Element 25

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ASX ANNOUNCEMENT 21 FEBRUARY 2023

# Independent Life Cycle Assessment Confirms Element 25 Process can Produce the Lowest Carbon HPMSM Globally[2]

## Highlights:

- Supersmart Energy delivers cradle to gate independent Life Cycle Assessment (LCA) on E25's HPMSM process.
- Assessment covers Scope 1,2 and 3 emissions including mining and concentration facilities in WA and the proposed USA-based HPMSM processing plant (subject to current feasibility study).
- E25 HPMSM calculated to produce ~1.7kg of $CO_2$ for every 1kg of HPMSM which is approximately.
    - **~ 67% lower** than competitors in China;
    - up to **47% lower** than competitors outside China;
    - **~26% lower** than closest non-China competitor's optimised case; and
    - the E25 process is not yet fully optimised for carbon reduction.
- E25 to explore the integration of renewable energy and other potential carbon reduction strategies going forward.

Element 25 Limited (**E25** or **Company**) (**ASX:E25**) is pleased to provide the results of an independent Life Cycle Assessment (**LCA**) for its battery-grade high purity manganese sulphate monohydrate (**HPMSM**) production process, which has confirmed the mine to market carbon footprint for the production of E25 HPMSM as the lowest in the global manganese industry based on published data.

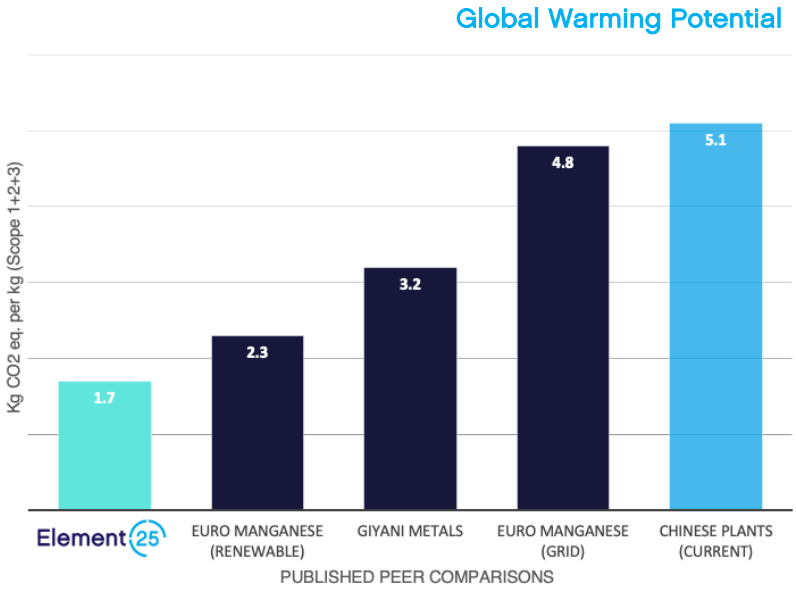


Figure 1. E25 HPMSM carbon intensity compared to available peer results[1,2]

The LCA is based on data from E25's Butcherbird operations in the Pilbara region of WA and its feasibility study for a proposed HPMSM plant in Louisiana, USA and was compared to publicly available LCA reports from peers Euro Manganese (**ASX: EMN**) and Giyani Metals (**TSXV: EMM**), which are also developing HPMSM projects as well as independently validated data on the carbon intensity of current Chinese production methods.

## COMPANY SNAPSHOT

| Market Summary | |
|---|---|
| ASX code: | E25 |
| Shares on issue: | 190M |
| Share price: | $0.78 |

| Board of Directors: | |
|---|---|
| Seamus Cornelius | Chairman |
| Justin Brown | MD |
| John Ribbons | NED |
| Fanie van Jaarsveld | NED |
| Sam Lancuba | NED |

*Element 25 Limited is developing the world class Butcherbird Manganese Project in Western Australia to produce ethically sourced, sustainable, high quality manganese products including lithium-ion battery grade manganese sulphate monohydrate (HPMSM) for the rapidly growing electric vehicle (EV) battery markets.*

E25's HPMSM process is estimated to produce just **1.7kg $CO_2$ equivalent per kg of product**, which is ~ 67% lower than competitors in China, and up to 47% lower than planned projects located outside China. Peers included in the comparative analysis include Euro Manganese's Chvaletice project in the Czech Republic and Giyani Metals' K. Hill project in Botswana[1].

*Table 1: HPMSM LCA published result comparison*

| LCA Comparison for HPMSM – based on publicly available data | | | | | |
|---|---|---|---|---|---|
| **Impact Category** | **Element 25** | **Euro Manganese (Grid)** | **Euro Manganese (Renewable)** | **Giyani Metals** | **Units per Kg of HPMSM** |
| Scope 1 | 0.07 | 0.4 | 0.4 | 0.2 | kg $CO_2$ eq. |
| Scope 2 | 0.38 | 3.3 | 0.7 | 1.2 | kg $CO_2$ eq. |
| Scope 3 | 1.21 | 1.2 | 1.2 | 1.8 | kg $CO_2$ eq. |
| **Global Warming Potential** | **1.7** | **4.8** | **2.3** | **3.2** | **kg $CO_2$ eq.** |

**E25 Managing Director Justin Brown said**: *"We are delighted with the results of the life cycle assessment completed on our proposed HPMSM plant in Louisiana, USA. As we expected, the results confirm just how low our carbon footprint will be compared to other projects in development. It has also highlighted some areas which we can further investigate to further reduce our carbon intensity.*

*The study also underlined the massive potential carbon reduction opportunity of manganese compared to other battery metals such a cobalt and nickel – and E25 manganese is the lowest carbon of all. With our large manganese resources at Butcherbird, E25 can potentially supply low carbon ethically sourced manganese to battery markets around the globe with fully transparent and traceable supply changes from cradle to gate. E25 intends to go beyond what is outlined today in this initial LCA, with a number of additional opportunities identified around renewable energy integration and the use of lower carbon reagents as we continue on our journey to net zero."*

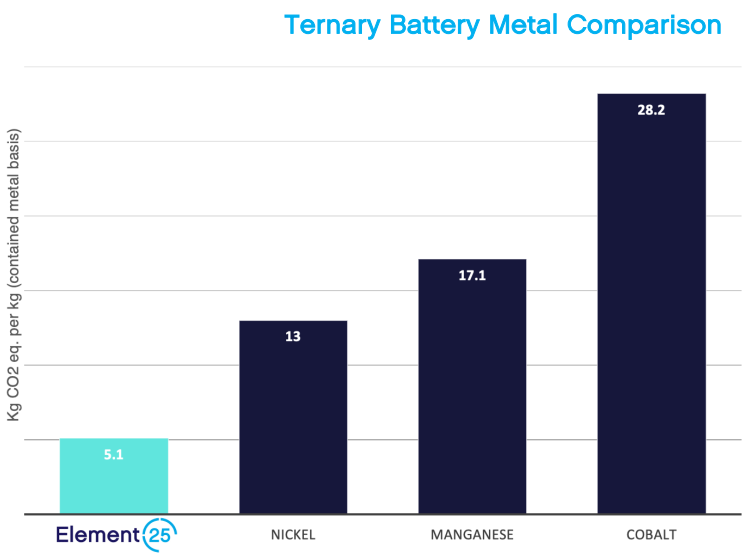


Figure 2. E25 HPMSM carbon intensity vs current cathode metal production.

[1] https://www.mn25.ca/post/comparative-lca-study-results-show-emn-s-battery-grade-manganese-products-have-lowest-co2-footprint

Perth-based consultancy Super Smart Energy completed the cradle-to-gate study, which means the life cycle has been assessed from the point of resource extraction (cradle; including pre-extractive removal of overburden and waste rock) to end gate, which is HPMSM ready for distribution[2]. The study aims to assist in project development and improvement through identification of environmental hotspots, and it was carried out in accordance with ISO-14040/44:2006 and ISO-14044:2006 standards, with 16 Environmental Footprint 3.0 impact categories evaluated. Climate change and water scarcity footprint impacts were investigated in more detail via contribution analysis.

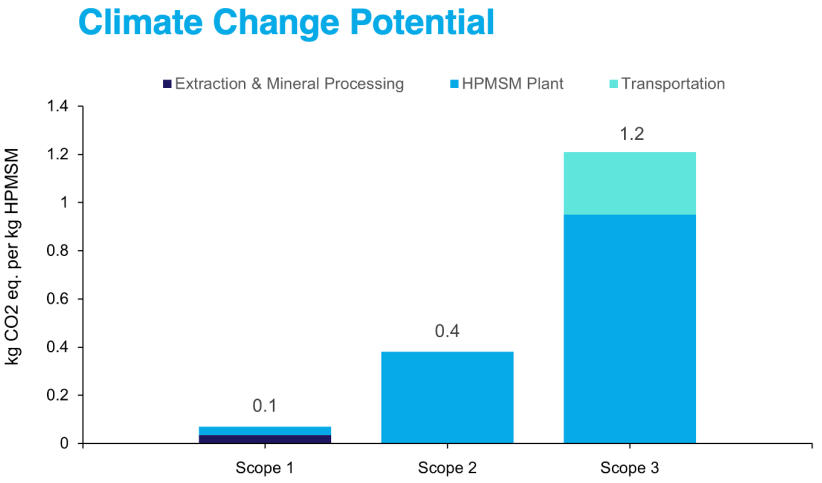


Figure 3. Climate change potential impact by scope 1,2 & 3 classifications.

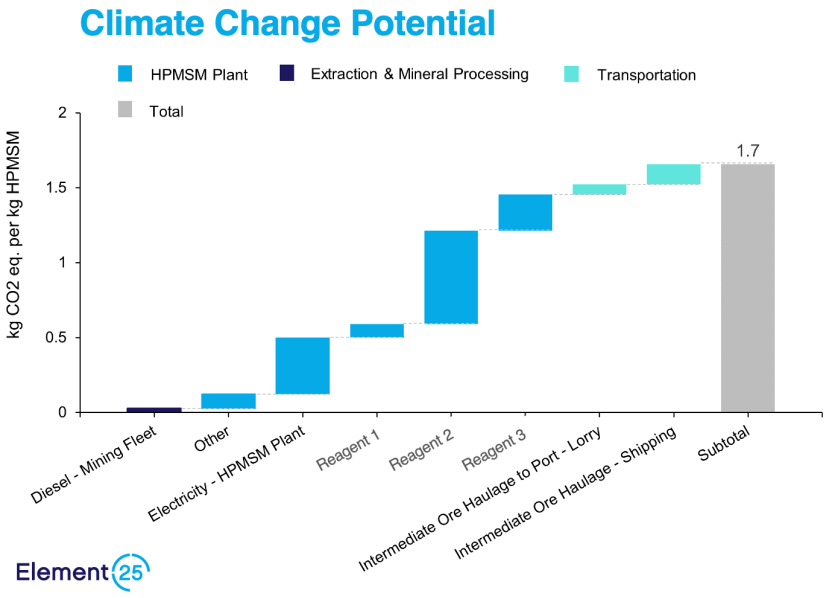


Figure 4. Climate change potential waterfall by supply chain segment.

The most significant contributors in the production of E25's HPMSM to climate change impact are the reagents required for the process and electricity associated with the plant.

The plant is initially expected to source electricity from the grid based on natural gas fired generation, which does not include optimization using renewable energy (**RE**) integration. The LCA has recommended that E25 focus on sourcing RE for the plant, which is expected to further reduce its carbon footprint. E25 intends to include RE in pre-construction optimization work, either sourced from the grid via established RE producers or by utilizing on site roof top solar and other similar technologies.

There is also opportunity to consider the environmental impact of reagents by transitioning over time to reagents produced using RE and/or non petrochemical feedstocks. E25 will further investigate these opportunities as part of a longer term decarbonization strategy.

[2] Supersmart Energy: Prospective Life Cycle Assessment Study of Element 25's High Purity Manganese Sulphate Monohydrate Manufacturing - February 2023

As a base case, this LCA has successfully shown the Element 25 process can produce HPMSM with the lowest global warming potential compared to all available competitors and there remains significant potential to further reduce the carbon intensity of the E25 HPMSM product.

For this LCA, the functional unit is one kilogram of HPMSM at >32% manganese content and the reference flow is 1kg of HPMSM at >32% manganese content produced at the HPMSM plant from manganese concentrate extracted and processed at E25's Butcherbird mine. The study was performed in accordance with ISO 14040/44:2006 standards[3,4].

The study is based on data from the operational E25 Butcherbird operations, and work completed as part of the feasibility study for the production of HPMSM. Background data was sourced from Ecoinvent 3.9.1 and some global averages were used for reagents, creating associated limitations to the study.

The LCA study was completed by Super Smart Energy and a subsequent critical review was carried out by two independent external experts, covering the required competencies relevant to the critical review. The critical review was performed at the end of the LCA study.

## About Element 25

Element 25 is an ASX listed company (ASX: E25) operating the world class 100%-owned Butcherbird Manganese Project in Western Australia and developing high purity manganese sulphate monohydrate (HPMSM) products for traditional and new energy markets. It aims to become an industry leading, world class, low-carbon battery materials manufacturer.

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

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## 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.

[3] International Standards Organisation (ISO). ISO 14040:2006 - Environmental Management - Life Cycle Assessment - Principles and Framework. (2006).
[4] International Standard Organization (ISO). ISO 14044: Environmental Management — Life Cycle Assessment — Requirements and Guidelines. (2006).

# Appendix 1 - Data Sources

| LCA Comparison for HPMSM – based on publicly available data | | | | | |
|---|---|---|---|---|---|
| **Impact Category** | Scope 1 | Scope 2 | Scope 3 | **Global Warming Potential** | **Reference** |
| **Units** | kg $CO_2$ eq. per kg HPMSM | | | | |
| **Element 25** | 0.07 | 0.38 | 1.21 | **1.7** | Supersmart Energy: Prospective Life Cycle Assessment Study of Element 25's High Purity Manganese Sulphate Monohydrate Manufacturing - February 2023. |
| **Euro Manganese (Grid)** | 0.4 | 3.3 | 1.2 | **4.8** | https://www.mn25.ca/post/comparative-lca-study-results-show-emn-s-battery-grade-manganese-products-have-lowest-co2-footprint |
| **Euro Manganese (Renewable)** | 0.4 | 0.7 | 1.2 | **2.3** | |
| **Giyani Metals** | 0.2 | 1.2 | 1.8 | **3.2** | https://giyanimetals2020tf.q4web.com/news/news-details/2022/Giyani-Announces-Results-of-Life-Cycle-Assessment-Study-for-the-K.Hill-Battery-Manganese-Project/default.aspx |