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## **ALTECH – CERENERGY® PROPOSED BATTERY SPECIFICATIONS**

### **Highlights**

- CERENERGY® Battery Specifications
- 60 KWh Battery Pack (ABS60) for commercial applications
- 1 MWh (ABS1000) GridPack for grid-level storage and industrial power
- Fireproof, all-weather applications, multiple cycles per day
- Lowest levelised energy storage cost compared to Li-ion batteries
- Surplus renewable power discharged to the ground in Germany is EUR 2 billion p.a.
- Reliable grid storage battery solution of the future

Altech Batteries Limited (ASX: ATC, FRA: A3Y) is pleased to announce the release of preliminary battery specifications for its CERENERGY® 60 KWh (ABS60) and 1 MWh (ABS1000) GridPack battery products. Collaborating closely with its joint venture partner, Fraunhofer IKTS ("Fraunhofer"), Altech has developed these specifications to cater to the evolving needs of the renewable energy and grid storage market. These preliminary specifications serve as a significant milestone for Altech, enabling the company to initiate discussions with potential off-take partners and secure future sales in the lucrative and growing grid storage battery market.

The increasing demand for renewable energy sources, coupled with the intermittent nature of renewable power generation, has underscored the critical need for efficient and reliable energy storage solutions. Grid storage batteries have emerged as a key enabler for balancing energy supply and demand, ensuring stable power delivery, and maximising the utilisation of renewable energy sources.

The transition of countries like Germany to a power system heavily reliant on weather-dependent renewables is reaching its limitations, a challenge that all nations adopting wind and solar energy will eventually confront. The absence of sunlight and wind for prolonged periods raises concerns about power supply. Additionally, the short, dark, and cold days of midwinter pose a specific problem for meeting countries' power demand through renewables.


In addition to shortages, surpluses also pose a significant issue. On days when sunlight is abundant, but demand is low, excess power is discharged to the ground. This results in substantial wastage of electrical power. Germany alone wastes approximately EUR 2 billion annually due to this discharge. Similarly, the state of California wastes approximately US\$3 billion of renewable energy each year due to surpluses or lack of grid capacity to bring the power to where it is needed. Excess power in the grid can lead to negative prices, compelling grid operators to pay customers to consume electricity. The expansion of renewables

amplifies the volatility within the system. Grid battery storage is crucial to maintain a delicate balance in power supply to ensure a stable and reliable energy infrastructure, whilst accommodating the fluctuations inherent in renewable energy sources. The grid energy storage market is expected to grow by a 28% compound annual growth rate in the coming decade. The global grid energy storage market is expected to grow from USD 4.4 billion in 2022 to USD 15.1 billion by 2027. Or further out, growth is expected from 20 GW in 2020 to over 3,000 GW by 2050.

Altech recognises the potential of the grid storage battery market and aims to contribute to its growth and development through the introduction of its CERENERGY® battery products. Altech has developed cutting-edge battery specifications that meet the specific requirements of this sector. The preliminary specifications for the CERENERGY® 60 KWh (ABS60) battery pack, as well as the 1 MWh (ABS1000) GridPack battery products, are attached below:

**Specifications 60 KWh Battery Pack (ABS60)**

The 60 KWh Battery Pack (ABS60) is rated at an operating voltage of 600 volts and 100 amp (Ah). The battery is designed to provide battery backup and excellent performance in grid-tied commercial applications for an uninterrupted power supply.

|  |                          |   |
|--|--------------------------|---|
|    | <b>Battery Type:</b>     | Battery Pack ABS 60<br>Sodium Nickel Chloride Solid State Battery |
|  | <b>Application :</b>     | Power Grid Operation & Renewable Energy Storage                   |
| <b>ABS 60 – Battery Pack</b>   |                          |   |
|  | Dimensions:              | 500 mm x 2330 mm x 1100 mm  |
|  | Weight:                  | ≈ 800 kg  |
|  | Nom. Voltage:            | 600 V DC  |
|  | Voltage range:           | 410 V DC (min) to 670 V DC (max)                                  |
|  | Current Capacity:        | 100Ah Nominal   |
|  | Discharge Current:       | cont. 25 A / trans. 33 A  |
|  | Internal Ops Temp.:      | min. 270 °C – max. 350 °C   |
|  | Ambient Ops. Temp.:      | -40°C to +60°C  |
|  | IP Rating:               | IP65  |
|  | Nominal Energy Capacity: | 60 kWh  |
|  | Operational SoC Range:   | 15%-95% (80%)   |
|  | C-Rate :                 | 0.16C - 0.33C bi-directional                                      |
|  | C-Rate Power Mode:       | 0.5 C for 15 Minutes  |
|  | 24h cycle capability:    | yes, continuous without interruptions                             |
|  | Cycle per day:           | up to 3 @ 80%   |
|  | Design Life:             | >15 years   |
|  | Warranty:                | 5 years or 5000 cycles  |
| <p><i>Note: A</i><br/>AC conversion included, all permits on AC<br/>BMS included</p> |                          |   |

**Specifications 1 MWh GridPack (ABS1000)**

The ABS1000 GridPack battery targets larger-scale applications, such as grid-level storage and industrial power backup. With a capacity of 1 MWh, this high-performance battery system ensures a stable and uninterrupted power supply, contributing to grid stability and reducing reliance on fossil fuels. The preliminary specifications for the ABS1000 GridPack battery positions Altech as a frontrunner in the grid storage market, offering a technologically advanced and commercially viable solution to meet the industry's evolving needs.

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#### GridPack USP – Macro Parameters

- Safe, Non-flammable, zero fire & explosion hazards
- No location limitation
- Stackable up to 3 Grid Pack
- Operates in any climate without external thermal management, forced cooling
- Negligible maintenance costs
- Plug and play ready to operate
- High availability (>99%)
- Battery may be idle for any period of time and be restarted without any capability loss
- Round-trip Efficiency of avg. 90% (DC)
- Lowest levelised energy storage costs
- Can be shipped fully assembled

#### ABS 1000 – Grid Pack

|                          |  |
|--------------------------|--|
| Arrangement:             | 18 Battery Pack, with controller BMS     |
| Dimension:               | Open standard high cube 20ft Container   |
| Delivery:                | 20ft high cube container 2.4mx5.9mx<2.7m |
| Weight:                  | < 17 t                                   |
| Nom. Voltage:            | 600 V DC                                 |
| Voltage range:           | 410 V DC (min) to 670 V DC (max)         |
| Current Capacity:        | 100Ah Nominal                            |
| Discharge Current:       | cont. 25 A / trans. 33 A                 |
| Internal Ops Temp.:      | min. 270 °C – max. 350 °C                |
| Ambient Ops. Temp.:      | -40°C to +60°C                           |
| IP Rating:               | IP65, CE                                 |
| Nominal Energy Capacity: | 1 MWh / nominal 1,08 MWh                 |
| Operational SoC Range:   | 15%-95% (80%)                            |
| C-Rate                   | 0.16C - 0.33C bi-directional             |
| C-Rate Power Mode:       | 0.5 C for 15 Minutes                     |
| 24h cycle capability:    | yes, continuous without interruptions    |
| Cycle per day:           | up to 3 @ 80%                            |
| Design Life:             | > 15 years                               |
| Warranty:                | 5 years or 5000 cycles                   |

\* Levelised energy storage cost is the overall costs including capital, maintenance and operating cost over the life of the battery

The Altech GridPacks have been engineered to ensure complete protection from both dust and any external environments. This means that there is no need for any additional shelters or buildings to house the Altech GridPack batteries, and they can be safely installed outdoors in any weather conditions. The Altech GridPacks will be constructed using a sea container design, which facilitates their easy transportation by sea or road to the installation site, as well as ensuring simple installation.



Unlike other mega battery pack designs on the market, these GridPacks can be stacked on top of each other. The ability of the GridPacks to be stacked minimises the battery footprint and permits easy scalability to meet any energy storage requirements. The stackable feature, coupled with the "plug and play" design, makes the GridPacks the obvious choice for BESS solutions to meet any future energy storage

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requirements. The Altech GridPacks are also designed without the requirement for any moving parts such as cooling fans, which are typically found in lithium-ion battery mega packs. This is a notable advantage, as end-users have raised concerns about the noise generated by mega packs, preventing them from being placed near residential areas. With the absence of any moving parts, the Altech GridPacks are practically maintenance-free and completely noise-free in operation, making them an ideal solution for remote and noise-sensitive environments.

Authorised by: Iggy Tan (Managing Director)

### 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>

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Authorised by: Iggy Tan (Managing Director)

For more information, please contact:

**Corporate**

**Iggy Tan**

Managing Director  
Altech Batteries Limited  
Tel: +61 8 6168 1555  
Email: [info@altechgroup.com](mailto:info@altechgroup.com)

**Martin Stein**

CFO & Company Secretary  
Altech Batteries Limited  
Tel: +61 8 6168 1555  
Email: [info@altechgroup.com](mailto:info@altechgroup.com)

## 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 Alumina Solid State (SAS) 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 Anode™ 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.