

DAF CF HYBRID&amp;ELECTRIC

# HERE WE GO MR GREEN



**H**ere is DAF's turn to step boldly into the electric territory. Which they do, as is natural, with urban distribution and city service applications in mind (e.g. waste collection) aiming straight to the highest capacities that fit into this kind of applications. It is well known, after all, that city routes are short and low-speed, hence ideal given that range is still every EV's Achilles heel. On the other hand, the urban environment is also what suits best a powertrain whose gas and, notably, also noise emissions are equal to zero. **DAF's offer is particularly interesting not only for the 28-tonne potential GVW of the 3-axle CF, a fully-fledged heavy vehicle** (and yet one that boasts high manoeuvrability thanks to a third steered axle) but also for the enticing truck and trailer combo with the

same 28-tonne potential GVM. The weights we are talking here are, indeed, potential, to be measured against every country's legal requirements. In both cases, however, these vehicles are ideal for round the clock supermarket distribution, as the truck's (or tractor's) battery pack can be (re)charged during loading and unloading operations. Indeed, 100/150 kW – a power range that is no doubt already available at every store – is well enough to bring batteries back

**DAF enters the electric sector, aiming at city distribution and urban services, with the highest capacities**

to 80 percent charge capacity in half an hour, or a little more than that, thus securing the driving range that is needed to get back to the central depot – usually found in the suburbs – to get loaded with goods, as well as with electrons. Back and forth. And when the time comes to get fully charged, one hour and a half will be enough. Such difference in charging times confirms the time/charge level ratio as being non-linear; a detail to keep into account when planning when and where to get a recharge. While CF's architecture is well known, there's a difference with traditional versions in that this one is fitted with a 210 kW engine and a 170 kWh battery pack. Differently than on the models from the Volvo range, here there's no gearbox and it's up to the proverbial drive shaft-breaking torque of 2000

Nm that's typical of electric motors to guarantee that driving is as smooth as required. Power-wise, if we compare it to their diesel counterparts, the CF fitted with the 6.71 M-X7 gets around 210 kW, so you need to step up to the 10.8 l of the MX-11 to start with some ten kW more, going up to 330 kW depending on rating. Whilst, then, they are similar in power, torque is what truly marks the difference: with 2000Nm, we're getting 50 to 100% more as compared to the MX-7 with the same power level, and only the XM-11 with higher ratings manages to go slightly above that. What's more, **one can benefit from the extraordinary torque curve that's typical of electric motors: an awful lot of torque immediately available that stays as high as desired.** Going back to the hardware, the whole powertrain

*"Although electric vehicles are ideal for urban distribution, hybrid technology is preferable for longer routes. In the city, the operation of the DAF CF Hybrid model is fully electric, and thanks to the diesel engine, the vehicle can move to and from the various distribution centres".*

Marcel Pater, fleet manager at Peter Appel Transport, The Netherlands.

was named VDL E-Power and it stems from cooperation with Dutch company VDL taking charge of the entire electric section, from batteries to the motor, all the way through to the BMS, down to the very quick charging stations. Before they were put to market (just a few units a year to begin with, to make sure that even such innovative vehicles could meet the Dutch manufacturer's usual quality standards) both versions were tested by longstanding customers of the Eindhoven-based company. Vehicles were purposely put under strenuous conditions to ensure they were suitably challenged. In one test, for example, a food distributor used them 7 days a week on 18-hour shifts, driving an average of 250 km per day, thus well over the 100 km range secured by the battery pack – which entailed a careful planning of routes and stops. This also placed considerable strain on batteries, as they're particularly sensitive to charge-discharge cycles. But all of the above comes at a price – not simply the one that's found on the price list. The battery pack adds about 3 tonnes to the empty weight, net of a weight loss of 700 kg compared to the first prototypes thanks to advancements in battery technology. Yet, there are still 3 tonnes to be subtracted from payload capacity, at least until amendments to legal requirements allow batteries to be excluded from GVW calculations.

But what if it turns out the 100 km range just isn't enough? In such a case, DAF's offer includes the same CF, but in a hybrid configuration. Which is not meant to be second-best, but rather a fierce competitor to the full-electric version. In addition to the renowned muscle-flexing attitude of the 10.8 l, 330 kW Paccar MX-11, with 2200 Nm of

constant torque between 900 and 1400 rpm (going up to 2300 between 900 and 1125 rpm in top gear with direct drive and in the two highest gears with overdrive transmission) we have a continuous output of 75kW (rising to 130 under peak conditions) from the electric motor integrated into the gearbox, a ZF TraXon that's been modified to fit hybrid applications. This model features half the batteries of the full electric counterpart, so it settles at 85kWh not to further impact an empty weight that's already strongly affected by the presence of the combustion engine and its ancillaries. **Battery capacity is, however, enough to guarantee a range between 30 and 50 km with the combustion engine turned off.** Not bad, then, considering that the goal here is not running in electric mode all day long but simply covering the entire required city route. Great care has been taken to integrate the engine and the motor. For example, to slow down while saving the brakes, priority is given to the 130kW recovered from the electric motor, also available at relatively low rpm, then to the 340kW MX integrated Engine Brake with exhaust brake, especially effective at the highest speed levels. As for the charging system, it features a typical plug that fits into both AC and High voltage direct current mains, but batteries can also recharge while driving, using some of the power from the combustion engine. An option that could turn out to be more interesting than one might think, so much so that it could rival, cost-wise (€/kWh) with some super expensive ultrafast chargers. Its only limitation lies in the on-board inverter's rating that might extend the charging time, thus making this an option only for longer routes.