

# LITHIUM DIFFERENCE

More often than not, the best companies in the world start from the humblest of beginnings and this could not be truer for Italy's best-selling lithium battery manufacturer, Flash Battery.

Starting from a garage in the picturesque town of Campegine in 2012, the brainchild of Marco Righi, now Founder and CEO, and Alan Pastorelli, Co-Founder and CTO, it has since grown into a multi-million euro turnover company, manufacturing lithium iron phosphate (LFP) batteries for industrial machines and electric vehicles.

In 2018, Flash Battery turned its attention to the GSE sector and is now widely respected, working with major OEMs on how to electrify their fleets. Since 2019 it has seen 40% growth in this segment and looks set to achieve over 30% growth this year.

"We are growing fast; we want to be seen as an active promoter of the current energy transition," said Elisabetta Orlandi, Business Development Manager at Flash Battery.

The company's unique customised LFP battery solutions are far reaching with many OEMs snapping them up for applications as diverse as GPUs, tow tractors, pushback, beltloaders, ambulifts, and passenger stairs and PRM units to name a few.

Charlatte is one of the first companies to adopt Flash Battery lithium batteries for its tow tractor fleets. As early as 2019, Flash Battery, in collaboration with Charlatte, was powering three electric demos with LFP at different airports.

"This gave us the chance to test our battery in different weather conditions and different usages to prove its capabilities, and the results were very satisfying. We sat

Elisabetta Orlandi, Business Development Manager, shares why OEMs are turning to Flash Battery to electrify their fleets.

together with Charlatte after the various trials and analysed the results, and could verify the parameters, the real usage on the field and the operational performance," said Orlandi.

## Electrification trend

She says the current trend towards electrification on the apron and at airports is fast becoming the norm thanks to the increasingly diverse challenges launched by the European Green Deal, which is making airports look seriously at reducing emissions by 2030.

"Another main reason is the purchase and maintenance cost of diesel is constantly increasing as it is being driven by emission reduction technology," continued Orlandi. "Another reason is the slowdown of investment in diesel due to the uncertainty of long-term use and the



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Elisabetta Orlandi - Business Development Manager at Flash Battery

increase in the development of alternative energy-based technology."

The biggest challenge for airports, she stressed, is still the infrastructure-related problems which are necessary to overcome in order to improve capacity and charging availability, and, of course, they have to get through the existing energy crisis, where the price of electricity has risen dramatically.

"We see the electrification trend happening across the globe at all the airports, not only in North America and Europe," she said.

## Lithium versus lead-acid

The total cost of ownership (TCO) is convincing airports, ground handlers, and OEMs to purchase lithium battery-powered machines over their lead-acid operated counterparts.

"Many people who use lead-acid batteries are often forced to park and charge for a considerable time. But because lithium batteries accept partial charging it helps optimise duty cycles while reducing the costs of the operation," said Orlandi.

Moreover, lead-acid batteries have several disadvantages: starting with their long charging time and no flexible duty cycle, their low energy efficiency, their short

service life (maximum 1,000 charge cycles) and expensive maintenance costs, all of which are easily overcome by choosing lithium technology.

Furthermore, Flash Battery has developed its own Battery Management System (BMS) to enable vehicles to operate longer and more efficiently. The system, which recently received an Italian patent as an industrial invention is called Flash Balancing System and works by acting on each individual cell with combined active and passive balancing, and a balancing current that is at least 20 times higher compared to a traditional BMS, which has a low current and takes far longer to charge each battery cell.

"The main added-value is that we balance both in active mode during discharging and in active and passive mode during charging, which means Flash Battery lithium batteries are balanced in record time (<30 minutes) and the charging time is still kept down to a minimum. This saves customers a lot of time on charging, giving the vehicle more autonomy. Correct balancing of a lithium battery pack is therefore an essential process to ensure maximum efficiency and the highest capacity throughout the battery's entire lifecycle."

## Why choose Flash Battery?

One of the main advantages of choosing Flash Battery comes down to its focus on the industrial market, which has allowed the company to shape its technology on the basis of the needs of this precise segment. It is precisely for this reason that Flash Battery lithium solutions are associated with LFP chemistry.

"LFP is in fact the safest and most stable chemistry on the market, thanks to its high decomposition temperature and slow heat release," said Orlandi. "It is also available in large-capacity formats as required in industrial applications and that's why it works in the GSE segment as well, which also has large capacity requirements.

"I focus on this because in this segment you can also find different chemistries which may have higher energy density like nickel manganese cobalt (NMC), but due to the intrinsic composition of the chemistry, the type of assembly and the electronics behind it, it is less safe and, therefore, less suitable for the GSE sector.

"LFP is also the best compromise in terms of lifecycles compared to other chemistries. Our third generation elements can reach more than 4,000 cycles at 70% depth of discharge. This is why the TCO makes good commercial sense," said Orlandi.

To constantly be sure about the safety of its battery packs, Flash Battery tests the elements to see how they react in the case



of a short circuit. This is done through a specific safety test called the Nail Penetration Test.

"In our batteries all of our elements have several thermal sensors to avoid any unexpected and dangerous situation. Moreover, Flash Battery's approach is always tailor-made according to the application needs. For instance, when Flash Battery met Charlatte, the discussion started from the analysis of the mechanical space, the duty cycle and the current flow of the application, to creating a technical dossier, specifically for Charlatte tow tractors. This due diligence procedure happens with all other OEMs that Flash Battery works with. This is an important difference when comparing the standard products you can find on the market, which have not been analysed in details according to the real needs of the applications. With our tailored-made solutions, we are, therefore, sure that we are developing the right battery pack, not only for the right kind of vehicle but for the right kind of operation."

## Remote ability

Last but not least, Flash Battery offers remote monitoring for each battery which is very important as a preventative diagnostic maintenance tool.

"We are currently working on an airport fleet of tractors in Turkey. Each lithium battery has a router and a SIM card, which

sends us all the parameters of the battery: voltage, capacity, energy and power thanks to the Internet. Flash Data Center is our own proprietary remote monitoring software that harnesses the power of artificial intelligence and machine learning technologies and uploads and analyses all the data coming from the battery such as temperatures, and any kind of anomalies or parameters that are not working properly. For example, on a trial carried out in the UAE, Flash Battery could inform the operator who left the tow tractor out in the sun in 55°C heat for one week. We received an alert and notified our customer to go and check that battery showing an irregularity because of the high temperature recorded. By intervening remotely, it gave us the chance to solve the situation without losing any time and money – predictive maintenance is a big win for OEMs."

## Strategy for 2023?

Flash Battery's main goal is simple: to continue supporting their active OEM customers in the GSE sector. "We want to support OEMs not only for one type of ground support equipment but for the whole range of their products. We will continue to offer our customers our tailor-made lithium batteries and will be happy to assist when the time is ready to electrify other GSE in their portfolio to meet their net-zero goals in the long term.

"Our goal, ethically in line with the European Green Deal, is also to contribute to the achievement of the EU's goal of climate neutrality by 2050 in cooperation with all players in the supply chain, from machine manufacturers to producers of all powertrain components," added Orlandi. **ghi**

