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THE CHICKEN OR THE EGG?

TOM ALLETT SPOKE WITH BORIS WEBER, FRANKFURT'S PROJECT MANAGER FOR GROUND SERVICES ABOUT THE AIRPORT'S INCREASING USE OF ELECTRICAL POWER.

The desire to promote 'green credentials' has never been higher on most airport agendas than it is today. The scientists' alarming warnings about global climate change have focused many minds on reducing carbon footprints and the topic has become a key point of interest across the sector. Like it or not, the truth is that ensuring 'profit' rather than becoming 'greener' is still the overriding concern of this (and almost every other) industry, and aviation, of course, is seen as a key polluter. However, to put things in perspective, all the evidence so far shows cumulative aviation emissions to be, at worst, a fifth of that produced by road vehicles. Nevertheless, in recent years press coverage has promulgated the view that aviation is the only industry with significant work to do on the emissions front, and there's no doubt that the attention generated has prompted the industry to get 'greener'.

ACI's carbon accreditation scheme, which encourages airports to identify their emissions and then reduce them, is already ten years old. It has done much to encourage the industry's environmental actions and Frankfurt Main (IATA: FRA) has been at the forefront of the scheme since

Frankfurt Airport had introduced its first four battery-powered GPUs into service by February this year (KEY – Tom Allett)

it was launched. Long-time readers of *Airports International* will know that FRA's environmental efforts, driven by its management company, Fraport, have regularly featured in this magazine. A recent 'green' addition that caught this editor's eye was that of battery-driven ground power units (GPUs), which has paved the way for further electrification of airside power needs. Aircraft parked at either of Frankfurt's two terminals already used fixed electrical ground power during turnarounds, but those using the remote stands have had to rely on power supplied by diesel-powered GPUs.

Boris Weber, Frankfurt's project manager for ground services explained why the airport chose to test electrical GPUs: "[Efforts] to reduce airports' carbon emissions are certainly a 'big deal' today but ours started in 2008/2009 with an expansion of our electric – or alternative-drive trains – which reduced some CO2 and emissions.

"Our first new type of electric ramp equipment was a pallet high-loader from TREPEL. It was quite difficult to get that type of electric item at the time because few companies had them in their portfolio. So, each time we wanted to do a [battery power] project we had to approach manufacturers and ask them to build [the equipment] for us.

"Of course the reason for asking was climate control, reducing CO2 emissions and the airport's climate strategy."

Today, the local authority – the State of Hesse – partially funds the airport's 'green' activities, but this wasn't always the case. Mr Weber said that the first environmental 'steps' were not subsidised. Then the airport launched its E-PORT (electromobility) initiative to progressively replace diesel-powered vehicles with battery-driven alternatives. The state recognised the E-PORT move as one of its 'lighthouse' projects, which qualified for subsidies. Mr Weber added: "In the second phase [of the acquisition], after the first prototype vehicles, we were able to buy our first partly financed vehicles."

Today, some equipment, such as buses, are classified as special projects that attract partial subsidies from the State of Hesse but other equipment, among them pallet loaders, no longer qualify for subsidies.

Other types of battery-powered ramp equipment were introduced; electric conveyor belt loaders appeared in the 1990s, then after a new handling company was launched at the beginning of 2000, there was a temporary move back to diesel units. Mr Weber clarified: "The new handling company began with very cheap equipment and we went back to using diesel conveyors. We quickly realised that the staff, who had become used to operating 'clean' equipment, didn't like using diesel because of the [exhaust] emissions and noise surrounding them. We did a financial analysis of the cost [of switching back to battery power] and found battery loaders kept their re-sale values better. It was also proved to be financially better to buy electric equipment, so we switched back."

That decision was taken in 2004. Battery-powered belt loaders were added to the inventory in 2009/10 and since then these have been the only type purchased by Fraport. It now has a fleet of 107 and Mr Weber said that today, the subject of whether to buy diesel or electric isn't even discussed; the choice is always battery powered when the right (ie capable) product is on the market. Battery power was also selected for towable passenger stairs, 3.5-tonne cargo loaders and a variety of cars and vans for transporting staff and equipment. Electric baggage tow-tractors have been part of the inventory for many years and, more recently, bigger long-range versions have also been added.

There are more than 100 fixed electric power points in use at Frankfurt's on-terminal parking areas, plus 64 mobile diesel units used at the remote stands. Mr Weber said the airport would "probably" swap the remining diesel GPUs for electric ones in due course. However, as he explained, is a 'chicken and egg' situation because the wider use of battery GPUs can only be maximised when the airport's electrical power supply infrastructure has been improved. "Right now, we don't have a plan to replace all our [diesel] units by a certain date and to go to 100% electric. The board has asked us to analyse what [equipment] we need to switch to make the complete [GSE] fleet carbon neutral in respect of emissions, but this is still an analysis, not a fixed plan with set numbers and a fixed date yet.

"I think this is the right way [to approach acquisitions], because

if you buy a huge fleet and switch everything [immediately] to electric, you will definitely get a big problem with your [electricity supply] infrastructure."

More charging points and, therefore, a more robust electricity supply are the two things needed to facilitate wider use of airside electrical equipment. He added: "Yeah, it's necessary to improve the basic power supply and provide a lot more connectors, charging places, wall boxes, etc, and that's not that easy."

In terms of timescale Mr Weber said the equipment analysis is set to run until 2028, but it isn't yet clear if the required carbon neutral equipment needs to be in service by then.

"In my opinion, we won't manage to have 100% carbon neutral equipment until 2028. For example, I don't know of any electric-powered main deck loaders that you can buy at the moment. If you have to buy diesel units now, you're going to want 15+ years of operating time from these items, so would we want to sell this equipment by 2030 just because it's diesel driven? Maybe, maybe not." He believes it is too early for such a decision to be made: "From today's point of view, we will grow into using ever more electric [equipment] and I hope from a technical and operative point of view that we don't get a fixed date and a political decision saying, 'OK, this is your fixed date and you have to replace everything by X'. It might be technically possible by that date, but not at this time."

The controls on the electric 7400 GPU are no different to those on its diesel equivalent. (KEY – Tom Allett)

Battery GPUs

Late last year the first of four battery ITW GSE 7400 GPUs arrived at Frankfurt. Mr Weber said three companies had responded to the airport's tender, but two of the proposals were for power units that were as yet untested, while the ITW GSE 7400s had successfully completed a trial period at Amsterdam's Schiphol. The new equipment's switches and functionality are the same as those for the airport's diesel units. Mr Weber added that all the units were operational by mid-February: "Of course it takes time to introduce new equipment. The staff always ask, 'What is it?' 'How does it work?' so it takes time to get people used to new technologies and to get it into regular operation. But [work practices] get better and more operating hours [are accumulated]. Now, all four units have achieved 300/340 hours – no problems."

He noted that the electric units had improved working conditions for the ramp staff as there was now less noise and fewer emissions. He recalled one of the ground handling team reporting that a GPU wasn't working…it was, but he hadn't realised it was a battery unit, and so wasn't making the noise or emitting the fumes that a diesel unit would have. "[The 7400s] are just like stationary electrical convertors, it's just a question of turning them on and off, nothing more. They are very stable and easy to operate, and we don't have any problems with them right now. From an operational point of view, the only issue is battery capacity.

"If you opt to use electric equipment, the main challenge is to define the right balance of battery capacity and charging availability. We decided to buy the biggest available battery [version]." Currently the airport's 7400s are primarily employed to service regional aircraft parked on the western remote stands, but they are occasionally used on narrowbodies too. At the time of writing – May – they were not yet being used on widebody aircraft, but as the larger airliners need at least three of four GPUs at the same time, that would represent Frankfurt's entire electrical fleet.

The GPUs' status is monitored remotely by a telematics system. When a GPU's battery level begins to drop, an alert is sent to the operator and appears on their computer screen, essentially like a battery warning light would illuminate inside your car. Mr Weber said: "The 7400 GPU has a capacity of 160 kilowatt hours and, theoretically, an aircraft like an A320 will consume 30 kilowatt hours of energy during a complete turnaround. So, we expect to get five A320 turnarounds [before needing to recharge].

"We mainly use them on the smaller regional aircraft, which drain less power, so I think today we never get below 60, 70, 80% of the battery's charge. Over the coming months we will have to analyse how much battery capacity and energy we need on our system."

A series of 32- and 63-amp charging sockets have been installed close to the remote parking stands and, indeed, there were already many more 32-amp / 400 volt charging points 'airside'. These provide for all of the airport's battery-powered GSE equipment's needs. Mr Weber noted: "Right now we are ok to use standard industrial sockets but, in the future, for passenger and cargo transport fleets – buses – we will need some higher-powered charging capability. This is something we will have to address in the next few months.

"We will also examine how we will introduce electric GPUs on widebodied aircraft, but that's a development that I see as being three or four years away."