

## Building an Ethical Global Manganese Business

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Supplying low-carbon sustainable manganese ore and EV battery grade HPMSM to global markets.

Paydirt Battery Minerals Conference – April 2024

# Disclaimer

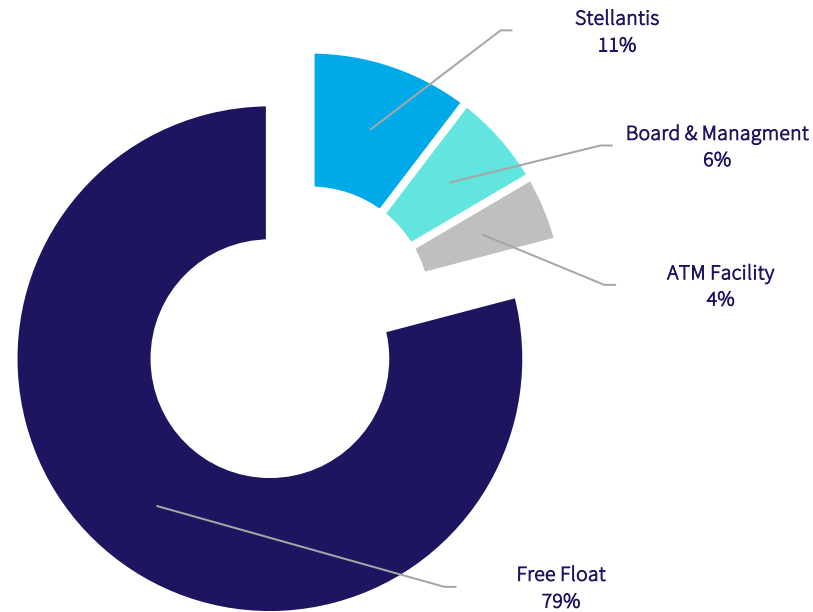
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- Owner of the Butcherbird Manganese Mine in Western Australia which is currently being expanded to produce >1Mt of high-quality manganese oxide concentrate<sup>1</sup>.
- Developing a USA-based refinery to supply ethical battery-grade High Purity Manganese Sulphate Monohydrate (HPMSM) products<sup>2</sup>.
- Offtake and funding agreements in place with our partners General Motors and Stellantis to supply HPMSM for Electric Vehicle batteries.



<b>ASX Ticker:</b>	E25	<b>Shares on Issue:</b>	218M
<b>OTCQX Ticker:</b>	ELMTF	<b>Debt:</b>	Nil

<sup>1</sup>Reference: Company ASX Release dated 23 January 2024

<sup>2</sup>Reference: Company ASX Release dated 12 April 2024

## BOARD OF DIRECTORS



John Ribbons  
Chairman  
CPA



Justin Brown  
Managing Director  
Geologist



Fanie van Jaarsveld  
Non-Executive Director  
Analytical Chemist



Sam Lancuba  
Non-Executive Director  
Chemical Engineer

Experienced, multi-  
disciplinary Board  
& Management

## PROJECT DEVELOPMENT AND OPERATIONS TEAM



Michael Jordon  
Chief Financial Officer  
CPA



Neil Graham  
VP Battery Materials  
Chemical Engineer



Sias Jordaan  
VP Marketing & Logistics  
Accountant



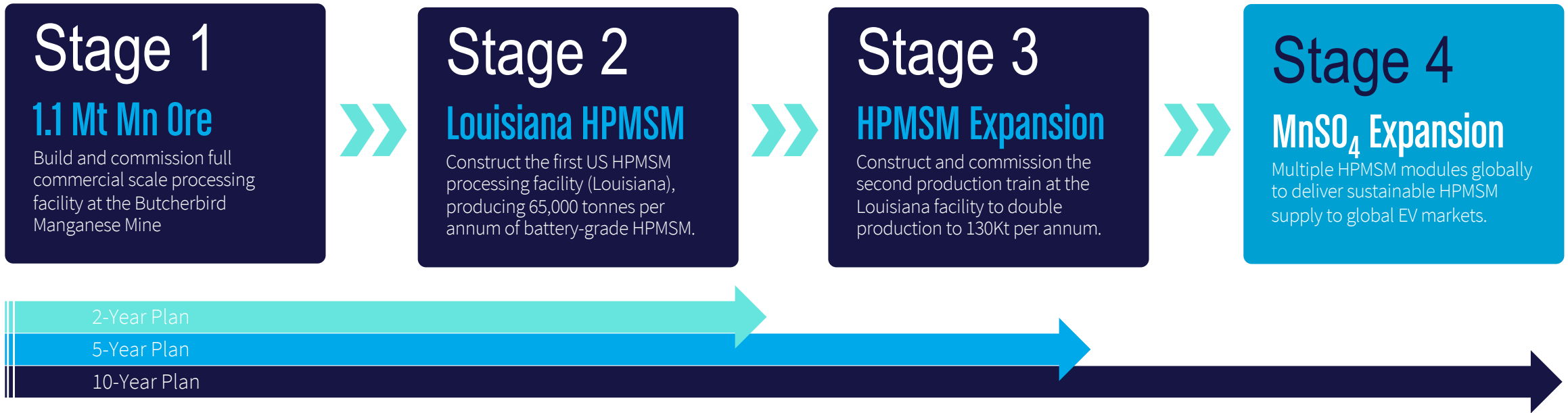
Ian Huitson  
Study Manager  
Mining Engineer



Gideon van Wyk  
GM Manganese Ore Bus.  
Mechanical Engineer



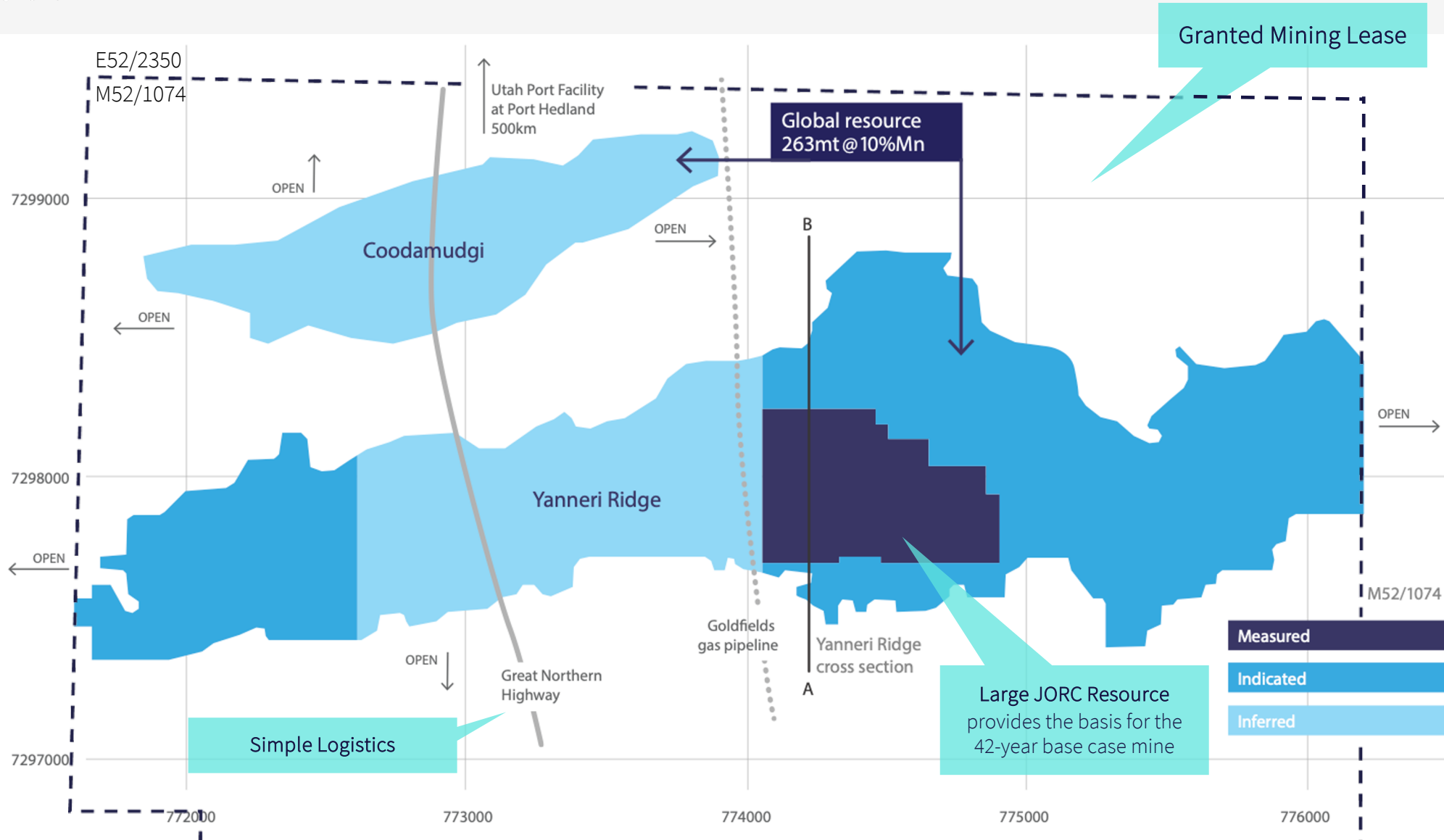
Leon Lima  
Technology Manager  
Chemical Engineer



Best in class, low carbon, ethically produced, scalable HPMSM for electric vehicle batteries:

**Sustainably Supplying Global EV Markets**

# Large, long-life manganese asset in Western Australia



# Established Australian manganese operations



Process Water Storage

ROM Stocks

Processing Plant

Main Access Road

Ore Stockpiles  
Feedstock for HPMSM  
conversion



## Key goals of Butcherbird expansion design:

- Increase production volume.
- Reduce unit operating costs.
- Reduce labour intensity.
- Improved reliability, clay (and moisture) handling.
- Increased profitability.

## Feasibility Study\* provides Compelling Economics:

- Equipment selection and capital cost estimate complete.
- Detailed engineering and design in progress.
- Implementation timeline estimated at 12 months from FID.

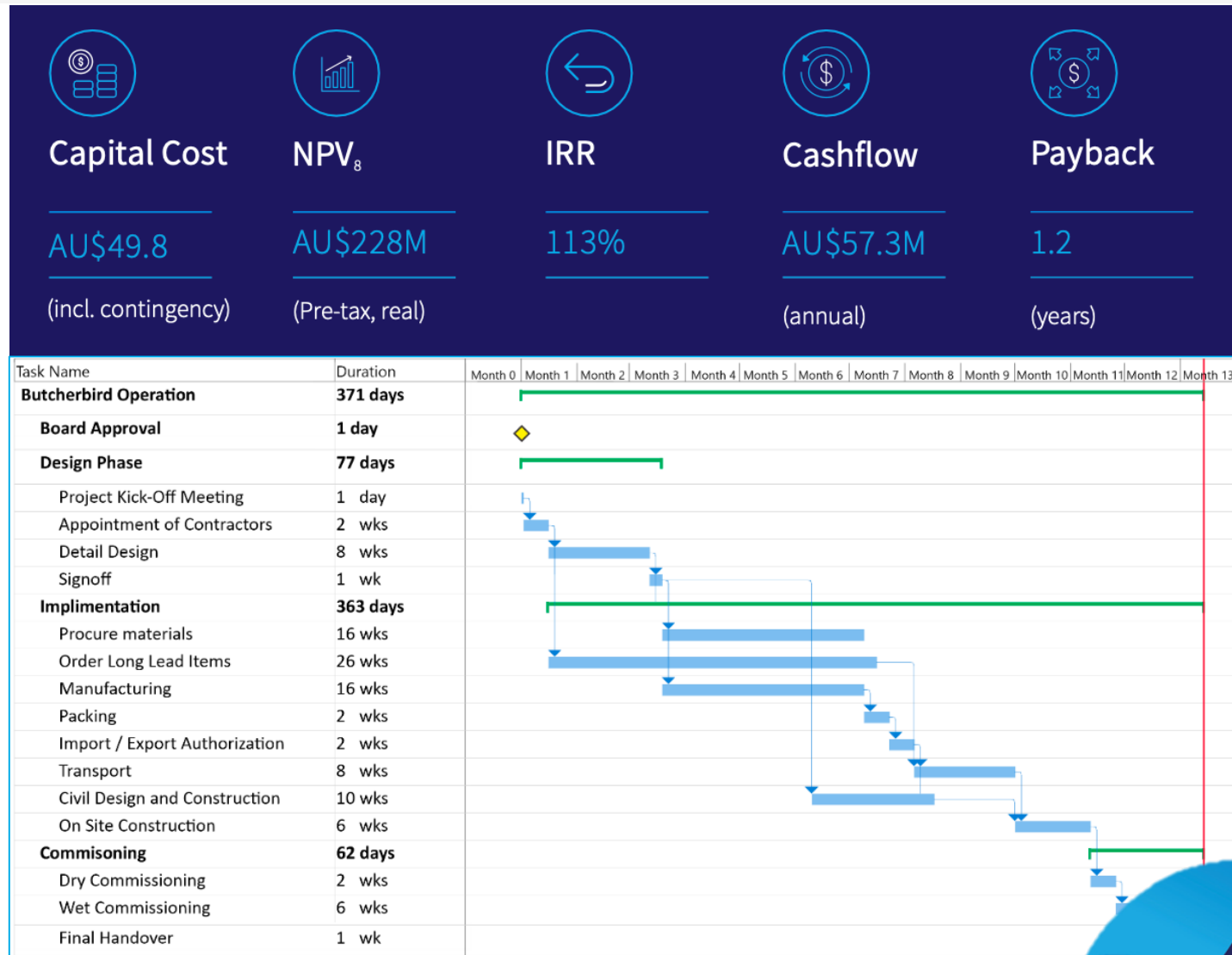
## Key Design/Equipment Selection Outcomes



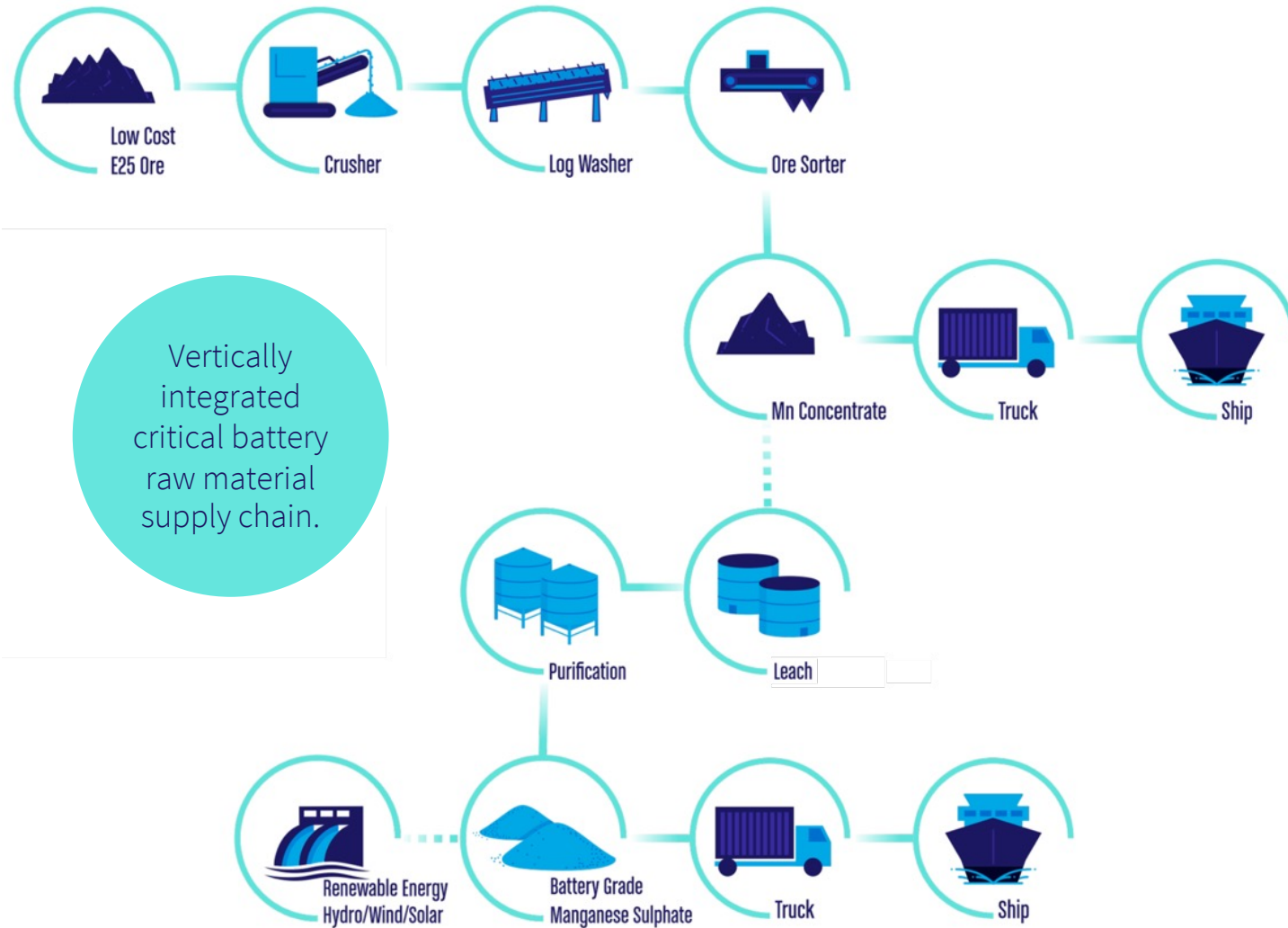


# Butcherbird Expansion – Feasibility Study delivers robust economics

- Butcherbird Expansion Feasibility Study targets 1.1 Mtpa manganese ore production
- Production to capture Economies of Scale with reduced operating costs.
- Moves Element 25 down the global manganese ore cost curve.
- Negotiations underway with current offtake partners and other industry players.
- Demand for additional volumes robust.
- Approximately 12 months to deliver post FID.
- NAIF Strategic Assessment Phase successfully completed, currently undergoing due diligence.



# Vertically integrated global HPMSM supply



## Manganese Ore Supply

Australia

Production of high-quality Australian manganese ore concentrate as feed-stock for HPMSM refinery to be built in the USA.

Ore which is not used for HPMSM production will be sold to existing customers in the ferro alloy industry.



## Louisiana HPMSM Refinery

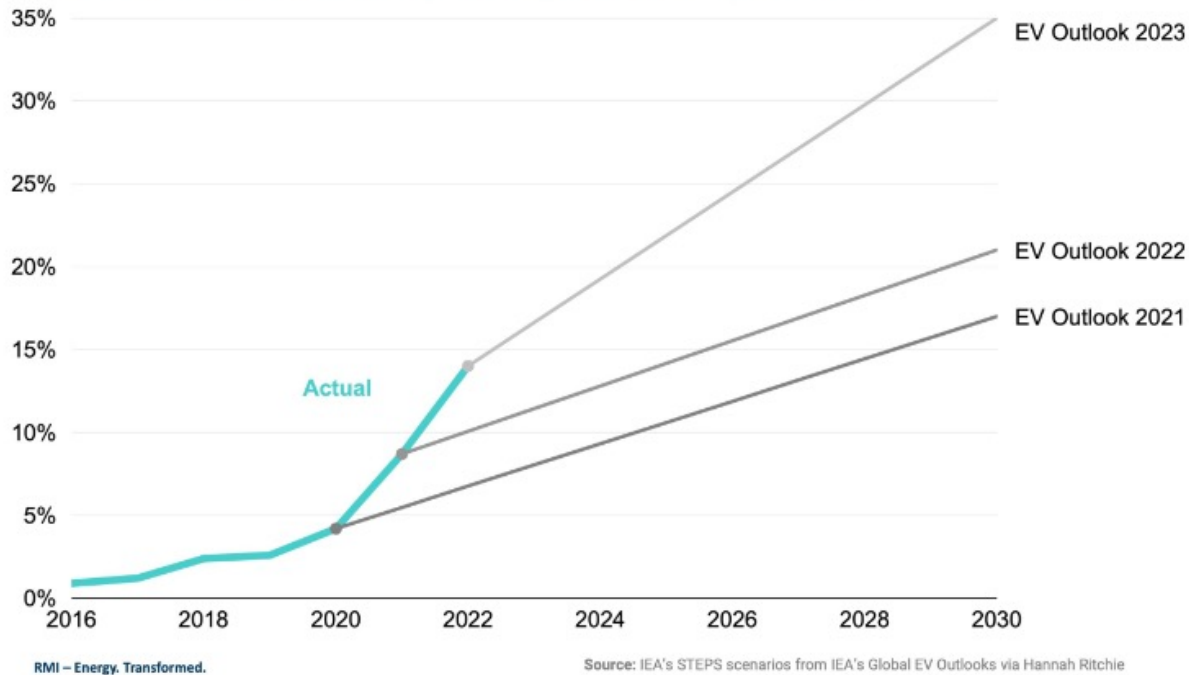
USA

Louisiana manganese refinery will utilise the Australian ore as feedstock to produce high purity low carbon IRA compliant battery grade manganese sulfate.



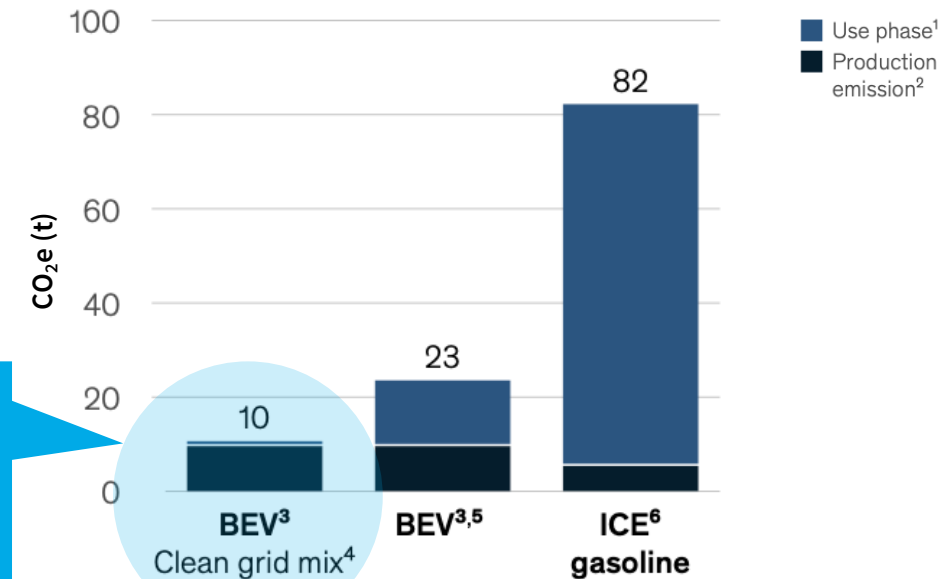
“...S-curve modelling, based on the EV growth so far and the lessons of other technology shifts, suggests EV sales will grow at least four-fold by 2030, and make up between 62 percent and 86 percent of global car sales in 2030...” RMI – Energy Transformed 2023

## EV sales forecasts keep being revised upwards



## Lifetime CO<sub>2</sub>e emissions by vehicle powertrain

### United States



Electric Vehicles have much lower lifetime carbon emissions when charged with clean energy

<sup>1</sup>Estimated use phase of 243,000 km.  
<sup>2</sup>Production emission references global average vehicle C-segment.  
 Source: McKinsey & Company, 2024

# Transition to higher manganese cathodes is beginning

Manganese Rich Cathode chemistries help to solve supply, ESG and supply security challenges



“High-manganese represents the **optimum cost-benefit ratio.**”

*Volkswagen, March 2021*



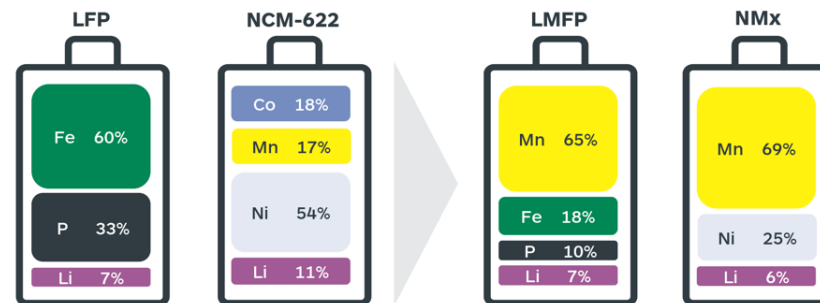
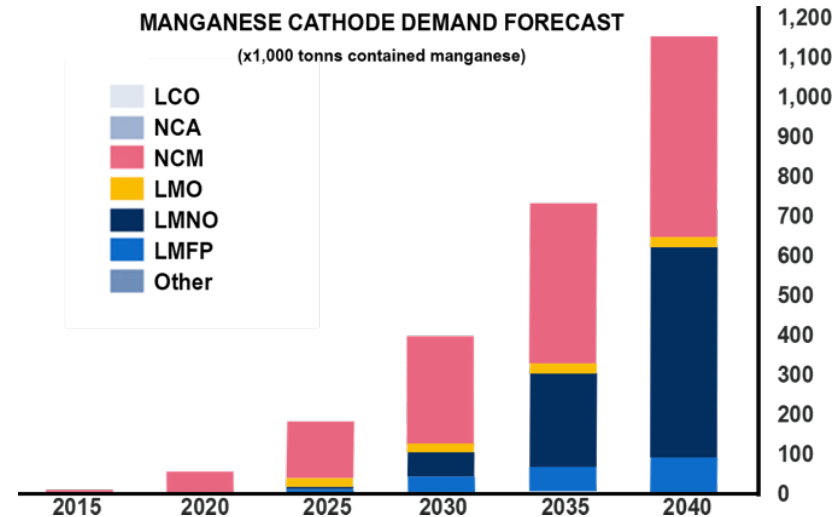
Li-Mn-rich technology shown as “**cost**” solution in electrification roadmap.

*BMW, November 2021*



Tesla is **working on new manganese battery cell.**

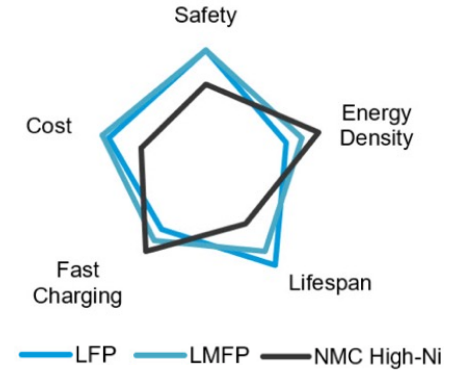
*Tesla, March 2022*



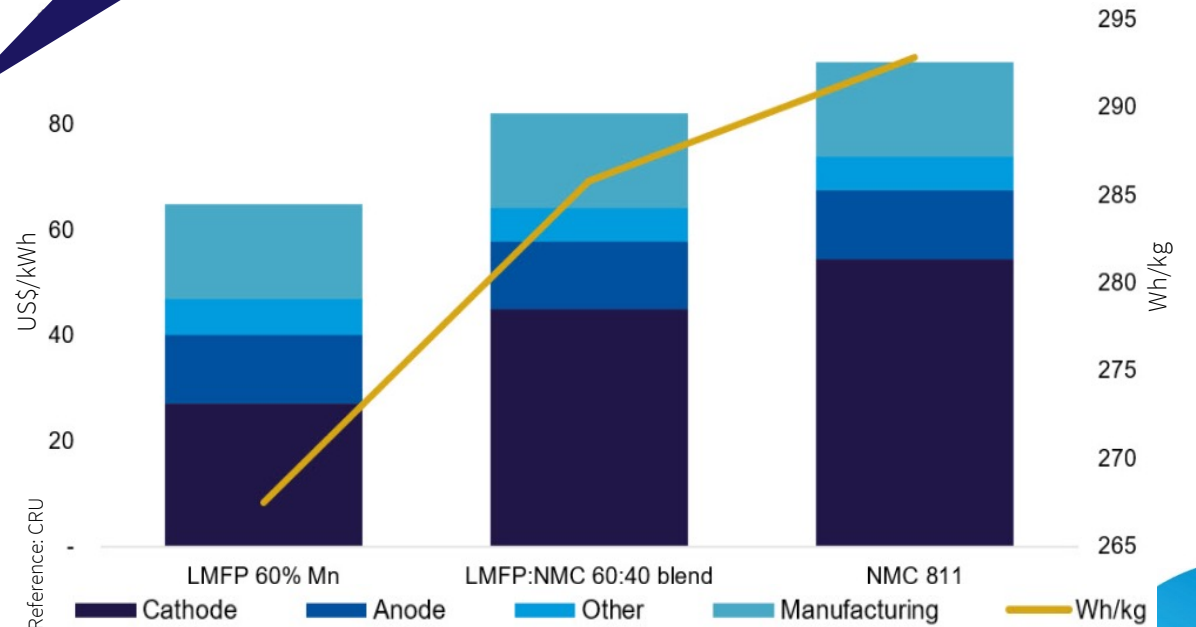
# Transition to higher manganese cathodes is beginning

LMFP, LMNO and  $NM_x$  cathode chemistries offer improved safety, higher energy density, reduced cost per kWh and greater supply chain flexibility.

**M is for Manganese.**  
Shift to higher manganese intensity cathodes is expected to continue beyond 2030.



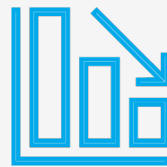
	2010s		2020s		2030s	
<b>1 Cathode</b>	LCO <sup>1</sup>	LMO <sup>2</sup> LFP <sup>3</sup>	LFP <sup>3</sup> NMC <sup>4</sup> /NCA <sup>5</sup>	LFP <sup>3</sup> NMC <sup>4</sup> /NCA <sup>5</sup> LMFP <sup>6</sup> /LMNO <sup>7</sup>	NMC <sup>4</sup> /NCA <sup>5</sup> LMFP <sup>6</sup> /LMNO <sup>7</sup> Sulphur	LMFP <sup>6</sup> /LMNO <sup>7</sup> Sulphur
<b>2 Separator/electrolyte</b>	Polymer/liquid	Polymer/liquid	Polymer/liquid	Polymer/liquid	Polymer/liquid Advanced liquid Semi-solid	Advanced liquid Semi-solid Solid
<b>3 Anode</b>	Graphite	Graphite	Graphite	Graphite Graphite and silicon	Graphite and silicon Lithium metal Silicon anode	Lithium metal Silicon anode
<b>4 Casing</b>	Cylindrical	Cylindrical Pouch	Prismatic Cylindrical Pouch	Prismatic Cylindrical Pouch	Cylindrical Pouch Prismatic	Cylindrical Pouch



## Problems with Current Technologies

- Large volumes of waste residues
- Toxic Reagents
- Inefficient
- Higher Cost
- Outdated processing technology

The Element 25 Process makes significant changes & improvements:



Reagents/Cost



Carbon Emissions



Waste Residue

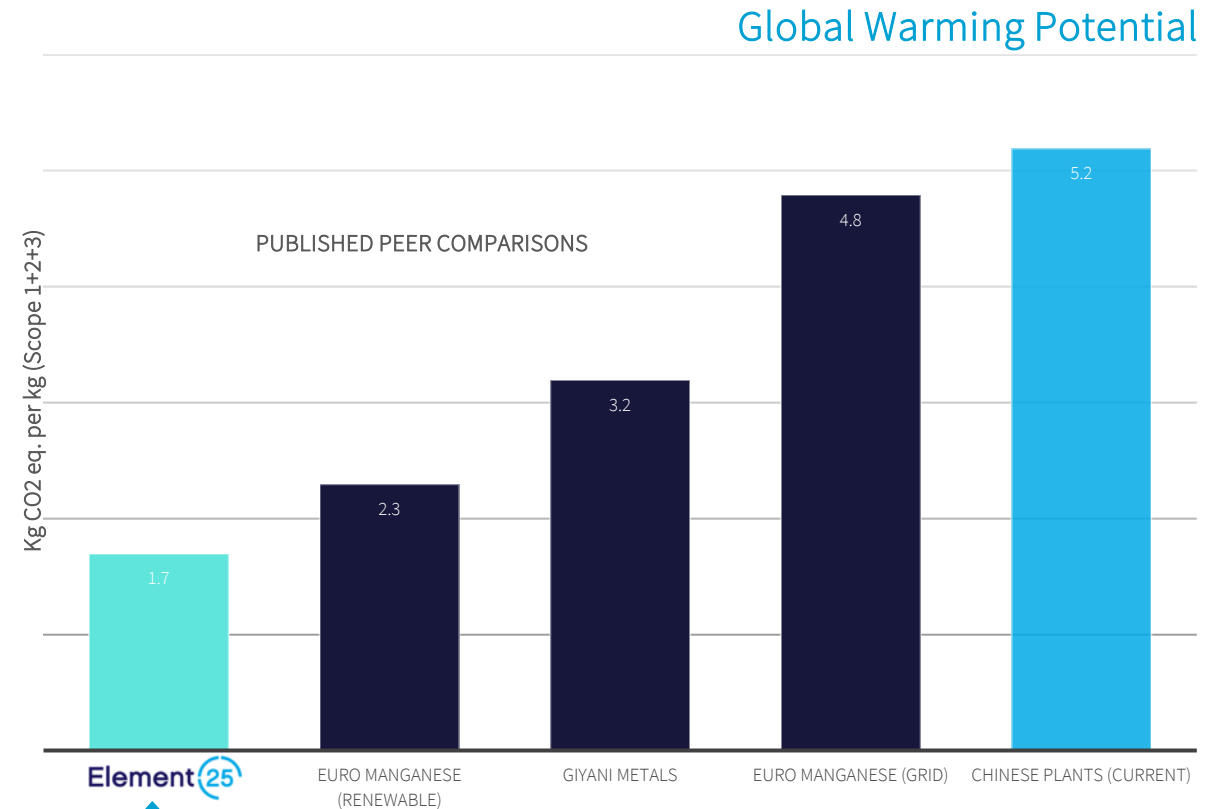
## Element 25 Process

- More efficient (fast kinetics, reduced energy)
- Minimises reagent requirements
- Reduced carbon intensity
- Lower volumes of waste residues
- Non-toxic residues may be able to be repurposed.



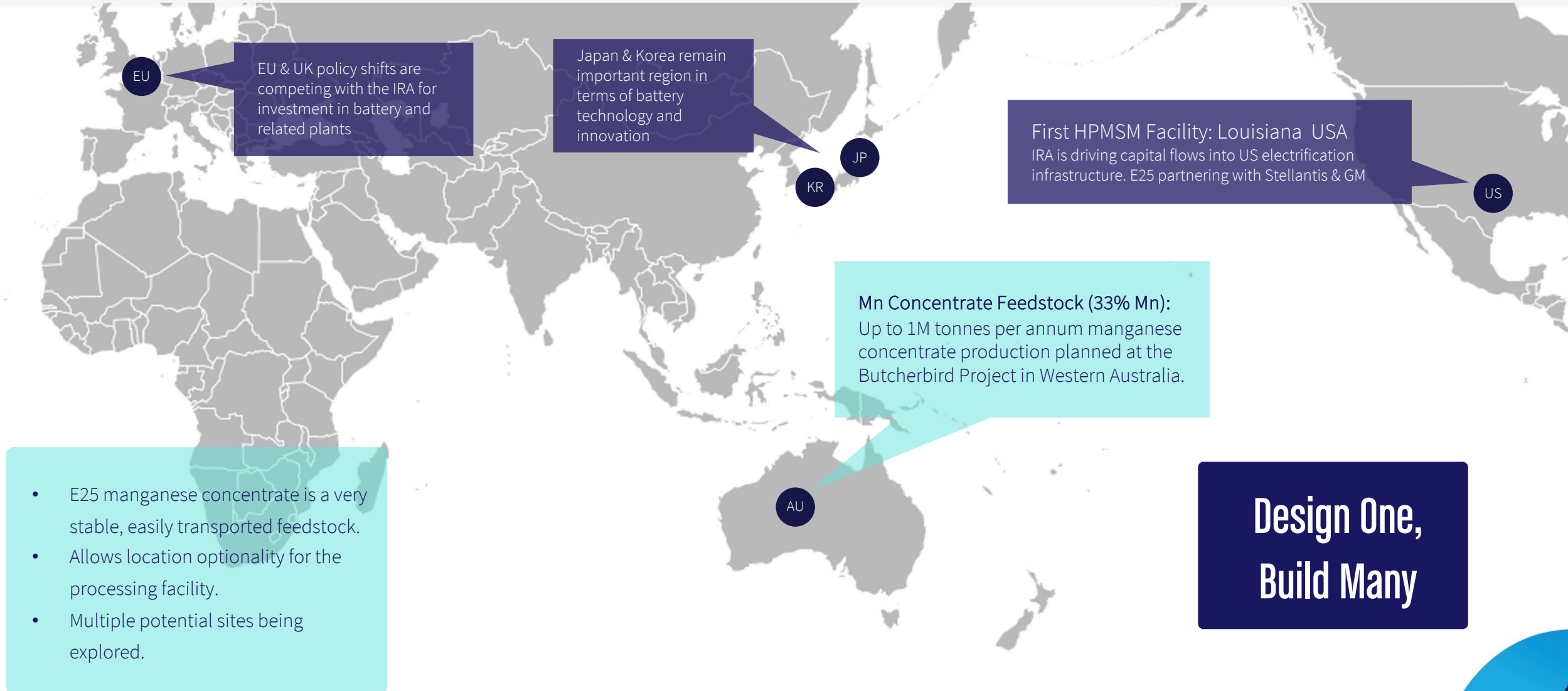
# LCA demonstrates a low-carbon, ethical process

- LCA covers Scope 1, 2 and 3 emissions from mining through to the proposed USA-based HPMSM processing plant.
- E25 HPMSM to produce ~1.7kg of CO<sub>2</sub> for every 1kg of HPMSM:
  - ~67% lower than competitors in China.
  - up to 47% lower than competitors outside China.
  - ~26% lower than next lowest project's optimised case.
- E25 process is **not yet fully optimised** for carbon reduction.
- E25 to explore renewable energy and other potential carbon reduction strategies to further reduce CO<sub>2</sub>.



THE E25 PROCESS IS THE LOWEST CARBON INTENSITY OPTION FOR HPMSM TODAY

# Global refining capacity in the longer term





## Strong financial results underpinned by competitive capital and operating cost estimate



Cashflow

**US\$155M**

pre-tax average cashflow p.a. at full production (2 trains)



NPV

**US\$1,662M**

pre-tax (real) at full production  
Discount Rate 8%



IRR

**29%**

pre-tax at full production



Capital

**US\$289M**

for train 1 with an additional US\$187M required for train 2

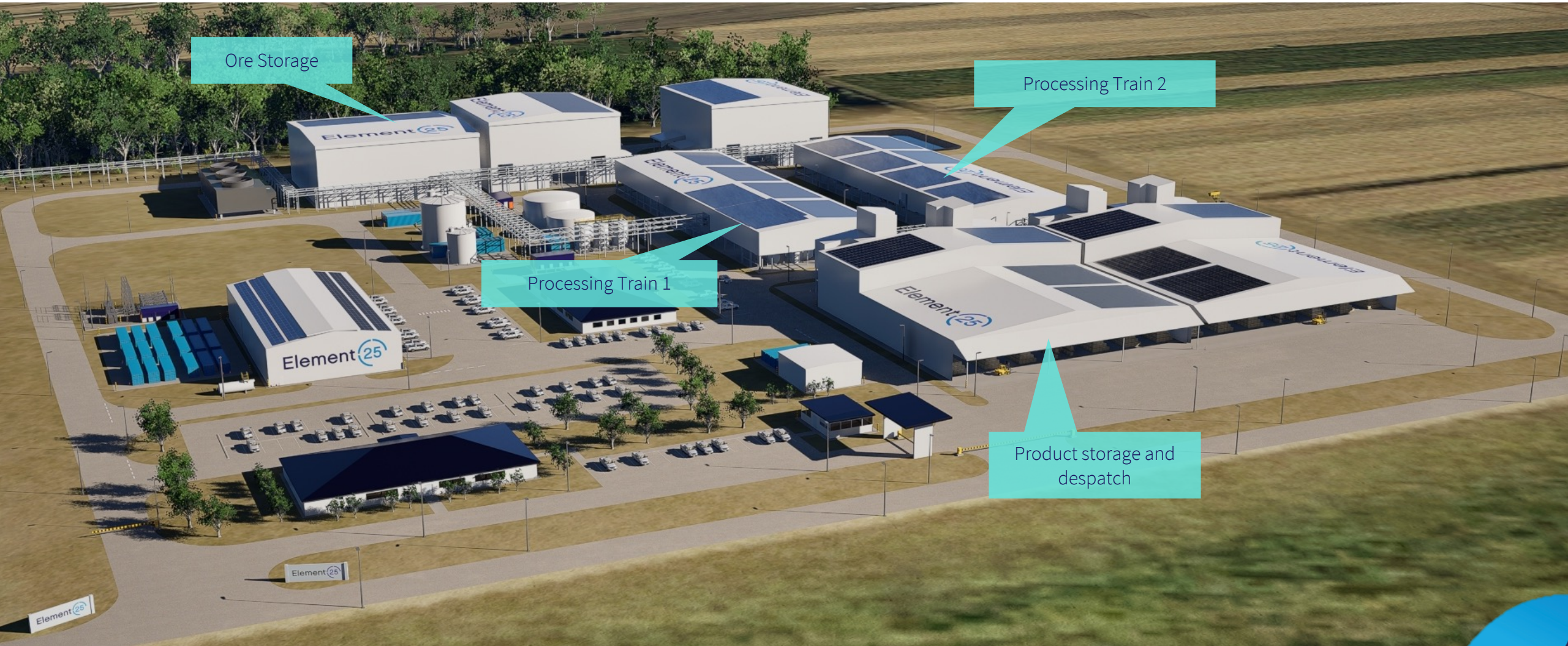


HPMSM

**65,000 t/a**

expanding to 130ktpa with a second train

# Proposed HPMSM facility in Louisiana, USA



Ore Storage

Processing Train 2

Processing Train 1

Product storage and  
despatch

Element 25

Element 25

## Maiden Ore Reserve<sup>1</sup>

Category	Tonnes (Mt)	Mn (%)	Contained Mn (Mt)
Proved	14.4	11.5	1.65
Probable	36.2	9.8	3.56
Total	50.6	10.3	5.22

## Global Mineral Resource<sup>1</sup>

Category	Tonnes (Mt)	Mn (%)	Si (%)	Fe (%)	Al (%)
Measured	16	11.6	20.6	11.7	5.7
Indicated	41	10.0	20.9	11.0	5.8
Inferred	206	9.8	20.8	11.4	5.9
Total	263	10.0	20.8	11.4	5.9

- 89% conversion of measured and indicated resources to reserve.
- Maiden Reserve only exploits approximately 20% of global mineral resource.
- Excellent potential for future expansion.
- More drilling has potential to add to global resource.

The information in this presentation that relates to Exploration Results is based on information compiled by Mr Justin Brown who is a full-time employee of the Company and is a member of the Australasian Institute of Mining and Metallurgy. Justin Brown has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the 'Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves'. Justin Brown consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

All references to Mineral Resources pertain to the ASX release dated 29 September 2023. The Company confirms that all material assumptions, underpinning the estimations continue to apply and have not materially changed. All references to Mineral Reserves pertain to the ASX release dated 29 September 2023. The Company confirms that all material assumptions, underpinning the estimations continue to apply and have not materially changed.

For further information on Element 25 Limited and its Projects please visit its website at [www.element25.com.au](http://www.element25.com.au) which contains copies of all continuous disclosure documents to ASX, Competent Persons' Statements and Corporate Governance Statement and Policies.

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## CONTACT US

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Justin Brown

**Managing Director**

Email: [admin@e25.com.au](mailto:admin@e25.com.au)

Phone: +61 (8) 6375 2525

Media Inquiries:

**Nathan Ryan**

Email: [nathan.ryan@nwrcommunications.com.au](mailto:nathan.ryan@nwrcommunications.com.au)

Phone: +61 (0) 420 582 887

ASX : E25  
OTCQX : ELMTF