

## E25 Formalises Key Battery Division Team Roles and Provides Feasibility Update

ASX ANNOUNCEMENT 8 NOVEMBER 2022

### Pilot Scale Testing Confirms Flowsheet Parameters for Engineering Design

#### Flowsheet Completion

- **Feasibility Study** into the production of battery grade HPMSM from Element 25 concentrate on track for December 2022 delivery.
- Proprietary Element 25 process reliably generates battery grade HPMSM product with industry endorsement from multiple potential offtake partners.
- **Pilot scale HPMSM purification** test work in North American test facilities is now complete, confirming flowsheet parameters for engineering design.
- Final ten-day continuous steady-state test programme to be undertaken in late November 2022 to support the FS delivery.
- **Crystallisation and separation test programme** in USA test laboratory scheduled for November 2022 to confirm engineering parameters for equipment design.
- Tight product specifications and **reduced carbon footprint** provides for “future-proofing” against increasingly high purity and tightening ESG requirements as battery technologies evolve.
- Plant based principal reagent and unique, **no solid waste design philosophy** aims to minimise the environmental footprint at all stages of the E25 process. Production flowsheet largely eliminates solid waste.

#### Project Execution Team Structure Defined

- Neil Graham appointed VP Battery Materials development team lead tasked with project execution. COO (HPMSM) Doug Flanagan working closely with Neil to deliver the critical first module of the global roll-out strategy.
- Sias Jordaan appointed VP Battery Materials Marketing lead tasked with closing and managing the product offtake and financing strategy.

#### Project Financing

- Element 25 pursuing a combined offtake/financing solution with Original Equipment Manufacturers (OEM) and cathode manufacturers to provide substantial project funding.
- Project offtake and financing strategies scheduled to be finalised in line with FS completion in December 2022.



Figure 1. Pilot scale laboratory test equipment in operation.

## COMPANY SNAPSHOT

#### Market Summary

ASX code: E25  
 Shares on issue: 153M  
 Share price: \$1.24

#### Board of Directors:

Seamus Cornelius Chairman  
 Justin Brown MD  
 John Ribbons NED

Element 25 Limited is developing the world class Butcherbird Manganese Project in Western Australia to produce high quality manganese concentrate and high purity manganese products for traditional and new energy markets.

Element 25 Limited (**E25** or **Company**) (**ASX:E25**) is pleased to provide an update with respect to the planned production of high purity battery grade manganese sulphate monohydrate (**HPMSM**) from manganese oxide concentrates currently produced at the Company's 100% owned Butcherbird Project (**Project**) including key developments in the delivery of the Feasibility Study (**FS**) scheduled for December 2022.

Several locations are being investigated in line with the Company's ambition to develop multiple processing location over time to serve the rapidly expanding lithium-ion battery material markets in different geographic regions with a particular short-term focus on Asia and North America.

Important macro-economic and geopolitical influences support the business case for HPMSM production from an Australian manganese source including widespread efforts to electrify the global vehicle fleet, as well as supply chain ESG considerations which require more scrutiny on material provenance and a move towards diversifying the source of supply of critical minerals.

HPMSM is the highest purity "battery grade" manganese chemical used in lithium-ion batteries and demand for this specialty material is expected to grow rapidly in coming years<sup>1</sup> in line with the growth in production of Electric Vehicles (**EV's**) and sustainable and ethical considerations will, in the opinion of the Company's board, become an increasingly important factor in sourcing strategies across the globe.

In western markets, battery makers are looking to manganese rich cathode chemistries to help solve the supply chain bottleneck for cathode materials. Adding **manganese** to the popular LFP formula is also becoming more widely adopted, as it increases the voltage and energy density of the battery cells, hence **LMFP** (an LFP cathode with around 25% elemental manganese<sup>2</sup> is becoming an important option for some battery suppliers.<sup>3</sup>

## Flowsheet Development

### Pilot Scale Test programmes

The Element 25 process flowsheet offers several advantages over existing HPMSM production technologies including reduced reagent consumption and a near zero solid waste footprint due to the production of co-products which can be utilised in complementary processes including the fertiliser, ferro alloy and cement industries.

Process design for the HPMSM facility is largely complete with final metallurgical confirmation of the proprietary Element 25 flowsheet confirmed with the recently completed bulk purification programme at a North American test laboratory.

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<sup>1</sup> Reference: <https://about.bnef.com/electric-vehicle-outlook/>

<sup>2</sup> <https://pushevs.com/2022/07/12/catl-will-soon-mass-produce-lmfp-batteries/>

<sup>3</sup> <https://electrek.co/2022/07/22/catl-m3p-batteries/>

The results of the programme confirmed all key assumptions of the relevant steps in the process design and will inform engineering implementation of the Element 25 process in the first production module.

The defined process parameters will now be used to set up a ten day steady state piloting run which will conclude the FS testing programme on purification. The programme, in conjunction with the crystallisation test work, will also produce sizeable samples for offtake qualification purposes.

## Project Execution

### Key Project Execution Roles Defined

The Company is planning to progress from FS to project implementation as quickly as possible, subject to a successful FS outcome, project financing and receipt of necessary approvals.

To this end, E25 has appointed Development Manager Neil Graham to the position of **VP Battery Materials** to lead the project delivery team. Neil will be supported by **COO (HPMSM)** Doug Flanagan.

Marketing Manager Sias Jordaan has been appointed **VP Battery Materials Marketing**. Mr Jordaan will lead the negotiations and documentation of offtake and financing contract to underpin the HPMSM project.

Subject to a successful FS and project financing, these key team members will now move to recruit additional personnel as E25 transitions from the feasibility study phase to project execution, construction and commissioning.

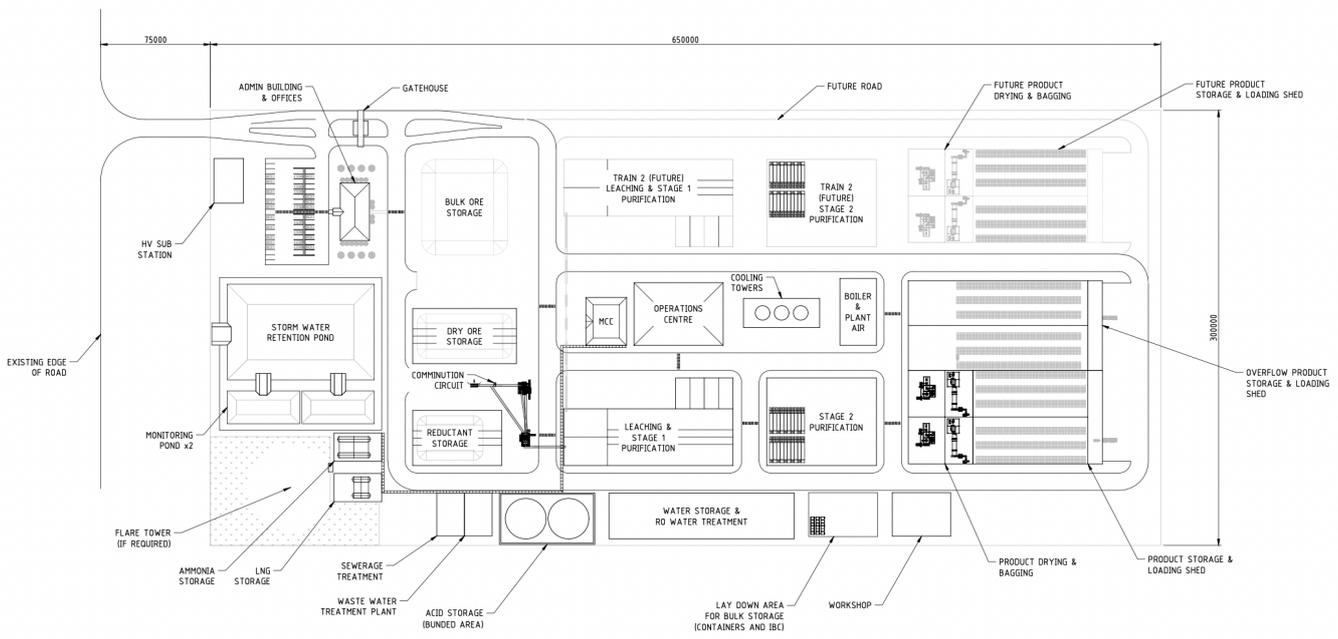


Figure 2. HPMSM processing facility layout including module 1 production capacity of 65,000tpa and expansion allowance for module 2 of an additional 65,000tpa battery grade HPMSM.

## Offtake/Marketing Update

### The impact of the Inflation Reduction Act<sup>4</sup>

The Inflation Reduction Act, (IRA) passed in the USA congress in August 2022 will inject hundreds of billions of dollars into clean energy and EV incentives and programs. A number of the provisions of the IRA directly impact EV supply chains including the HPMSM used in the manufacture of EV batteries.

Importantly, to qualify for certain incentives, a percentage of the value of applicable critical minerals contained in a vehicle's batteries must be extracted or processed in the US or in a country with which the US has a **free trade agreement (FTA)** (or must have been recycled in North America). Applicable percentages increase from 40 percent prior to 2024, to 80 percent after 2026.

Also significantly, after calendar year 2024, the incentives will not be available for EVs that contain critical minerals that were "extracted, processed, or recycled by a foreign entity of concern" – including companies owned by, controlled by or subject to the jurisdiction of the government of the People's Republic of China.

Importantly for Element 25 investors, qualifying FTA countries include **Australia** and qualifying critical minerals include **manganese**, placing the Butcherbird Project and the Element 25 HPMSM technology in an excellent position to supply US based EV market supply chains in coming years whilst allowing our partners to maintain eligibility for the incentives offered under the IRA scheme.

### Offtake/Financing Negotiations

Element 25 has been engaged in constructive discussions with a number of potential offtake partners in relation to the supply of HPMSM using the Element 25 process to satisfy potential growth in demand for HPMSM in lithium-ion battery cathodes for EVs.

Counterparties to these discussions, aimed at securing binding supply agreements with high quality project partners, have included electric vehicle OEMs as well as established cathode and precursor material manufacturers. The discussions have also been focussed on combining offtake, pricing and finance outcomes to bring certainty to project delivery and, in turn, provide supply and pricing certainty to customers.

These discussions are progressing well and in line with stated project timelines, the Company anticipates being in a position to announce binding agreement(s) in the near future.

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<sup>4</sup> Reference: <https://www.dlapiper.com/en/us/insights/publications/2022/08/inflation-reduction-act-seeks-to-jumpstart-electric-vehicle-market/>

## Project Team Focus

E25’s Operations team continues to focus on delivering sustained nameplate production. The Business Development team is focussing on E25’s multi-stage development strategy, including a Stage 2 expansion of the concentrate business in parallel with the Stage 3 development of a conversion facility to convert the concentrate material into HPMSM for EV batteries to power the global transition away from fossil fuel powered mobility.

**Manganese is emerging as an increasingly important ingredient** for EV batteries, with potential supply constraints for nickel and cobalt forcing battery manufacturers to look to high manganese cathodes to produce the vast amount of cathode material required by the EV industry in coming years<sup>5</sup>.

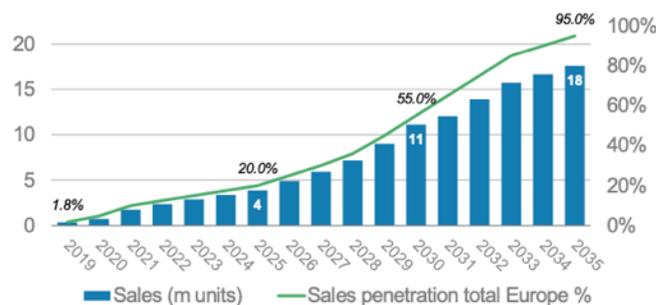
In western markets, battery makers are looking to manganese rich cathode chemistries to help solve the supply chain bottleneck for cathode materials. Adding **manganese** to the popular LFP formula is also becoming more widely adopted, as it increases the voltage and energy density of the battery cells, hence **LMFP** (an LFP cathode with around 25% elemental manganese<sup>6</sup> is becoming an important option for some battery suppliers.<sup>7</sup>

The Project is ideally placed to feed this potential demand, with **advanced flowsheet development** work undertaken in 2019 and 2020 confirming a simple leach process for E25 ores which, when combined with offsets, will target the world’s first **Zero Carbon Manganese** for EV cathode manufacture<sup>8</sup>.

The Company released a Scoping Study (**Study**) in January 2022<sup>9</sup> to update the market prior to the release of the Feasibility Study which is currently being completed.

## Battery EV Penetration Rate Forecast to Increase

As battery electric vehicle (BEV) makers seek to increase the uptake of electric vehicles, one commercial driver is cost reduction. VW’s Power Day suggested a 50% cost reduction for batteries with cell design (-15%), production process (-10%), **cathode/anode materials (-20%)** and battery systems (-5%) driving the change. Global BEV penetration is expected to rise to 15.2% by



Source: ACEA, Morgan Stanley Research estimates

Table 1. Europe BEV sales volumes (m) and penetration (%)

<sup>5</sup> <https://thenextavenue.com/2021/01/22/svolt-opens-orders-for-its-nmx-nickel-manganese-batteries/>

<sup>6</sup> <https://pushevs.com/2022/07/12/catl-will-soon-mass-produce-lmfp-batteries/>

<sup>7</sup> <https://electrek.co/2022/07/22/catl-m3p-batteries/>

<sup>8</sup> Reference: Company ASX release dated 12 February 2019

<sup>9</sup> Reference: Company ASX release dated 18 January 2022

2025 and 39.5% in 2030 – led by Europe and China, according to Morgan Stanley’s latest report<sup>10</sup>. The main driver in the cathode materials is a shift to a high manganese cathode material for the volume production, which is expected to underpin strong demand growth for battery-grade manganese sulphate. Current estimates put demand by 2030 at 13 times current supply and a deficit of 1.3Mt even factoring in planned supply increases<sup>11</sup>.

## About the Butcherbird Manganese Project

E25’s Butcherbird Manganese Project is a world-class manganese resource with current JORC resources of more than 260Mt of manganese ore<sup>12</sup>. The Project straddles the Great Northern Highway and the Goldfields Gas Pipeline, providing turnkey logistics and energy solutions. The Company plans to integrate renewable energy into the power solution over time to target a zero-carbon footprint for the Project, which is expected to also reduce energy costs. A cleaner, lower carbon flowsheet and high penetration renewable energy will place Butcherbird at the forefront of sustainable high purity manganese production.

### Mineral Resources

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
<b>Total</b>	<b>263</b>	<b>10.0</b>	<b>20.8</b>	<b>11.4</b>	<b>5.9</b>

Notes:

- Reported at a 7% Mn cut-off for the Measured and Indicated categories and an 8% Mn cut-off for the Inferred categories.
- All figures rounded to reflect the appropriate level of confidence (apparent differences may occur due to rounding)

### Mining Reserve

Based on the results of the Pre-Feasibility Study completed in May 2020, E25 has published a Maiden Ore Reserve for the Project of 50.55Mt in the Proved and Probable categories<sup>13</sup>.

Classification	Tonnes (Mt)	Grade (Mn%)	Contained Mn (Mt)	Recovered Mn (Mt)
Proved	14.4	11.5	1.65	1.35
Probable	36.2	9.8	3.56	2.92
<b>Total</b>	<b>50.6</b>	<b>10.3</b>	<b>5.21</b>	<b>4.27</b>

<sup>10</sup> Morgan Stanley Research published 3 September 2021

<sup>11</sup> Euromanganese company presentation dated September 2021

<sup>12</sup> Reference: Company ASX release dated 17 April 2019.

<sup>13</sup> Reference: Element 25 Limited Reserve Statement lodged with ASX 19 May 2020.

Justin Brown

**Managing Director**

Company information, ASX announcements, investor presentations, corporate videos and other investor material in the Company's projects can be viewed at: <http://www.element25.com.au>.

## **Competent Persons Statement**

The company confirms that in the case of estimates of Mineral Resource or Ore Reserves, all material assumptions and technical parameters underpinning the estimates in the market announcements dated 17 April 2019 and 19 May 2020 continue to apply and have not materially changed. The company confirms that the form and context in which the competent person's findings are presented has not been materially modified from the original market announcements.

The information in this report that relates to Exploration Results and Exploration Targets is based on information compiled by Mr Justin Brown who is a member of the Australasian Institute of Mining and Metallurgy. At the time that the Exploration Results and Exploration Targets were compiled, Mr Brown was an employee of Element 25 Limited. Mr Brown is a geologist and 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'. Mr Brown consents to the inclusion of this information in the form and context in which it appears in this report.

This announcement is authorised for market release by Element 25 Limited's Board of Directors.