



# POWERTRAIN SYSTEM INTEGRATORS

**T**oday, the reduction of CO<sub>2</sub> emissions and the transition to more sustainable technologies are a top priority for the airport industry. The ambitious targets set by the European Green Deal — which requires a 55% reduction in emissions by 2030 — are not seen only as regulatory constraints, but as drivers of growth and competitiveness for the entire sector.

According to data published by ACI Europe, the association bringing together more than 500 airports across 55 countries, sustainability is now central to airport strategic agendas: more than 200 of them have already joined the Net Zero 2050 programme, committing to carbon neutrality by mid-century.

After the abrupt standstill of 2020 caused by the pandemic, the “green transition” of airports is experiencing a period of strong acceleration. New investments in electrified solutions are transforming both airside and landside areas, with a growing number of electric applications already in operation or in testing.

## GSE: the operational core of the airport

Much of the reduction in emissions depends on the renewal of ground support equipment (GSE), the essential equipment for the daily operation of an airport.

GPUs, tow tractors, pushbacks, beltloaders, PRM platforms and passenger stairs: much of the GSE fleet is expected to play a decisive role in drastically reducing

## How Flash Battery is supporting OEMs and ground handlers in the energy transition.

emissions within the next decade. This objective involves all players in the supply chain, from manufacturers to handlers, not to mention OEMs specialised in GSE and the airports themselves.

The future of airports is electric. The current scenario offers two parallel paths:

- OEMs pioneering electrification, developing new full-electric vehicles.
- Ground handlers and airport operators choosing to convert their existing fleets, replacing lead-acid batteries with higher-performing lithium systems.

In both cases the goal is the same: drastically reduce local emissions, improve efficiency and cut operating costs.

### TCO as a decision driver

For years the main obstacle to adopting lithium was its higher upfront cost

compared with lead-acid solutions. However, total cost of ownership (TCO) analysis has flipped this perspective.

Calculating TCO means evaluating the entire lifecycle of a vehicle, including maintenance costs, energy consumption, battery life and downtime. Lithium is the clear winner in this comparison:

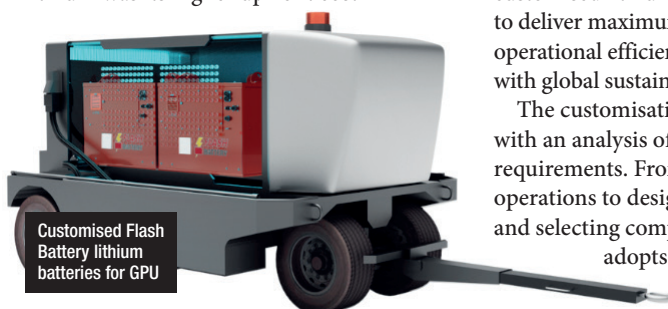
- It reduces both scheduled and unscheduled maintenance
- It improves energy efficiency
- It extends fleet lifetime
- It enables fast and partial charging without damaging the cells

More and more airports and operators are realising that lithium is not only a “green” choice, but also an economically advantageous solution in the medium to long term.

### Flash Battery: more than ten years of experience in GSE

Since 2012 Flash Battery has been supporting leading international ground handlers and OEMs in developing customised lithium batteries designed to deliver maximum safety and superior operational efficiency in airports, in line with global sustainability targets.

The customisation process for GSE starts with an analysis of the vehicle's operating requirements. From studying actual operations to designing battery architecture and selecting components, the process always adopts an integrated machine-system approach. ▶





All Flash Battery lithium packs developed for the airport sector are designed with specific characteristics to fully meet the requirements of this area of application.

All Flash Battery packs destined for the airport sector are designed to ensure operational continuity even in critical conditions:

- IP54-IP65 protection rating, making them waterproof and resistant to weathering.
- Integrated thermal management system, essential for operation even in extreme temperatures.
- Flash Data Center, a proprietary remote diagnostics platform enabling predictive maintenance, reduced downtime and lower operating costs.

These elements ensure reliability and operational continuity, two essential requirements for machines operating 24/7 in high-intensity environments such as airports.

## The strategic role of Powertrain System Integrators

While the battery is the heart of the electric system, its full integration with the other powertrain components is what determines overall performance. This is where Powertrain System Integrators come in.

They are strategic partners with extensive technical knowledge and a direct presence in the local market. Their mission is to integrate the battery within a complete, turnkey electrification package, including power electronics, control systems and vehicle architecture.

For Flash Battery, collaboration with powertrain system integrators is a key asset. Long-standing partnerships include Atech GmbH for the German and Austrian markets and Q-Tronic for Benelux, while more

recently collaborations have been established with Paul Forrer (Switzerland), Zapi UK (United Kingdom) and TEM (Spain).

It's a European network providing local presence, knowledge of specific regulations and high-level technical support. The benefit for the end user is clear: a single point of contact that is able to deliver a complete, high-performance, ready-to-use system with perfect integration between battery, power electronics and vehicle architecture.

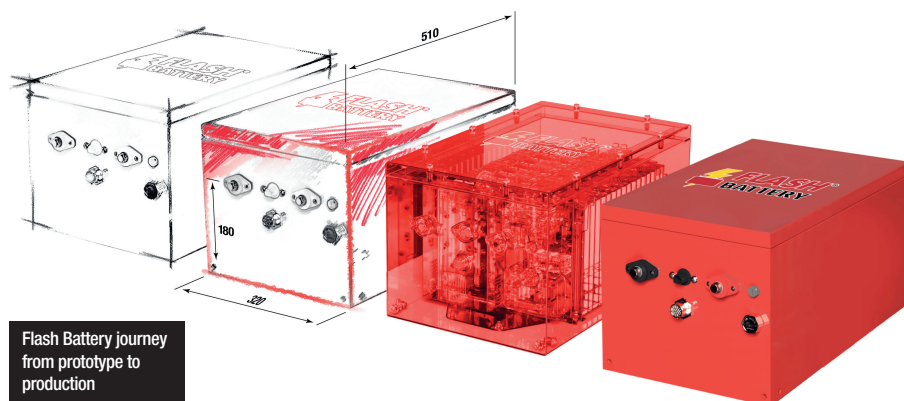
## The Flash Battery approach to GSE customisation

The customisation process always starts with a thorough analysis of operating requirements. For GSE no two jobs are identical: a tow tractor has different energy requirements than a GPU or a conveyor belt.

This is why every project is "tailor-made", taking into account parameters such as:

- Daily usage intensity
- Required charging cycles
- Autonomy requirements
- Climatic and environmental conditions
- Interface with airport management systems

This focus enables a perfect integration between battery and vehicle, maximising performance, autonomy and safety.



"The battery is the beating heart of the entire electric system," explained Elisabetta Orlandi, Business Development Manager at Flash Battery. "As manufacturers, we are always happy to engage in technical discussions with our international customers, bringing our specific expertise to support the overall project. Cooperation between battery manufacturer, powertrain system integrator and end customer is a winning formula for developing effective, truly customised electrification solutions."

This three-way synergy makes it possible to manage complex processes such as GSE electrification, where every detail — from power electronics to remote diagnostics — contributes to ensuring operational continuity in high-intensity contexts.

## Towards a more sustainable and efficient airport

The path towards airport decarbonisation is clear. In the coming years GSE electrification will continue to accelerate, driven by public and private investment and growing sustainability awareness among passengers and stakeholders.

More sustainable airports mean not only lower emissions, but also greater operational efficiency, reduced operating costs and higher equipment reliability. Cooperation among technology companies, integrators and industry operators will be crucial for the success of this process. The future of the airport is electric. Lithium batteries, integrated into complete electrification packages thanks to powertrain system integrators, are now the key to cutting emissions and making ground operations more efficient.

With more than ten years of experience and a highly qualified network of European partners, Flash Battery has positioned itself as a key player supporting OEMs and ground handlers in the energy transition.

The challenge is complex, but the direction is clear: airports that are more sustainable, efficient and technologically advanced, are capable of combining economic competitiveness with environmental responsibility. **ghi**