FLASH BATTERY

Agriculture, a world ripe for electrification

THE MOVE TOWARDS ELECTRIC VEHICLES IN AGRICULTURE MAY GO AGAINST THE TRADITIONAL GRAIN BUT BATTERY SOLUTIONS ARE ALREADY PROVING TO BE A SUCCESS

An epoch-making revolution is underway in Europe. The transition to electric for green and sustainable mobility is a real paradigm shift that isn't sparing any sector, including agriculture, which has traditionally relied on internal combustion engines.

Environmental sustainability

Big, medium or small, agricultural producers are embracing the concept of zero emissions and are now on the fast track towards environmental and technological sustainability. More and more hybrid and full-electric applications are appearing on the market, for greater flexibility and efficiency and in an effort to generate energy without having to resort to polluting fossil fuel sources.

"The whole market context is changing", says Flash Battery's sales manager, Matteo Donelli, "That's why we are present in Europe both directly and through partnerships with highly expert powertrain system integrators, including Atech GmbH in Germany, Efa France in France and Q-Tronic in Benelux; for these three markets, which alone account for 80% of the European electrification market in the industrial machinery and electric vehicle segment, agricultural electrification is the hottest near-future trend."

While not long ago OEMs considered lithium-based electric and hybrid applications a little more than a mere technological showcase, there are now true champions in the agricultural market that are driving forward the movement towards electrification.

With a decade-long experience in the sector, Flash Battery has always presented itself as a technological partner in the shift from internal combustion to electric and gives painstaking attention to every step of this delicate transition because it knows the choice of the battery is paramount. This sector is definitely energy-intensive by nature: when an agricultural machine is electrified, one of the most crucial aspects is ensuring adequate range and power to the machine.

Wine making

Viticulture is one of the top agricultural segments primed for electrification, which is growing rapidly. This is especially true in France, where there is a drive towards greater process quality, precision and simplification. The straddle tractor harvester is a good vineyard application example that is reaping the benefits of Flash Battery's lithium technology. In the electrified version it offers the same performance of its internal combustion engine counterpart while gaining multiple advantages, including zero maintenance costs, lower vehicle noise levels, and most importantly, given the numerous environmental restrictions imposed in French sensitive regions like Champagne, Burgundy and Bordeaux, zero CO2 emissions.

"To produce custom batteries made to fit the space and size specifications of the application and with voltages and capacities studied for the specific task to be performed", says Flash Battery CEO Marco Righi. "We draw from a decade-long experience gained by working alongside numerous European manufacturers that decided on us as their chosen provider because of our focus on the industrial machinery market. Today we have produced over 500 different and completely custom battery models.

"What's more, with our European partners, with whom we interact on a daily basis, we can now offer complete electrification solutions: Flash Battery works on the battery pack's preliminary and dimensional project while the system integrator adapts the inverter and engines, a synergistic combination that enables us to meet the exact needs of the final customer and supply a finished, ready-to-market product."

Livestock farming

Livestock is another segment where Flash Battery's lithium batteries are very popular and being used, in particular in animal feed mixers. These applications are in large part extremely energy-intensive and require high-voltage solutions that can deliver more energy than power. Solutions often exceed 600V where industry know-how is crucial. For feed mixers the work focuses on solutions involving high-level mechanical engineering. The available space is often limited so the battery pack has to be distributed on the machine in unusual ways.

Batteries are also required to power up to five engines and in applications that operate inside farms, so safety has to be factored in to protect the animals and workers. The lithium-iron-phosphate (LFP) chemistry used by Flash Battery is perfect in situations such as this because it can eliminate the risk of fire (from dusts, for example, which can ignite due to the high temperatures that internal combustion engines can reach).

However, the advantages of LFP technology don't stop there. The chemistry is best suited for the agricultural sector because it is the safest and most stable you can find in the market; it exhibits a high decomposition temperature and slow heat release, a combination that ensures top performance, a very high level of safety and excellent electrochemical performance.

Electric feed mixers also reflect ethical considerations in terms of animal safety and keeping the production chain protected and sustainable. Today, the market is demanding that animal farmers increasingly ensure the mental and physical well-being of the animals under their care. Electric equipment is a step ahead, as it does away with polluting emissions in stables and offers near-silent operation, ideal for both animals and workers.

Urban green space maintenance

A third category that is very much a part of the electrification process in agriculture is the number of European municipalities that are recognising the benefits of lithium in terms of zero emissions and zero noise is growing and wood chippers/shredders are one reason. Once electrified, these agricultural machines become greener and less noisy but also better performing.

Thanks to the high power density of Flash Battery batteries, coming up with solutions

ABOVE: **A customised 115.2V 560Ah - 64.5kWh Flash Battery solution for an industrial EV**
BELOW LEFT TO RIGHT: **CEO Marco Righi, sales director Matteo Donelli and CTO Alan Pastorelli**

that ensure low weight, a long lifespan (> 4,000 charging cycles) and high autonomy is something that can be achieved. The patent-pending 'Flash Balancing System' acts both actively and passively on the cells and with a balancing power that by far exceeds conventional systems (20A). This applies not only at the end of the charging cycle but also in active mode during discharge, which translates in ultra-quick balancing and maximum lithium battery autonomy over time.

It must also be taken into account that wood chippers/shredders are used outdoors so they are exposed to the weather elements and wood dust. This is where the importance of the customisation process of the Italian company comes in, because it addresses these aspects with purpose-built, IP65-rated solutions that also integrate a heating system to ensure proper operation and constant performance even at freezing temperatures.

Remote control predictive maintenance

Therefore, an electrified agricultural machine can become an advanced and efficient piece of equipment from every perspective and include a choice of features to optimise it for every circumstance. Remote control is one of these, a beating heart of the Flash Battery technology that thanks to the proprietary Flash Data Center software enables predictive maintenance, removing time and geographical constraints and anticipating and preventing faults before they occur.

Integrated in the batteries, the system can continuously and automatically monitor, 24/7, each of the 15,000 lithium batteries installed by Flash Battery to date in over 54 countries worldwide. Automatic data control is one of the essential characteristics of Flash Data Center. It sends real-time alerts of warnings, abuses or faults, eliminating costly maintenance and carrying out a non-stop prevention action.

"This feature is particularly valuable for agricultural manufacturers that export their machinery around the world", says Righi. "For example, we successfully installed it recently on an electric fleet of an important customer of ours, a leading European manufacturer and exporter of telescopic handlers that considered it a crucial function and demanded it, because it not only enables Flash Battery to do accurate check-testing during the prototype stages but also lets the final customer check at any time the state of health of the batteries installed in its fleets scattered throughout the world."

Future of the planet

Today, electric agriculture means awareness and attention towards the environment and technological development as well as commitment to the general public and the future of our planet. Europe, in fact, is growing more conscious about the threat posed by environmental degradation and aims at achieving net-zero climate impact by 2050 so that people's health, clean energy and technological innovation become central to a new business strategy. Flash Battery looks to the future with this mindset, and pushes for continual investments in high efficiency- and sustainability-oriented R&D skills.

The company's R&D department, which now accounts for 35% of staff, focuses on building new competencies. This drive for investigation and innovation is what has enabled us to develop batteries with a new generation of cells.

Flash Battery's third-generation lithium batteries and new release of the Flash Data Center remote control, a vitally important ally for fleet control and consumption analysis, are set to play a leading role in the most pioneering companies of agriculture. **iVT**

Author: Flash Battery