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## **ALTECH – CERENERGY® BATTERY 50% GREENHOUSE GAS EMISSIONS OF LITHIUM-ION BATTERIES**

### **Highlights**

- CICERO engaged to evaluate green credentials of CERENERGY® battery project
- Independent studies cited on Greenhouse Gas Emissions (GHG) for both lithium-ion and CERENERGY® batteries
- Comprehensive analysis performed of the life cycle of both battery types
- CERENERGY® batteries exhibit a minimum 50% lower GHG emissions compared to lithium-ion batteries
- Superior environmental performance and footprint
- CERENERGY® eliminates the need for critical metals such as lithium, cobalt, copper, graphite, and manganese
- ESG reporting program initiated - World Economic Forum ESG Framework

Altech Batteries Limited (Altech/the Company) (ASX: ATC and FRA: A3Y) is pleased to announce that the Company has engaged the Centre of International Climate and Environmental Research (CICERO), associated with the University of Oslo, for a green accreditation of the CERENERGY® battery and project.

The Company has enlisted the services of CICERO to conduct an external assessment of its environmental credentials. CICERO is renowned for its expertise in providing independent evaluations for green credentials, particularly within the green bond market. Previously, the Company sought CICERO's accreditation for its Silumina Anodes™ project, which received a "Light Green" rating.

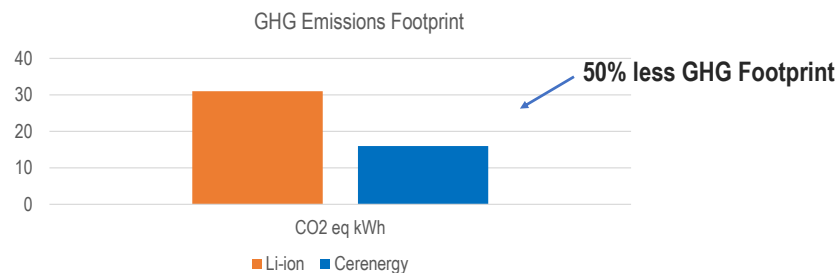
With the transition towards renewable energy sources in the global energy sector, the importance of efficient energy storage systems is growing rapidly. Grid storage batteries have emerged as a highly promising solution to address the intermittency and variability associated with renewable energy sources. Altech is well aware of this trend and has strategically focused its efforts on the grid storage battery market, exclusively targeting this sector with its revolutionary Sodium-Chloride Solid State CERENERGY® batteries. Whilst lithium-ion batteries currently dominate the emerging grid storage sector, the following analysis examines the carbon footprint of the CERENERGY® battery in comparison to its competitors.

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## **Greenhouse Gas Emissions (GHG) Footprint**

A study titled "Life Cycle Assessment of Sodium-Nickel-Chloride Batteries (CERENERGY® batteries)" conducted by the Sustainable Technologies Laboratory at Bochum University of Applied Sciences in Bochum examines the ecological implications of different battery types, specifically lead acid batteries, lithium-ion batteries, and sodium-chloride CERENERGY® batteries. The study focused on greenhouse gas emissions (GHG) as a key parameter and incorporates two scenarios related to end-of-life (EoL) considerations, including waste management and battery lifespan.

The results indicate that the GHG emissions of CERENERGY® batteries range from 9.1 to 22.7 g CO<sub>2</sub>eq per kWh (with an average of 16 g CO<sub>2</sub>eq per kWh) discharged and consumed, compared to 31.3 g CO<sub>2</sub>eq for lithium-ion batteries and 122.1 g CO<sub>2</sub>eq for lead-acid batteries. The life cycle assessment concludes that CERENERGY® batteries exhibit a GHG footprint of at least 50% lower than that of lithium-ion batteries. This outcome aligns with the fact that CERENERGY® batteries do not rely on critical metals such as lithium, cobalt, copper, graphite, and manganese, which are associated with high GHG emissions from mining and extraction processes. Instead, CERENERGY® batteries employ sodium-chloride (common table salt) and nickel, of which nickel is also used in lithium-ion batteries. The production of lithium-ion batteries has faced criticism due to its negative environmental impact.



**Figure 1 – GHG Emissions Footprint of Lithium-ion batteries vs CERENERGY® type of batteries**

## **Use of Renewable Power**

The planned CERENERGY® battery plant in Saxony, with a capacity of 100 MWh, has been meticulously designed to minimise its greenhouse gas (GHG) footprint by leveraging renewable energy sources. To illustrate, the tunnel kiln utilised for sintering the ceramic tubes will be powered by electricity instead of natural gas, enabling the utilisation of renewable power. In fact, the entire factory will completely abstain from natural gas usage. All heating systems within the plant have been specifically designed for renewable electrical heating. The site's total power requirement is approximately 5 MWh, and negotiations are currently underway to secure a renewable power supply for the facility.

## **On Site Renewable Generation**

The 100 MWh CERENERGY® battery plant has been designed with an expansive factory roof space dedicated to housing photovoltaic panels. These panels harness solar energy during daylight hours, generating renewable power. To optimise energy usage, the plant employs multiple banks of 1 MWh GridPacks to store excess energy during the day for use during nighttime hours. By combining photovoltaic panels with energy storage capabilities, the CERENERGY® battery plant demonstrates a commitment to sustainable practices.

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## **Recycling Plant**

In the comprehensive design of the 100 MWh plant, a recycling facility will be integrated. This recycling plant will have the capability to recycle both off-spec battery units and returned battery units from the field. Unlike many lithium-ion battery producers that rely on third-party companies for recycling, Altech has adopted a cradle-to-grave approach by assuming the responsibility for battery recycling in its design and business approach. The recycling unit within the plant will be equipped to efficiently extract and recycle various components. It will be capable of removing and recycling the nickel probes, recovering the nickel from the cathode, and recycling the stainless-steel canister. By incorporating a dedicated recycling facility, Altech demonstrates its commitment to sustainable practices and takes proactive steps to ensure the proper disposal and recycling of battery components, minimising waste and environmental impact.

## **ESG Reporting Program**

Altech has initiated the reporting process in alignment with the World Economic Forum's Stakeholder Capitalism Metrics ESG Framework, utilising Socialsuite's ESG platform. The primary objective is to showcase the existing on-the-ground efforts and initiatives undertaken by Altech. As the ESG reporting commenced, it became apparent that many of the ESG metrics were already in place; they simply needed to be organised within a visible framework to effectively communicate with stakeholders. The first report will be issued in the next quarter.

The significance of ESG reporting is underscored by the fact that 82% of retail investors express interest in investing in socially and environmentally responsible companies. Furthermore, 9 out of 10 institutional investors now incorporate ESG factors into their investment decision-making processes. This growing recognition and consideration of ESG criteria by investors highlight the importance of transparent reporting and the role it plays in fostering sustainable business practices and attracting investment from socially conscious stakeholders.

Managing Director Iggy Tan expressed confidence in obtaining a green accreditation for the Company based on previous experience and interactions with CICERO. Mr Tan states *"There is clearly an environmental advantage of the CERENERGY® battery and proposed factory. Considering the GHG footprint evaluation conducted by independent groups, we anticipated from the outset that our batteries would be classified as 'green batteries.' We are currently in the official accreditation process"*.

## **Altech Batteries Interactive Investor Hub**

Engage with Altech directly by asking questions, watching video summaries and seeing what other shareholders have to say about this, as well as past announcements, at our Investor Hub <https://investorhub.altechgroup.com/announcements>

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## **About Altech Batteries Ltd (ASX:ATC) (FRA:A3Y)**

### **CERENERGY® Batteries Project**

Altech Batteries Ltd is a specialty battery technology company that has a joint venture agreement with world leading German battery institute Fraunhofer IKTS ("Fraunhofer") to commercialise the revolutionary CERENERGY® Sodium Chloride Solid State (SCSS) Battery. CERENERGY® batteries are the game-changing alternative to lithium-ion batteries. CERENERGY® batteries are fire and explosion-proof; have a life span of more than 15 years and operate in extreme cold and desert climates. The battery technology uses table salt and is lithium-free; cobalt-free; graphite-free; and copper-free, eliminating exposure to critical metal price rises and supply chain concerns.

The joint venture is commercialising its CERENERGY® battery, with plans to construct a 100MWh production facility on Altech's land in Saxony, Germany. The facility intends to produce CERENERGY® battery modules to provide grid storage solutions to the market.



### **Silumina Anodes™ Battery Materials Project**

Altech Batteries has licenced its proprietary high purity alumina coating technology to 75% owned subsidiary Altech Industries Germany GmbH (AIG), which has commenced a definitive feasibility study for the development of a 10,000tpa silicon/graphite alumina coating plant in the state of Saxony, Germany to supply its Silumina Anodes™ product to the burgeoning European electric vehicle market.

This Company recently announced its game changing technology of incorporating high-capacity silicon into lithium-ion batteries. Through in house R&D, the Company has cracked the "silicon code" and successfully achieved a 30% higher energy battery with improved cyclability or battery life. Higher density batteries result in smaller, lighter batteries and substantially less greenhouse gases, and is the future for the EV market. The Company's proprietary silicon graphite product is registered as Silumina Anodes™.

The Company is in the race to get its patented technology to market, and recently announced the results of a preliminary feasibility study (PFS) for the construction of a 10,000tpa Silumina Anodes™ material plant at AIG's 14-hectare industrial site within the Schwarze Pumpe Industrial Park in Saxony, Germany. The European graphite and silicon feedstock supply partners for this plant will be SGL Carbon and Ferroglobe. The project has also received green accreditation from the independent Norwegian Centre of International Climate and Environmental Research (CICERO). To support the development, AIG has commenced construction of a pilot plant adjacent to the proposed project site to allow the qualification process for its Silumina Anodes™ product. AIG has executed NDAs with two German automakers as well as a European based battery company.



### **HPA Production Project**

Altech is also further aiming to become a supplier of 99.99% (4N) high purity alumina (Al<sub>2</sub>O<sub>3</sub>) through the construction and operation of a 4,500tpa high purity alumina (HPA) processing plant at Johor, Malaysia, and has finalised Stage 1 and Stage 2 construction of its HPA plant in Johor, Malaysia. Feedstock for the plant will be sourced from the Company's 100%-owned near surface kaolin deposit at Meckering, Western Australia and shipped to Malaysia. The HPA project is significantly de-risked with a bankable feasibility study completed, senior lender project finance from German government owned KfW IPEX-Bank approved, and a German EPC contractor appointed – with initial construction works at the site completed. In addition to the senior debt, conservative (bank case) cash flow modelling of the HPA plant shows a pre-tax net present value of USD 505.6million at a discount rate of 7.5%. The project generates annual average net free cash of ~USD76million at full production. Altech is in the final stages of project finance with a potential raising of US\$100m of secondary debt via the listed green bond market. In addition, US\$100m of project equity is being sought through potential project joint venture partners.