

## Advancing two battery tech projects

Altech Batteries Ltd (ASX:ATC) is a Perth-based company advancing its CERENERGY® and Silumina Anodes™ battery projects. CERENERGY® is a solid-state sodium chloride (SCSS) battery that is a promising alternative to lithium-ion batteries given their safety, durability, and cost-effectiveness, and the fact that they use sodium-chloride (common table salt technology) and don't rely on lithium, copper, cobalt, graphite or manganese. Silumina Anodes™ is a composite HPA coated silicon-graphite anode material that can be used in lithium-ion batteries, increase the battery's energy capacity.

### Advancing towards commercialisation

Altech has made substantial progress in the past few months, particularly with respect to commercialisation of the 100MWh CERENERGY® battery plant. In particular, it has confirmed key project suppliers and end-product specifications, and is currently fabricating two ABS 60KWh battery prototypes. Independent studies on CERENERGY® have shown that it exhibits 50% less greenhouse gas emissions compared to lithium-ion batteries. Altech has also continued construction on its Silumina Anodes™ pilot plant. In August 2023, the company completed a \$13m+ capital raising, ensuring the company is well-placed for the next stage of development.

### A major opportunity awaits

As outlined in our initiation report, there is a major opportunity awaiting the company. The global grid energy storage market, is an early-stage market but is expected to grow at a CAGR of 28%, from US\$4.4bn in 2022 to US\$15.1bn in 2027. The market is likely to grow from 20GW in 2020 to over 100GW by 2030 (Figure 13). Lithium-ion batteries control 90% of the global grid-market and demand for them is expected to grow over 30% annually up to 2030, by which time it would be over US\$400bn. There is a substantial market opportunity for both Silumina Anodes™ and CERENERGY®.

### Valuation range of A\$0.25-0.35 per share

We have updated our valuation for ATC, based upon the company's recent capital raising as well as the passage of time since our inaugural valuation (which slightly reduce the discount attributed to future cash flows). Our base case is \$417.3m or 25.3c per share while our bull case is \$581.4m or 35.3c per share. Please see page 7 for further detail on the valuation and page 8 for the key risks.

Share Price: A\$0.073

ASX: ATC

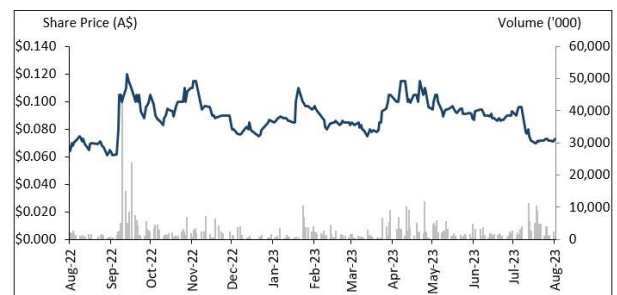
Sector: Materials

9 August 2023

Market cap. (A\$ m)	107.3
# shares outstanding (m)^	1,469.6
# shares fully diluted (m)^	1,499.7
Market cap ful. dil. (A\$ m)	109.5
Free float	64.8%
12-months high/low (A\$)	0.13 / 0.043
Avg. 12M daily volume ('1000)	2,442.3
Website	www.altechgroup.com

Source: Company, Pitt Street Research

### Share price (A\$) and avg. daily volume (k, r.h.s.)



Source: Refinitiv, Pitt Street Research

<b>Valuation metrics</b>	
DCF fair valuation range (A\$)	0.25–0.35
WACC	12.6%
Assumed terminal growth rate	2.0%

Source: Pitt Street Research

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## Recapping Altech

Altech Batteries (ATC) (formerly Altech Chemicals) is a Perth-based battery technology development company with two key projects: the CERENERGY® project and the Silumina Anodes™ project.

*CERENERGY® is a promising alternative to lithium-ion batteries given their advantage of durability across a variety of conditions and a longer period of time.*

### The CERENERGY® project

The CERENERGY® battery is a sodium nickel chloride battery (SCSS battery), in a solid-state. CERENERGY® is a promising alternative to lithium-ion batteries given their advantage of durability across a variety of conditions, over a longer period of time. Another key advantage that is fundamental to their commercial proposition is their lower cost of manufacturing given how sodium salt is a cheaper commodity than most other major battery metals.

Altech has a JV with the Fraunhofer Institute for the commercialisation of a 100MWh production facility on Altech's land in Saxony, Germany. Altech, together with associated Altech Advanced Materials AG, owns 75% of the project, with the remaining 25% carried interest being owned by Fraunhofer. In March 2023, Altech launched the SCSS 1MWh GridPack (ABS1000), a sodium chloride battery pack that utilises the CERENERGY® technology. It can provide a source of backup power during periods of high demand or when renewable energy sources are not producing at capacity. Just like the underlying CERENERGY® technology, the GridPacks have higher durability than existing products on the market, have lower set up and ongoing costs. This results in more efficient utilisation of renewable energy sources such as wind and solar power, in turn significantly benefitting the renewable energy and grid storage sectors.

### The Silumina Anodes™ project

*Silumina Anodes™ is ATC's proprietary lithium-ion battery anode material, using high-purity alumina (HPA) coated silicon, that can go into the anodes of batteries.*

Silumina Anodes™ is Altech's proprietary lithium-ion battery anode material, using high-purity alumina (HPA) coated silicon and graphite, that can go into the anodes of batteries. Silicon is a promising anode material with potential to replace graphite due to its higher theoretical energy density, but Altech has solved the dilemma (the Silicon Code) of how to get silicon into the anode and having it last. Altech's technology has a 30% higher energy retention capacity, better durability in individual cycles and higher overall life compared to a conventional graphite-only anode.

In January 2022, Altech Industries Germany GmbH (AIG), Altech's German subsidiary, acquired a 14-hectare (ha) site at the Schwarze Pumpe Industrial Park in Saxony, Germany, to build a full-scale Silumina Anodes™ coating plant. The location is ideal due to its close proximity to current and proposed lithium-ion battery and EV plants across Europe. Altech announced outstanding results from its PFS that was conducted to validate the economics of its proposed 10,000tpa Silumina Anodes™ plant. The plant is likely to use 100% green energy from the European electricity market.

AIG has now commenced a Definitive Feasibility Study (DFS) study for the Silumina Anodes™ plant ahead of schedule. The DFS is being conducted in tandem with the construction of a pilot plant, adjacent to the proposed project site. Construction of the pilot plant is nearing completion in Q4 of 2023, to enable end user qualification of the Silumina Anodes™ product.



## ATC has made progress in the last quarter

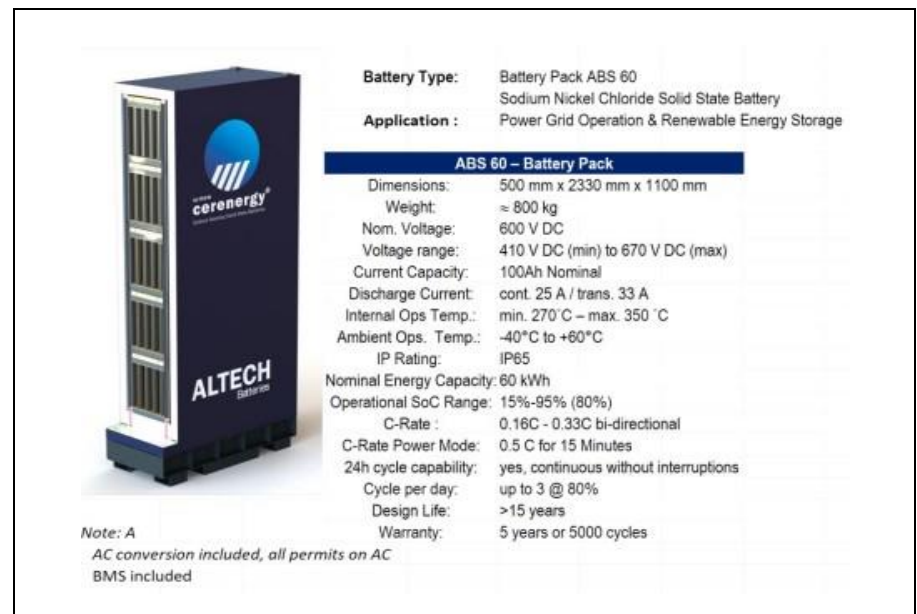
### Proposed specification of CERENERGY® GridPacks

ATC released preliminary specification for its CERENERGY® GridPack battery products – the 60kWh Battery Pack and the 1MWh GridPack (ABS1000), outlined in Figures 1 and 2. These specifications place ATC in an ideal position to meet the industry’s evolving needs. They position the company to initiate discussions with potential off-take partners and secure future sales.

As the world turns to renewables, the intermittent nature of renewable power sources (especially in countries with volatile weather such as Germany) requires the need for energy storage solutions that can ensure the stability of power supply. Storage solutions can also help with the opposite problem, a surplus of energy – a problem because it results in a wastage of electrical power and potentially even for providers to pay consumers to use electricity. The grid energy storage is expected to grow by a 28% CAGR in the coming decade from a market size. But looking at it from an energy usage angle, growth is expected to increase from 20 GWh in 2020 to over 3,000 in 2050.

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

**Figure 1: Specifications of ATC’s 60kWh Battery Pack (ABS60)**

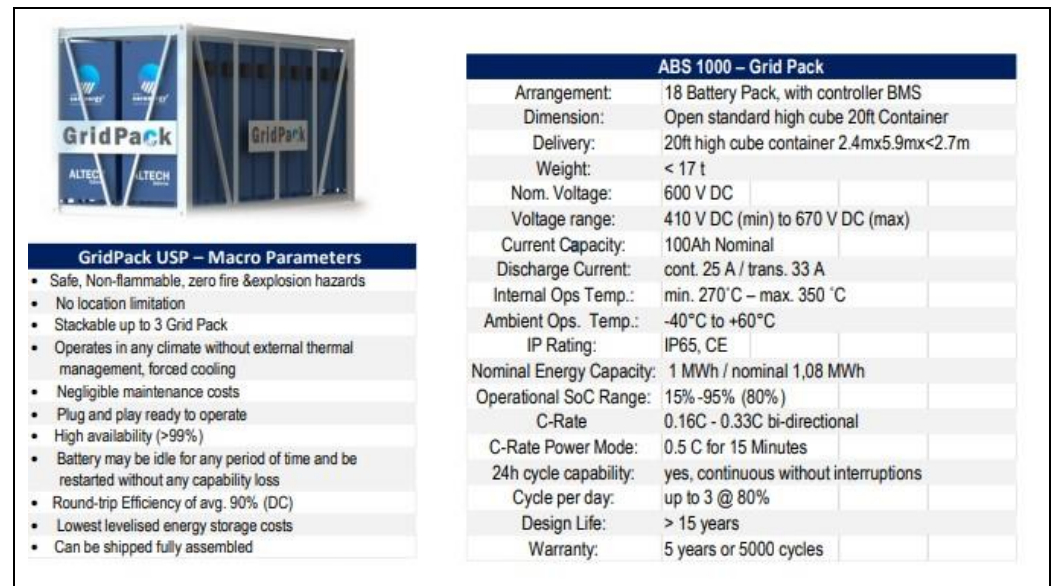


Source: Company, Pitt Street Research



As for the ABS1000 GridPack battery (Figure 2), it targets larger-scale applications, such as grid-level storage and industrial power backup. With a capacity of 1 MWh, this high-performance battery system enables a stable and uninterrupted power supply.

Figure 2: Specifications of the 1MWh GridPack (ABS1000)



Source: Company, Pitt Street Research

### Two prototypes in productions

ATC has two prototypes of the 60 kWh (ABS60) battery pack currently being produced and fabricated at the Fraunhofer IKTS facility in Hermsdorf, Germany. Once production and fabrication is complete, cyclical testing will be conducted on the battery packs and they will then be available for testing at customer premises.

### CERENERGY® shown to have 50% lower greenhouse gas emissions than lithium-ion batteries

CERENERGY® has been shown to have a GHG (Greenhouse Gas Emissions) footprint of at least 50% lower than that of lithium-ion batteries. This was depicted by a study conducted by the Sustainable Technologies Laboratory at the Bochum University of Applied Sciences. The study examined the emissions from several different battery types including lithium-ion and CERENERGY®.

The result indicated that lithium-ion batteries have an average of 31.3 CO2eq CO2 equivalent) for lithium-ion batteries whilst CERENERGY® has an average of 16g CO2eq (with a total range of 9.1-22.7g). This is because CERENERGY® does not rely on GHG-intensive critical metals such as lithium, cobalt, copper, graphite and manganese, instead employing sodium-chloride. This does not take into account that the CERENERGY® battery plant will leverage renewable energy sources,



## Suppliers confirmed

ATC has confirmed the key suppliers for the CERENERGY® project. Among them:

- **Gustav Eirich GmbH** will provide the granulation equipment and technology for granulating sale and nickel.
- **Frey Systeme GmbH** will provide isostatic machines for the production of green ceramic tubes,
- **Riedhammer GmbH** will provide a tunnel kiln for sintering of ceramic tubes.
- **Xenon Automation GmbH** will implement quality checks for the completed sintered ceramic tubes, ensuring there are no cracks or faults, and;
- **Fritz Automation GmbH** will supply the cell assembly plant, providing systems for cell initialisation and performance testing standards, advanced automation systems which will ensure efficient and precise execution of each step of the cell assembly process.

## Progress at Silumina Anodes™ pilot plant

ATC has progressed the pilot plant project in Saxony, Germany for Silumina Anodes™. The company has completed a Preliminary Feasibility Study that revealed an NPV of US\$507m.

ATC has begun construction of a pilot plant adjacent to the proposed project site to facilitate the qualification process. The power supply, laboratory, building modifications and front-end wet circuit infrastructure is completed. The on-site laboratory is undergoing commissioning, which will enable for Silumina Anodes™ to be tested and analysed on-site. Fabrication of the back-end of the pilot plant is currently underway in South Africa and Europe. Some of the back-end items, such as the silicon carbide linings, are having production expedited and ATC anticipates these will be installed and commissioned by the end of Q3 this year.

## A \$13.3m capital raising completed

The company has raised \$13.3m in capital to accelerate the development of CERENERGY® and Silumina Anodes™. Specifically, it will enable the DFS for both projects as well as the finalisation of construction and commissioning of the Silumina Anodes™ pilot plant and the fabrication of two 60kWh battery prototypes and Fraunhofer joint venture payments.

The offer consisted of a \$3m placement to sophisticated and professional investors and a pro-rate entitlement offer to existing shareholders that raised \$10.3m. ATC's largest shareholders, Deutsche Balaton Aktiengesellschaft and Delphi Unternehmensberatung Aktiengesellschaft agreed to partially underwrite the placement to \$6.7m.



## Our Valuation of ATC

In our initiation report on ATC, dated mid-May, we valued the company at \$416.7m in a base case valuation scenario and \$581.0m in a bull case scenario, both using a DCF methodology assuming commercialisation of ATC's technologies. Our valuation equated to A\$0.28 per share in our base case and A\$0.39 per share in our optimistic case, based on our assumptions of future capital raisings and associated dilution.

However, we are updating our valuation slightly. Our valuation assumed \$5m was raised in both FY24 and FY25, resulting in 1,547.7m shares on issue by the end of FY25.

We have updated our model in light of the recent capital raising and now increase the number of shares on issue to 1,646.8m shares, accounting for the recent capital raise. We have changed the timing of our model to start in August which slightly eases the discount factor attributed to future cash flows. Therefore, we have a new valuation (Figure 3) that is slightly higher on a total equity value basis, but slightly lower on a per share basis. Our base case is \$417.3m or 25.3c per share while our bull case is \$581.4m on a total equity value basis but 35.9c per share per share.

**Figure 3: DCF valuation for ATC (post assumed equity dilution)**

(A\$ m)	Base Case	Bull Case
<b>Enterprise Value (A\$ m)</b>	<b>415.1</b>	<b>579.2</b>
Net (debt) cash	(0.6)	(0.6)
Minority Interest	(0.2)	(0.2)
Other Investments	3.4	3.4
Provisions	(0.3)	(0.3)
<b>Equity value (A\$ m)</b>	<b>417.3</b>	<b>581.4</b>
Diluted Shares (m)	1,646.8	1,646.8
Implied price (A\$ cents)	25.3	35.3
Current price (A\$ cents)	7.3	7.3
Upside (%)	247.1%	383.6%

Source: Pitt Street Research

## Catalysts that could lead to a re-rating of ATC

We believe there are two main reasons for the undervaluation of ATC – a lack of funding clarity on the Silumina Anodes™ project (DFS is pending) and a lack of awareness about the prospect of CERENERGY® batteries.

However, we foresee ATC being re-rated by the market, mainly driven by the following key factors/developments:

- An announcement of a **successful offtake agreement** for CERENERGY® batteries will increase confidence in the economics of the project as well as funding prospects.
- An announcement of a successful **funding arrangement**: The biggest catalyst for a value uplift would be successfully closing a favourable funding plan within the expected timelines, especially if such a deal is non-dilutive. We believe this will be a testimony of the project's economics.



- **Successful completion of the DFS:** A favourable DFS within the expected timelines would catapult the share price.
- **Timely commencement of production** for its CERENERGY® batteries and Silumina Anodes™.

## Risks to our thesis

We foresee following key risks to our investment thesis for ATC:

- **Execution risk:** ATC's projects are in nascent stages. There is a risk associated with bringing the prospective product to the market and commercially establishing itself as an alternative battery manufacturer. In addition, any delay in the successful completion of DFS for the Silumina Anodes™ project will also hamper the investor's confidence.
- **Funding risk:** ATC might be required to raise a substantial amount for the commencement of commercial production. Raising funds/offtake agreement on favourable terms (both debt and equity), along with timeliness, continues to be the biggest challenge for the company in the foreseeable future.
- **Commercialisation risk:** After the successful development of a new technology, it is imperative that the company has a well-rounded commercialisation strategy and the resources to implement it to gain market share in a competitive industry. Failure to execute a commercial strategy, and potentially pivot it if required, could prevent the company from realising its potential.
- **Key personnel risk:** There is the risk that the company could lose key individuals and be unable to replace them and/or their contribution to the business.

### Risks related to pre-revenue Technology-driven companies in general

The stocks of technology-driven companies without revenue streams from product sales should always be regarded as speculative in character.

Since most technology-driven pre-revenue companies listed on the Australian Securities Exchange fit this description, the term 'speculative' can be reasonably applied to the entire sector.

The fact that the intellectual property base of these companies lies in technology not generally regarded as accessible to the layman adds further to the riskiness with which the sector ought to be regarded.

**Caveat emptor.** Investors are advised to be cognisant of the abovementioned specific and general risks before buying any the stock of any technology-driven pre-revenue stock mentioned on this report, including ATC.





## Appendix I – Glossary

**Anode** – An electrode in a polarised electrical device through which current flows in from an external circuit. The anode is the electrode where an oxidation reaction takes place. The charge of the anode is positive.

**Capacity loss** – A phenomenon in rechargeable battery usage where the amount of charge delivered by a battery at the rated voltage decreases with usage.

**Capacity retention** – A measure of the ability of a battery to retain stored energy during an extended open-circuit rest period. Retained capacity is a function of the length of the rest period, the cell temperature during the rest period and previous history of the cell.

**Cathode** – An electrode in a polarised electrical device through which current flows out. The cathode is the electrode where reduction reaction takes place. The charge of the cathode is negative.

**Electrochemical** – Relates to the production of chemical changes using electricity.

**Energy density** – Measure of how much energy a battery contains in proportion to its weight. The measurement is presented as Watt-hours per kilogram (Wh/kg).

**Kaolin** – A fine soft clay stemming from the natural decomposition of other clays. It is used for making porcelain and china as a filler in paper and textiles, and in medicinal absorbents.

**Metallurgical silicon** – Silicon metal is also called metallurgical grade silicon (MG Si, MGS). MG Si has a higher purity than the more common ferrosilicon, an alloy of iron and silicon at 15-90% silicon content. It is primarily used in large volumes in steel and cast-iron production.

**Solid electrolyte interphase (SEI)** – An ion conductive yet electron-insulating layer on battery electrodes, formed by the reductive decomposition of electrolytes during the initial charge. The nature of SEI significantly impacts safety, power and lifetime of batteries.

## Appendix II – Analysts’ Qualifications

Stuart Roberts, lead analyst on this report, has been an equities analyst since 2002.

- Stuart obtained a Master of Applied Finance and Investment from the Securities Institute of Australia in 2002. Previously, from the Securities Institute of Australia, he obtained a Certificate of Financial Markets (1994) and a Graduate Diploma in Finance and Investment (1999).
- Stuart joined Southern Cross Equities as an equities analyst in April 2001. From February 2002 to July 2013, his research speciality at Southern Cross Equities and its acquirer, Bell Potter Securities, was Healthcare and Biotechnology. During this time, he covered a variety of established healthcare companies, such as CSL, Cochlear and Resmed, as well as numerous emerging companies. Stuart was a Healthcare and Biotechnology analyst at Baillieu Holst from October 2013 to January 2015.
- After 15 months over 2015–2016 doing Investor Relations for two ASX-listed cancer drug developers, Stuart founded NDF Research in May 2016 to provide issuer-sponsored equity research on ASX-listed Life Sciences companies.
- In July 2016, with Marc Kennis, Stuart co-founded Pitt Street Research Pty Ltd, which provides issuer-sponsored research on ASX-listed companies across the entire market, including Life Sciences companies.
- Since 2018, Stuart has led Pitt Street Research’s Resources Sector franchise, spearheading research on both mining and energy companies.

Nick Sundich is an equities research analyst at Pitt Street Research.

- Nick obtained a Bachelor of Commerce/Bachelor of Arts from the University of Sydney in 2018. He has also completed the CFA Investment Foundations program.
- He joined Pitt Street Research in January 2022. Previously he worked for over three years as a financial journalist at Stockhead.
- While at university, he worked for a handful of corporate advisory firms.

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