Press Releases

Leclanché achieves breakthrough in environmentally friendly production of high-performance lithium-ion batteries

• Newly developed G/NMCA cells from Leclanché deliver 20 per cent more energy density
• Use of NMCA cathode reduces cobalt content of electrodes to only 5 percent (with high specific capacity cathode materials)
• The NMCA cathode is manufactured using an environmentally friendly water-based binder process

YVERDON-LES-BAINS, Switzerland and ANDERSON, Indiana, January 17, 2023– Leclanché SA (SIX: LECN) a leading global provider of energy storage solutions, has achieved a breakthrough in the environmentally friendly production of modern G/NMCA cells: As the first manufacturer worldwide, Leclanché is able to reduce the cobalt content in NMCA as cathode material from 20 to 5 percent and manufacture electrodes using an environmentally friendly water-based process. In doing so, Leclanché completely dispenses with the use of the highly toxic organic solvents (NMP) that are otherwise common in the production process. The new G/NMCA cells from Leclanché have a 20 percent higher energy density - with the same size, weight and performance level. Water binder-based NMCA cathodes are easier to dispose of and are also recyclable.

"With the water-based production of the high-capacity NMCA cathodes, we have reached a decisive milestone in lithium-ion technology," **emphasizes Dr. Hilmi Buqa, Vice President R&D at Leclanché** *"Until now, producing them using environmentally friendly processes was considered impossible. But, now we have mastered the process."*

Leclanché is the first company in the world to implement the environmentally friendly process in the production of Li-ion cells: The newly developed G/NMCA cell has a nickel content of around 90 per cent, which increases the energy density and enables the significant reduction of the cobalt content by 15 per cent. At the same time, it offers a longer service life, high cycle stability and good chargeability. Thanks to the high-volume energy density and high cycle stability, the new cells are particularly well suited for electric cars and heavy-duty applications such as ships, buses and trucks.

Water-based manufacturing process from Leclanché

High-capacity NMCA cathodes (nickel-manganese-cobalt-aluminium oxide) allow for a 20 percent increase in the energy density of a Li-ion cell compared to conventional G/NMC cells. However, these cathodes are manufactured by most manufacturers using organic solvents such as NMP (N-methylpyrrolidone). These are highly toxic and harmful to the environment. In April 2018, NMP was added to the list of Substances of Very High Concern, which can have serious irreversible effects on human health and the environment. The use of NMP has therefore been restricted by the European Commission.

Leclanché, on the other hand, has been using aqueous binders in its production process for around 13 years - and is a global pioneer in this field. No organic solvents are used in the technically simpler process. This not only eliminates the risk of explosion - there is also no health hazard for the employees involved in the production process. Additionally, thanks to the water-based process, Leclanché can dispense with energy-intensive processes for drying, flashing off and recycling the solvents. Thanks to the 10-30 per cent lower energy consumption, the Leclanché process also reduces the carbon footprint of battery cell production. Thus, it offers not only ecological but also economical advantages.

Certified quality from European production

Leclanché is one of the few independent manufacturers of high-quality lithium-ion battery cells in Europe. The large-format cells come 100 percent from German production at the Willstätt site in Baden-Württemberg, while Leclanché's module production takes place on a state-of-the-art automated assembly line at the company's headquarters in Yverdon, Switzerland. Unique in Europe are both the many years of experience and the depth of the production chain: Leclanché has the complete know-how for producing high-quality lithium-ion cells - from electrochemistry to battery management software and the combination of battery systems - and thus covers the entire technical value chain.

Leclanché's new environmentally friendly G/NMCA cells are expected to be available on the market in 2024.

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About Leclanché

Headquartered in Switzerland, Leclanché SA is a leading global provider of high-quality energy storage solutions designed to accelerate our progress towards a clean energy future. Leclanché's history and heritage is rooted in over 100 years of battery and energy storage innovation. This coupled with the Company's culture of German engineering and Swiss precision and quality, continues to make Leclanché the partner of choice for both disruptors, established companies and governments who

are pioneering positive changes in how energy is produced, distributed and consumed around the world. The energy transition is being driven primarily by changes in the management of our electricity networks and the electrification of transport, and these two end markets form the backbone of our strategy and business model. Leclanché is at the heart of the convergence of the electrification of transport and the changes in the distribution network. Leclanché is organised in three business units: energy storage solutions, e-Mobility solutions and specialty battery systems. Leclanché is listed on the Swiss Stock Exchange (SIX: LECN).

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Media contacts:

For Leclanché:

Switzerland / Europe:

Thierry Meyer

T: +41 (0) 79 785 35 81

E-mail: tme@dynamicsgroup.ch

Germany:

Christoph Miller

T: +49 (0) 711 947 670

E-mail: leclanche@sympra.de

North America:

Henry Feintuch / Ashley Blas

T: +1-646-753-5710 / +1-646-753-5713

E-mail: leclanche@feintuchpr.com

Investor Contact:

Pasquale Foglia

T: +41 (0) 24 424 65 00

E-mail: invest.leclanche@leclanche.com