirms potential lowest quartile cost position of high-purity 99.5% $V_2O_5$ (**)

** For full details please refer ASX release dated 6th April 2020 titled "High-Grade Vanadium Recycling Agreement"*
*** Please refer to ASX release dated 21 April 2021 titled "Vanadium Recovery Project – Positive Cost Study Results"*

# OUR PROPRIETARY RECOVERY PROCESS

## Successfully Mini-Piloted at Strategic Metallurgy Perth in 2020




***Source: Neometals*** *ASX announcement 21 April 2021 titled "Vanadium Recovery Project – Positive Cost Study Results"*

# PILOT PLANT TRIALS IMMINENT

- Successful demonstration proprietary vanadium recovery flowsheet in continuous mini-pilot test work campaign (100hrs @ 1kg/hr). Recovery +75%. Purity >99.5% $V_2O_5$

- Pilot plant construction materially complete and commissioning has commenced. Throughput rate 25X scale-up 25 kg/hr for 10+6+6 days continuously on samples from Lulea, Oxelosund and Raahe respectively

*For full details of Mini Pilot Plant results refer ASX release dated 4th November 2020 titled "Successful Vanadium Recovery Mini-Pilot and commencement of PFS"*

# PFS RESULTS

**Based on Mini-Pilot Plant at Strategic Metallurgy Perth in 2020**

**THROUGHPUT RATE**

**200,000tpa**

**PRODUCTS**

**13.43M lbs p.a.**
**high purity**
**zero carbon $V_2O_5$**

**OPEX**

**US$4.25/lb**

**CAPITAL COSTS**

**US$183.4M**

**$NPV_{10}$***

**US$230.5M**

**IRR***

**31.2%**

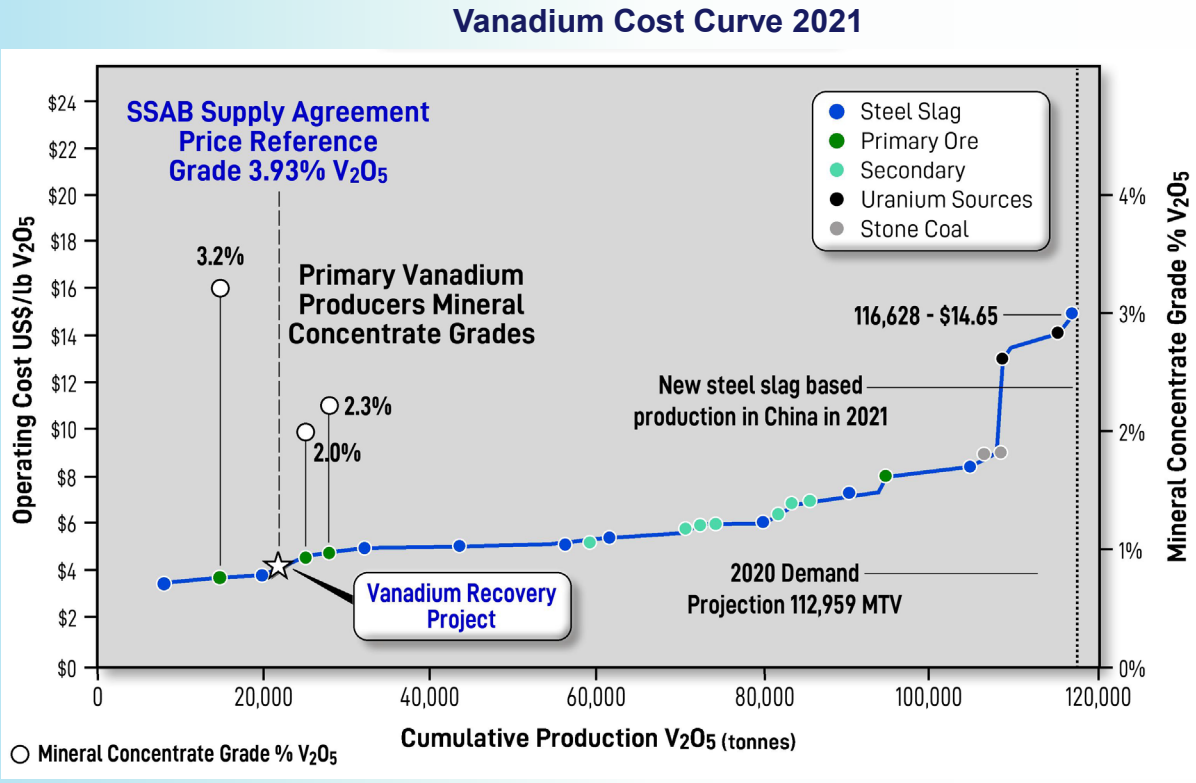
**PAYBACK***

**<4 years**

**Pre Tax and 100% ownership basis*

**Source: Please refer to ASX announcement 4 May 2021 titled "Vanadium Recovery Project - PFS Indicates Robust Potential Economics"*

# POTENTIAL LOWEST QUARTILE COST VANADIUM PENTOXIDE PRODUCER

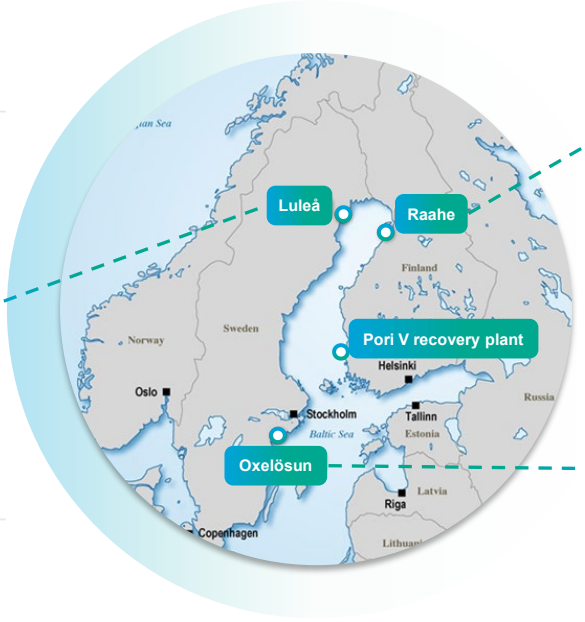



*Source: TTP Squared – Cost Curve, Neometals Management – Vanadium Recovery Project Cost Estimate*

*Please refer to ASX announcement 21 April 2021 titled "Vanadium Recovery Project – Positive Cost Study Results"*

# PLANT LOCATION AND STOCKPILES

| Luleå | |
|---|---|
| Slag stored | +630kt |
| Vanadium Grade $V_2O_5$ | +4% |
| Contained $V_2O_5$ | +25,000t |
| Net Slag Added | 100ktpa |




| Raahe | |
|---|---|
| Slag stored | +360kt |
| Vanadium Grade $V_2O_5$ | +3% |
| Contained $V_2O_5$ | +13,000t |
| Net Slag Added | 80ktpa |

| Oxelösund | |
|---|---|
| Slag stored | +890kt |
| Vanadium Grade $V_2O_5$ | +3% |
| Contained $V_2O_5$ | +25,000t |
| Net Slag Added | 90ktpa |

## Agreement Volumes and Price

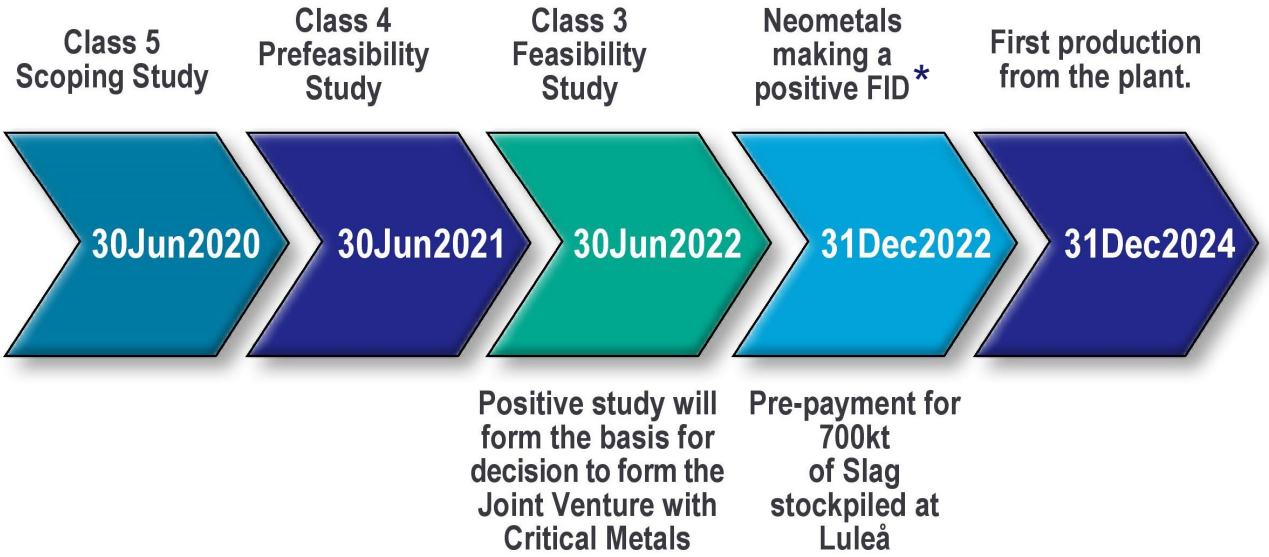
- Initial purchase of 700kt of Slag from Luleå post FID
- Purchase 200ktpa Slag post commercial production for 10 years
- Price linked to prevailing FeV80 vanadium price and vanadium content (reference grade 2.2% V ~ 3.9% V2O5)

# MOU WITH CITY OF PORI, FINLAND FOR VANADIUM RECOVERY PLANT SITE

- City of 86,000 inhabitants with a long history as a hydrometallurgical centre of excellence
- Access to a 'build-ready' 20 hectare industrial-zoned site adjacent to the deep water, year-round port with rail access to the bulk import/export and chemical berths
- Access to renewable power and other utilities and free access to its industrial sources of CO2 for capture and sequestration in Neometals' proprietary process flowsheet

*For full details of Site Selection results refer ASX release dated 10th December 2020 titled "PORI, FINLAND SELECTED FOR VANADIUM RECOVERY PROJECT"*

# INDICATIVE PROJECT TIMELINE

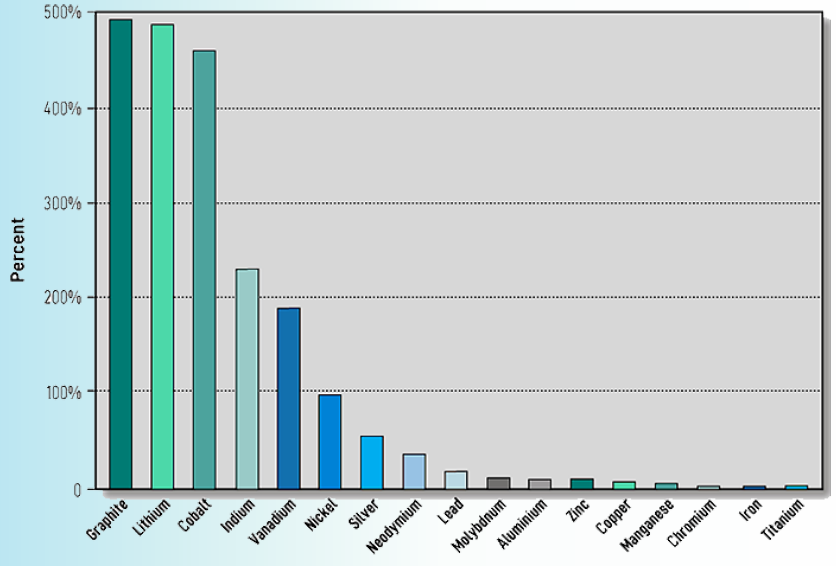



*Source: Neometals Management (*) Subject to NMT and JV Board Approval.*

# UNPARALLELED EXPOSURE TO THE NEW ENERGY (STORAGE) MEGATREND

- Exposure to key commodities as the World transitions to low carbon:
  - Li, Co, Ni, V, Cg
- All the right elements®

## 2050 Annual Demand from Energy Technologies as Percentage of 2018 Production




Source: World Bank Group

# COMPANY HIGHLIGHTS

## SECURITY

Strong balance sheet, no debt – can fund developments to FID

Consistent strategy - partnering to reduce risks and realise returns

Strong Board and management – project execution experience

History of cash returns to shareholders

Pivot to recycling and recovery removes traditional mining risk

## OPPORTUNITY

Green critical materials for Europe

Resource efficiency for circular economy

Secure, ethical supply chain certainty

Multiple catalysts across portfolio

Transitioning to best practice ESG - ‘sustainable investment’

THANK
YOU
PLEASE VISIT
NEOMETALS.COM.AU