Power hungry

Any serious contender for the race to an alternative fuel for commercial transport has to pass the test of large-scale sustainability and infrastructure. Brian Tinham reports

With the announcement by haulier Hardstaff last month that it has taken delivery of 31 Mercedes-Benz tractor units, running on its own dual-fuel diesel and natural gas system, the cause of alternative fuels may be gathering pace. This latest order comprises five Actros 2544 MegaSpace long-haul units and 26 Axor 2543s, with high-roofed sleeper cabs and PowerShift transmissions – so serious trucks.

Steve Storrar, Hardstaff's vehicle applications manager, states that the dual-fuel system is now running on 60% of the Nottinghamshire-based company's 100 truck fleet.

Other operators cannot fail to notice that Hardstaff is putting its money where its mouth is. Yes, the business unit marketing its OIGI (oil ignition, gas injection) technology is a profit centre, but the haulier wouldn't invest in the system, if it wasn't bringing home the bacon. "The advantages are both environmental and economical," insists Storrar. "If you reduce the amount of diesel being burned, and replace it with methane, you get a reduction in exhaust emissions, while gas is about half the price of diesel." And he makes the point that it works with the existing Mercedes diesel drivetrain.

Gas substitution

Like all such systems, the injection equipment is designed to vary the amount of alternative fuel metered into the engine, depending on operating conditions and engine load. Starting from cold and moving off, power is supplied by 100% diesel, but, with OIGI, gas is introduced from around 620rpm. Then, as the vehicle reaches cruising speed, gas substitution moves up to 70%. Most importantly, it also works without changing the engine's electronic management system, so the integrity of vehicle systems, such as braking control, remains intact.

All of which makes the technology sound compelling. And much the same applies to competing LPG (liquefied petroleum gas) and diesel dual-fuel arrangements, also on serious trucks. So why isn't it taking off, particularly when pundits

Politics versus progress

A clue to some of the slow take-up of alternative fuels comes in the form of last month's temporary shutdown of the Ensus bioethanol plant in Wilton. The unit – which only started production at the beginning of last year, following a £400 million plant build programme – was generating bioethanol from wheat for Shell to blend into its and others' petrol. However, demand has fallen way below forecast.

Commercial director Grant Pearson explains that, despite Europe's green aspirations and the Renewable Energy Directive enacted last December, only two countries, Germany and Austria, have so far transposed the directive into local law. "The UK will probably come on board next year, but, in the meantime, although the European Commission also agreed a voluntary scheme to meet the sustainability requirements of the directive, so far no schemes have been approved. We submitted ours last October and we've still had no feedback."

And it gets worse: on the supply side, Pearson reports a "fourfold increase" in imports from the US of 90% ethanol, blended with 10% gasoline. "The Americans are getting a subsidy credit in the US for production and then circumventing the European ethanol tariff by importing the liquid as a chemical blend. So the vast majority of consumption has become that blend."

Pearson expects Ensus' problems to be short-lived – partly because the US and Europe are investigating the trade; partly because the US is on the brink of moving from 10% to 15% enthanol in its gasoline; and partly because Europe must surely get its act together soon.

When Wilton does come back on stream, however, he hopes to attract interest from the larger end of the commercial vehicle market, as developments around multiple fuel injection systems, such as those conceived by G-Volution, start to materialise.

largely agree that, in the not so distant future, diesel will run dry – not least, as the rising BRIC (Brazil, Russia, India and China) nations ramp up demand – so it makes sense to start eking it out?

Answers are various, but include: the conservative nature of the transport industry; the additional capex for new vehicles (still around £25,000, all up) and potential setup costs, in terms of gas supply contracts and building a local infrastructure, if required. That, despite favourable experience with operators such as Gloucestershire-based distribution firm Howard Tenens (methane/diesel, with Hardstaff and Mercedes – TE, September 2010, page 12) and Telford-based haulier Maidens (LPG/diesel, with G-Volution and MAN – TE, July 201, page 10), both of which are demonstrating enviable returns.

Note, no-one talks about sustainability problems with CNG/LNG (compressed/liquefied natural gas) or LPG. Suppliers are plentiful and, in the case of the former, likely to remain so, particularly with the emergence of bio-produced methane (CBG/LBG). The same can't be said for some of the other alternative fuel candidates, such as DME (dimethyl ether), ethanol and reformed cooking oils – which are likely to remain valuable, but niche, alternative fuels.

As Hardstaff competitor Clean Air Power's technical director Steve Whelan (former chief engineer at automotive specialist Ricardo) puts it: "Natural gas is much cheaper than diesel [LNG at 80p per kg is 57.6p as a diesel litre equivalent] and much more abundant. It also comes from less politically unstable areas, and the technology to liquefy it is very mature and still improving."

He also reiterates methane's suitability for heavy duty diesel engines, partly because of its high auto ignition temperature, which resists detonation, and partly its high energy content, which exceeds diesel by 50:43. Equally, the gas is ideal for medium duty truck and bus spark ignition petrol engines, albeit not lean burn, due to the higher compression ratio.

Money for nothing

Just as important, though, Whelan makes the point that operators don't get paid for being green or even saving money. "They get paid for delivering their loads on time. So, if a spark ignition engine runs out of gas, they don't get paid, and you cant' refuel at the side of the road. That's where dual-fuel diesel scores so well right now. If it runs out, the system reverts to diesel."

He puts a strong case, and one that can be made equally well for LPG and diesel. For Whelan, however, Volvo Trucks' work with DME just doesn't tick the boxes. "I ran it at Ricardo and we used to say DME was, is and always will be the fuel of the future – because it requires a complete change to the diesel engine fuel injection system and a massive change to the fuel infrastructure." Producing DME as a by-product of wood and pulping operations in Sweden is fine, he says, but it's never going to be a substitute for diesel.

As for other, more immediate contenders, such as ethanol and biodiesel, the verdict is 'not yet'. Although Wilton-based Ensus is set up for ethanol production, it is land-, crop- and energy-intensive, and, as yet, geared only to petrol blending. Meanwhile, biodiesel from various sources soldiers on, but still exhibits problems around storage and clogged injectors.

The future for fuel looks interesting – with, for example, multi-fuelling along the lines of G-Volution's current work, likely to include on-board hydrogen generation providing a third fuel, with LPG and diesel. For the here and now, though, best advice is to check out dual-fuel and CNG/LNG or LPG.

The last word goes to Warburtons' group transport manager Mark Sutcliffe. Commenting on his company's recent purchase of six dual-fuel Mercedes-Benz Axor 1840 tractor units, all with Hardstaff OIGI technology on the straight-six, 400bhp engine, he says: "[Gas] is a clean fuel that helps us to reduce our emissions and so meet our own carbon targets. But the trucks also had to make financial sense for our business. I am confident the vehicles will perform well in our operation." TE