



The way forward

Volvo's range of future fuels is looking realistic, but which, if any, will work for your transport operations?

Dave Young finds out

Having researched eight future fuel possibilities, Volvo has refined its list to just three: diesel-electric hybrid, methane-diesel dual fuel (both in production) and DME (dimethyl ether – field test prototype). That facts are well known, but what about the operational issues?

Those in the market for Volvo's FE parallel diesel-electric hybrid truck are likely to be engaged on local stop-start runs in the municipal, utility or urban distribution sectors. Weight (the batteries alone are 200kg) and space issues dictate a three axle 26-tonne gvw rigid chassis (the heaviest CV hybrid), which is the only option offered.

Following extensive operator trials since 2008, the hybrid – powered by a 340bhp diesel and a 120kW electric motor – is claimed by Volvo to deliver fuel savings of around 30% on refuse collection and 15–20% for urban distribution duty. But quiet running, fuel saving and low emissions come at a price premium of around £100,000 and a payload penalty of 700kg.

Aware of potential pitfalls, such as battery life

(around six years on a vehicle depreciated over 10 years) and residual value, Volvo is offering the hybrid on a five-year contract, including Gold Star service and driver training. "This takes the risk out," says test manager Jeff Bird, adding: "We want to ensure that customers purchase our hybrids for the right reasons. It's not a flag-waving exercise."

Driver training, he says, is paramount. Drivers must understand and adapt their driving style to the vehicles. For example, when in electric mode there's no idling; simply engage drive and pull away, looking out for other road users who won't hear you. Service braking is to be avoided – second nature to long haul drivers, but not on the high street – to employ regenerative braking and charge the batteries. Gear changing is by automated I-Shift, while a digital dashboard shows recharging and energy wasted by footbrake application.

Able to run on electric power for up to one kilometre, eight times an hour, this is not, says Volvo, a plug-in chassis. However, therein lies a contradiction. To maximise a costly asset, double-shifting appears appropriate, but the refuse compactor is powered by separate batteries, requiring plug-in mains charging. So, without a demount body (more expense) or very rapid battery swap regime, vehicle availability will be restricted.

Methane-diesel dual fuel

The Volvo FM methane-diesel has a 13-litre, 460bhp engine with 2,300Nm of torque, fuelled by up to 75% liquefied methane gas – the proportion varying according to vehicle duty and speed.

This dual-fuel source suits regional and longer distance haulage applications (500km range), making it possible to use essentially gas-powered trucks for longer and heavier transport applications.

The AdBlue tank has become a common site on trucks, alongside the conventional fuel reservoirs



Ulf Johansson, president of haulier Götene Kyltransport, believes the approach is a solution for the future. "If the price of gas is right, I expect up to 80% of our fleet will be methane-diesel within the next five years," he says. Ulf Olsson, one of his drivers, adds: "It's just like driving a regular diesel-powered truck. There's a difference when it comes to refuelling, but you soon get the hang of it."

Compared with conventional gas-powered engines, methane-diesel units offer 30 to 40% higher efficiency, potentially cutting fuel consumption by up to 25%. "The optimal solution is to run on biogas. That cuts CO₂ emissions by up to 70%, compared with a conventional diesel engine," says Mats Franzén, manager, engine strategy and planning, at Volvo Trucks. "However, this means that access to biogas must increase... In most countries, truck owners will be able to recoup their [higher initial] investment, since the price of methane gas is usually considerably lower than the price of diesel."

There are no major technical differences with conventional diesel engines, albeit tanks for AdBlue, diesel and methane, a catalytic converter, vent stack, air tank and batteries represent a chassis packing challenge, especially on a UK-spec three-axle unit. Volvo expects to sell or lease 100 methane-diesel tractor units in Sweden, Britain and the Netherlands – the markets currently offering best liquefied gas availability. In 2012, the company hopes to increase production to 400 trucks and expand sales to other markets, such as Thailand.

Infrastructure issues

The Natural & Bio Gas Vehicle Association recently held a symposium for CV gas suppliers. "Through our participation, Volvo Trucks is helping to establish an infrastructure that will create transport that's both environmentally sustainable and more economical," reveals Lennart Pilskog, director public affairs at Volvo Trucks. "Within just five years, all truck owners in Sweden will be able to run on methane gas. In the rest of Europe, there will be 'blue corridors' along which it will be possible to refuel and run on methane gas in most countries," adds Anna Berggren, head of market development at gas distribution company Fordonsgas.

But for DME (see panel), a new fuel chain, with production, distribution and refuelling stations, needs to be established. The Swedish Energy Agency, working with Volvo, various fuel suppliers and the haulage industry, has launched a joint venture within the EU. Bio-DME, used in this project, is produced in northern Sweden.

The raw material is black liquor, a by-product of paper pulp production, in theory able to replace about 50% of diesel oil currently used for Swedish road transport. It can also be made from other renewables, such as forest residues, refuse or

manure. The EU calculates that, by 2030, Bio-DME could replace half the diesel currently used for heavy commercial transport.

In a UK context, however, Stobart's decision to commit to biomass and biomethane production for its own fleet and external supply, makes sense. LNG is also already fairly widely available, and some larger operators are successfully opting for on-site methane bunkering.

There's little doubt that future haulage may well see local diesel-electric hybrids and middle distance gas truck journeys. The technologies are largely proven; the gas and electricity charging infrastructures are the next hurdles in the way of wider adoption and reducing costs. Customers may be keen on green credentials, but, in times of economic constraint, will they be prepared to pay?

So the remaining questions: Who will capitalise on infrastructural development? Might UK government offer tax breaks or other incentives, as does the Netherlands? With the Exchequer desperate for revenue, and road fuel tax such a lucrative cash cow, does it want to support alternative fuel development? But ducking the fiscal burden can only hamper take-up. **TE**

Volvo FH DME

Dimethyl ether (DME – formerly better known as a spray can propellant) has properties of low auto-ignition temperature and a high cetane rating, well suited to fuelling diesel engines. Volvo is the world's first truck builder to undertake full-scale field trials, with operators in Sweden already running on DME. Although there may be engineering issues around aspects such as fuel efficiency, lubricity, tank and pump pressures, Volvo claims that DME carbon emissions can be 95% lower than with diesel.

Why? Because bio-DME is produced from biomass – in Sweden, the by-products of paper manufacturing. "High energy efficiency and extremely low emissions of greenhouse gases and hazardous substances make bio-DME one of the most promising alternative fuels for the future," insists Lars Mårtensson, director of environmental affairs at Volvo Trucks.

The Swedish field trials are using regular 13-litre Volvo FH trucks, with modifications to the injection and engine management systems. Operational experience to date reveals that larger tank volumes are needed, because DME offers less energy than diesel oil. That said, from the driver's viewpoint, performance and driving experience are virtually identical to diesel power, although, on a road test, TE discovered that the DME truck delivered higher torque and the engine ran more quietly.

