



24 October 2023

## **ALTECH – OPTIMISED DESIGN OF CERENERGY® BATTERY PACKS COMPLETED FOR DFS**

### **Highlights**

- Optimised design of 60 KWh battery pack completed
- Sleek stainless-steel exterior – maintains finish in all weather conditions
- Battery base incorporates high-temperature-resistant electrical cables
- Upgraded design to cell connector plates using mica insulation
- Two working prototype 60 KWh batteries in full production
- First stainless-steel battery case delivered – undergoing heat loss testing

Altech Batteries Limited (Altech/the Company) (ASX: ATC and FRA: A3Y) is pleased to announce that optimised design of the Company's 60KWh battery pack is now completed following final design collaborations with component suppliers.

The 60 KWh battery pack design has undergone a makeover, now sporting a sleek stainless-steel exterior (previously painted blue) with the prominent CERENERGY® logo on top and "ALTECH Batteries" engraved at the bottom. The Company has increased confidence that the stainless-steel finish will have a better ability to endure extreme temperature variations, be it in snowy or desert conditions, while maintaining its pristine appearance.

The battery's casing is equipped with a vacuum-sealed, double-sided enclosure that provides optimal insulation. Operating at approximately 270 degrees Celsius internally, it is crucial to minimise heat transfer losses and ensure the safety of human contact with the battery's exterior. The base of the battery has been further reinforced to accommodate high-temperature-resistant electrical cables and connectors, minimising heat loss to the outside environment.

To counter the issue of cold starting, heating pads have been integrated into the internal vacuum-packed casing. The heating process typically takes around ten hours before the battery is fully activated. Once initialised, the battery efficiently sustains its internal temperature with minimal reliance on the heating pads.



Further enhancements have been made to the five internal frames each housing 48 cells, optimising their performance. The connector plates, responsible for electrically linking the cells while maintaining insulation (using mica insulation), have been meticulously designed by the Altech team. The cells are connected through precise laser-targeted welding. Figure 2 shows the cross-section of the pack casing and assembly frames holding 48 cells in each frame.



Figure 2 – Cross section of 60 KWh ABS60 showing vacuum-sealed pack and cell frames

### Prototype Battery Packs

As announced previously, two working prototype ABS60 KWh batteries have been ordered from the Fraunhofer Institute partners. These packs are already in production, with roughly half of the required cells completed. The production capacity is limited by the size of pilot plant equipment and kiln capacity at the Fraunhofer Institute but excellent progress has been made. To date, completed cells are performing as expected.



Figure 3 – Production of cells at Fraunhofer Institute

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Whilst the cells are being fabricated, the first stainless-steel vacuum-sealed battery case has been delivered to the Fraunhofer Institute in Dresden. Prior to assembly of the battery cells, the battery casing will undergo comprehensive heat transfer loss testing as well as temperature profiling by the Fraunhofer scientists. The cells will be assembled in the pack once they are completed and further cycling and long-term performance tests will be conducted on the battery packs.



Figure 4 – Completed first stainless-steel casing delivered to Fraunhofer Testing Centre

Following a recent workshop in Germany, Group Managing Director Iggy Tan commented on the optimisation of the battery design and progress of the prototypes and stated *“We are extremely pleased with the new stainless-steel design of the 60 KWh batteries. These will be able to operate in the snow, as well as desert conditions, without the finish being affected. The vacuum-sealed casing will provide the perfect insulation and minimise any heat loss, which is the key benefit of our sodium chloride solid-state batteries. The production of the prototype batteries is progressing well. The produced cells are performing well under bench performance testing and it will be great to see the whole 60KWh unit under performance load. This is the first time our partner Fraunhofer has made such a large battery unit”*.

Authorised by: Iggy Tan (Managing Director)

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Altech's interactive Investor Hub is a dedicated channel where we interact regularly with shareholders and investors who wish to stay up-to-date and to connect with the Altech Batteries leadership team.



The graphic features the Altech Batteries logo on the left, which consists of a blue circle with three white diagonal stripes. To the right, the text "SCAN ME" is written in blue, followed by "to join the Altech Batteries investor community" in white. Below this is a QR code that incorporates the Altech Batteries logo. At the bottom right, the "InvestorHub" logo is displayed, featuring a stylized 'i' icon and the text "InvestorHub".

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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.