



Truck makers have spent billions on successive Euro emissions regulations, but how about alternative fuels? Ian Norwell visits Renault Trucks, in Lyon, to see where the smart money is going

Cleaning up the act

It's been said that development engineers at truck manufacturers have become world champions in measuring almost nothing.

Gaseous and particulate emissions at Euro 6 are such that you can now stand in an enclosed space with a heavy truck, diesel engine running, and barely notice. That's a far cry from a pair of bowler-hatted civil servants sitting in deck chairs on a post-war airfield, watching a smoke-belching lorry and judging its cleanliness by eye.

But even Euro 6 will not be clean enough for legislation ahead. So the search is on, not only for big CO₂ cuts,

but to usurp Dr Diesel for good. All truck makers acknowledge that diesel is the fuel for heavy transport in the short and medium term. But cracks are appearing, especially at the lighter end.

Alternative fuel technologies that lean on hybrids and electric machines have largely been at the lighter end of the market. The physics of power density from batteries alone mean diminishing returns further up the gvw scale.

However, while in 2012 the battery mass needed to propel a 44-tonne artic without a diesel was estimated at 52 tonnes, the speed of battery development – particularly with lithium-

ion – is re-drafting those numbers.

Indeed, Renault Trucks now has an all-electric 16 tonner on a two-year trial. It joined Speed Distribution Logistique's (SDL) fleet, delivering cosmetics for Guerlain to high-end retailers in Paris. A 16.3-tonne Range D chassis with a 400V/103kW electric motor provides 450Nm torque. The batteries are 170kWh 615V 286Ah lithium-ion and it is working – although SDL says it has to be creative with the duty cycle.

CREATIVE CHARGING

"To operate over the 200km long route – a first for any electrically-driven truck – it will recharge its battery several times during each 24-hour operating cycle. So its route has been planned for two partial recharges during the day and a total recharge between 19:00 and 02:00," explains Renault Trucks project manager Christophe Vacquier.

And he adds that the batteries weigh two tonnes, leaving a payload of six tonnes and, of course, zero emissions. The invisible element here is the will to make it work: in SDL and Guerlain, Renault leaned on two open doors, as

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both have a strong environmental ethos.

Although electric power is most commonly twinned in a hybrid configuration with a diesel engine, it doesn't have to be - particularly where zero emissions are critical. So Renault has another experimental chassis out at work with a hydrogen fuel cell as the partnering power source. A lower gvw here, at 4.5 tonnes, its Maxity Electric is already at work with several French inner city fleets operated by the French post office, La Poste. Here, the standard 400V/47kW electric motor delivering 270Nm, has now been extended with a 20kW PEM (proton exchange membrane) hydrogen fuel cell.

Developed in partnership with Symbio FCell, it's due to run until February 2016 and, compared to the standard Maxity Electric, offers a range doubled to 200km. La Poste is familiar with electric vehicles - already running a large number of Renault Kangoo electric vans and a fleet of electric bikes. But this electric/fuel cell vehicle is claimed as a 'first' in Europe.

DUAL ENERGY SOURCES

“This vehicle generates no noise and only releases water vapour,” comments Karine Forien, director of energy efficiency at Renault Trucks. “A range of 200km makes it the ideal choice for a daily schedule of urban and suburban routes.” And Vacquier adds: “When the vehicle is running, the electric motor is fed by complementary energy sources. The fuel cell is capable of delivering 20kW and, once that threshold has been reached, the batteries kick in.”

Vacquier also explains that when idle, the fuel cell can recharge the battery. This treats the fuel cell as the primary power source, with batteries as the back-up, even though the cell has half the power. And it's a similar story with a 16-tonne hybrid operating with Deret at Charles de Gaulle airport. Effectively an



electric truck with a range extender, its electric motor (103kW) runs with a diesel unit delivering 132kW. It's an interesting reversal of the usual logic that sees the conventional engine as the main event, helped by an electric motor with less clout.

What about the driving experience? One issue immediately apparent when you get behind the wheel of trucks like this - especially all-electric or hydrogen/electric - is their potentially deadly silence. With even conventional eight-wheelers failing to alert some cyclists to their presence, the stealthy approach of a vehicle with an almost

silent turbine whine and slight tyre noise is a worrying prospect.

They can be fitted with surrogate noise generation, but it's hard to deny the risk they pose to vulnerable road users - unless the latter acknowledge a need for minimum level of training and maybe some hi-viz? With the advent of CLOCS (Construction Logistics and Cyclist Safety) and talk of daytime bans on trucks in London, the cycling lobby can only be congratulated for seizing the heavy transport industry by the tail, and letting it wag to their tune. Not bad for an unregulated, untaxed, uninsured, un-MOT'd, and untrained group of road users, however vulnerable.

Apart from the eerie quietness, most notable from behind the wheel of the hydrogen/electric Maxity, was the powerful regenerative braking from the traction motor energy recovery system. On reasonable downhill gradients, releasing the accelerator pedal brings about a complete halt, with no service brakes. With CNG, biofuels and other hybrids, Renault gave a lot of technology an airing in one day. Clean air, of course. [TE](#)

Neither gone, nor forgotten

Diesel, by most truck makers' reckoning, still has a long way to go in tightening its efficiency. Using a standard Range T tractor, more than 20 on-board technologies were combined in Renault's Optifuel Lab 2 demonstrators which cuts fuel used by a claimed 22%.

Intelligent aerodynamics that move in response to the vehicle; advanced driver assistance systems; waste heat recovery (Rankine) to supply electrical power for peripherals and accessories; variable lubricant level in axles (demand-dependent); low rolling resistance tyres; and photovoltaic solar panels on the trailer roof...

All were all harnessed, along with one of the best boat tail trailer designs I've seen (right). Almost looks like a production item.

