



In the first of a two-part piece, Brian Tinham reviews the strides being taken with dual-fuel that are not only helping to save the planet, but also doing so on standard diesels and saving hauliers cash

If not quite taking off, dual-fuel for trucks appears finally to be taxiing enthusiastically onto the runway and shaking off any vestige of its earlier fringe image. Yes, the carbon savings – particularly by switching as much diesel as possible to methane gas, whether LNG (liquefied natural gas) or CNG (compressed natural gas) – have been beyond doubt for some time. But now, operators – and not just the big boys – are also confirming that the business case can be just as compelling. Quite simply, they say, the cost of converting trucks is easily offset, in terms of fuel savings, and often within two years.

That's not to say there aren't some caveats: not least the arrival of Euro 6 engines for which there are,

Driving

as yet, no finalised OEM solutions or emissions limits; and the absence of a workable LNG/CNG gas refuelling infrastructure. However, these hurdles are being overcome. Just last month (12 September 2013), the European GFV (Gaseous Fuelled Vehicles) working group came close to draft standards for Euro 6 heavy-duty, dual-fuel retrofits. Pundits agree that these – including the unburnt hydrocarbon emissions envelope – should be ratified within months. Equally, on the gas stations front (gas grid-connected and LNG tanker-fuelled) sites are being opened by high-profile operators, such as Howard Tenens, Tesco and Brit European.

Either way, growth in uptake of dual-fuel on Euro 5 trucks has been near exponential, albeit starting from a low base. Admittedly, some of that action must be attributed to the 50–50 funding provided under the £23m TSB (Technology Strategy Board) and DfT (Department for Transport) programme, which aims to encourage the use of low-carbon CVs, while also enabling further development and providing feedback, both for other

operators and to inform government policy. Tesco, John Lewis, Robert Wiseman Dairies, Brit European, JB Wheaton, Howard Tenens and BOC are among 13 companies leading the trial projects that, in all, involve some 40 firms (operators, OEMs, most of the main dual-fuel converters and associated service companies) and 360 converted trucks.

But there are also now plenty of others – including big players such as Sainsbury's and Wincanton, as well as much smaller operators like KBC Logistics – who are also getting in on the dual-fuel act, entirely under their own steam. And there are even greater numbers of operators that have successfully chosen the LPG (liquefied petroleum gas) and diesel dual-fuel route. Names such as Maidens of Telford and Lafarge Aggregates come to mind. For them, however – although the conversions are cheaper (one third of LNG/CNG/diesel) and LPG readily available, together making the business case very tenable, almost irrespective of duty – the green argument is less clear.

So what's the inside story? Talking to Catherine Crouch, CRS director at Howard Tenens, it's all about capitalising on already proven cost savings, while pursuing the green agenda and helping to evolve the

dual-fuel. They're a mix of tractors – 4x2s and 6x2s, with our slightly complex conversion, but also new 6x2s with small mid-lifts, all plated up to 44 tonnes – as well as some 26-tonne rigids."

She agrees that the rigids present no dual-fuel challenges, there being plenty of space on the chassis for CNG tanks. However, she argues that the 6x2 small mid-lifts are an excellent step forward, because it's much easier to get enough gas on board, without altering the chassis. That makes the conversion considerably cheaper. In fact, it's little more than the cost of converting a 4x2. And there's the weight saving against a standard 6x2. The only restriction: "We'll use these to haul trailers where we have consistent payloads and single drops, so we don't go over-weight on any of the axles," she states.

And she reveals another couple of developments. For its TSB trial, Howard Tenens is now using Prins (previously best known for LPG). And they're now on a mix of Mercedes Actros (2544s and 2444s, with standard and small midlifts), as well as DAF (4x2 XF105, 6x2 XF105, with small midlifts, and CF75 rigids).

Crouch argues that the changes provide

Dual-fuel is becoming big-business, with well known and even small hauliers now converting some of their truck fleets

dual-fuel

technology. This time last year, the haulier had completed work with converter Hardstaff and Mercedes-Benz, developing bespoke 6x2 Axors with a CNG dual-fuel range of 450 miles – something that had hitherto only been achieved with LNG, because of its far greater power density. That had, however, come at a cost (more than £25,000 apiece), since it involved considerable rework of the chassis, including installing vertical exhausts, and moving diesel and AdBlue tanks to shoehorn in the CNG vessels.

Three-year payback

Nevertheless, Crouch now reports successful operation of 24 thus-converted Axors. "With CNG, we are seeing payback in the anticipated timeframe of less than three years," she says, adding that these tractors are covering 100,000–130,000 miles per annum, mostly trunking, and hauling mid-weight products. "And we saved 1,000 tonnes of carbon last year and expect to at least double that next."

Because fast-forward to today and Crouch says that, within the next two months, no less than 88% of Howard Tenens' heavy-end transport fleet will be CNG dual-fuel. "We'll have 60 vehicles, all Euro 5

an opportunity to compare alternative conversions and vehicles, with a view to guiding specifications. That's a good point, given that Prins, Hardstaff, Clean Air Power, G-Volution and the other competing converters use different approaches to getting the gas-diesel mix mapped to the power demand, without compromising emissions (see next month).

Incidentally, the rigids are worth noting, if only because, she says, they'll be covering circa 95,000 miles per year on parts deliveries to dealers and retail outlets. "It's a mix of trunking, urban and stop-start work, but, even though substitution is lower, we still expect to see a three-year payback."

What about the paucity of fuel infrastructure? Crouch says that, as part of its TSB project, Howard Tenens is adding another CNG station to its existing three at the Andover, Boston and Aveley depots. "That will be in Swindon, connected to the gas grid, like Boston and Aveley. Andover gets LBM [liquefied biomethane], delivered by Portable Gas Services from Gasrec, and dispenses it as CNG. All our sites are open to third party operators who want to use CNG."

Crouch also observes that other operators are



Left: Catherine Crouch, CRS director at Howard Tenens. It's all about capitalising on already proven cost savings, while pursuing the green agenda and helping to evolve the technology, she says





building LNG/CNG refuelling sites – either grid-connected or served by LNG tankers – which, in time, will ease supply. Indeed, an online map of all LNG/CNG stations, launched in July, shows the growth. It's also the case that AD (anaerobic digestion) plants are increasingly being set up to inject biomethane into the UK's gas grid. Crouch concedes that this makes no difference to the gas stations or fuel economy, but insists it will massively improve carbon and fossil-fuel saving.

Talking of other operators, though, last month Sainsbury's announced that it has now extended its dual-fuel fleet to more than 50 trucks running on diesel and biomethane, promising a saving of 2,090 tonnes of CO₂ per year. That development builds on Sainsbury's three-year trial with five dual-fuel vehicles – all Euro 3 Mercedes Axors, with Clean Air Power Genesis Edge conversions – under the banner 'Running on Rubbish'. Last year, the retailer ordered the new batch of conversions and hence its latest fleet – all dual-fuel Euro 5 Volvo FM's – based at its Emerald Park Distribution Centre, in Bristol, serving stores and depots in Wales and the South West.

How is this retailer coping with refuelling? Early on, the firm took deliveries of biomethane from Gasrec. However, Nick Davies, Sainsbury's head of transport operations, explains that an on-site refuelling station has since been put in place, with a business case based not only on helping to improve fuelling efficiency today, but also allowing for an even larger number of dual-fuel vehicles in the future.

"Dual-fuel has a critical role to play in transport"
Jon Horsley, TSB

Dual-fuel matters

"Dual-fuel has a critical role to play in transport. We'd all like to see pure electric in all shapes and sizes, but the good news is you can run internal combustion engines with low or near-zero emissions." So says Jon Horsley, lead technologist for Technology Strategy Board's low-carbon vehicle innovation platform.

"What's important for us is [the TSB-funded trial projects] won't just be book-shelved," he continues. "Our intervention, which is right at the edge of where TSB can operate, involves real operators using their own fleets, treating them with the same disrespect as other vehicles. So we will generate and share learning across the consortia, get real-world data back to DfT on fuel consumption, substitution rates and fleet experiences – and help to inform future policy."

For Horsley, dual-fuel is critical for four reasons:

- It's a cheap, reliable retrofit for existing and new trucks.
- The costs and risks are not high and cost savings are very visible, with a two-year payback.
- It enables a pathway to lower-carbon fuels and gas vehicles, since it's a very short step from high gas substitution rates to running almost pure gas.
- It's a fuel that already has a grounding in a national, standard methane refuelling infrastructure.



"Our trial of dual-fuel was very successful and gave us the confidence to extend the fleet," states Davies. "Our early adoption of this technology is helping to significantly reduce CO₂ emissions and future-proof our fuel supply."

However, dual-fuel is not only catching on with the big guys: Purfleet, Essex-based KBC Logistics is one of a growing number of smaller operators doing more than just dipping its toes in methane. Director and compliance manager Dave Ashford explains that, late last year, he and his business partner received a grant from the Low Carbon Programme towards converting trucks to LNG dual-fuel to meet the requirements of the London LEZ (low emission zone).

"That fired us off and we bought two de-fleeted trucks from Hardstaff – both Mercedes-Benz 6x2 Axor 2543s that had done about 300,000 km. One was an 08 plate, which we bought in November last year, and the other was a 10 plate, which we acquired last February. But since then we've bought five more Axor 6x2s, all 59 plates from Dawson Rentals, with 200,000–300,000 km on them, and had them converted by Hardstaff."

They're all performing well, he reports. "We're looking at an 18-month payback, because of the miles we do – 4,500 km per week. But we'll also keep them to around 1.2 million km, so that's another three years of payback where we're earning well out of the much lower cost of LNG, which is currently equivalent to 65p per litre. It's a very good ROI and it improves our brand image as a responsible operator... In fact, we're looking to purchase another 10 used Euro 5 Mercedes soon and again have them converted by Hardstaff – although other converters are coming along."

Why LNG, not CNG? "Because it works for us. We run a 'back to base' business. Our trucks are on container work from Tilbury and Purfleet mainly on long haul to Birmingham, South Wales, Weston Super Mare, Bristol and so on. It's all double shifted 24/7, which lends itself perfectly to LNG fuelling." But not CNG, he says, stating simply that, with his operation involving trailer swapping and the limited space on available 6x2s for CNG tanks, it doesn't make technical or business sense.

His only warning: beware of unduly warming the fuel. Although properly managed LNG will stay cold for many days – both in storage and the onboard tanks – if it does warm and you run low, you're potentially into some fuel venting to refill, as LNG boils off in warm tanks. And there's the availability issue. "Our nearest filling stations are J9 M1 or J1 M48 Avonmouth, and you don't want the logistics nightmare of worrying about fuelling seven trucks, as well as routing them for the real work. So we are now working with Chive Fuels, who provided a 6,000 litre LNG tank at our base, which is now refilled once a week," says Ashford.

So you can't do CNG on 6x2s, Dave? Well, Brit

European – best known for its massive continental vehicle transportation business (“Everything from a Porsches to JCBs,” quips managing director Graham Lackey), but also big in tankers (mostly spot hire for Total, Tesco, DHL etc) and rolled carpet movements from Belgium and Holland to the UK – is doing it. What’s more, Lackey says they’re making it work on low-height 6x2s (admittedly small midlifts), running at 1,100mm chassis height to the fifth wheel.

“All the converters told us it couldn’t be done – and it certainly couldn’t with LNG, because we’d have been dragging the insulated tanks along the floor. But, working with Hardstaff and Mercedes-Benz, we cracked it.” Describing his company’s ethos as “tenacious”, and driven by a desire to improve its environmental impact and eliminate fuel cost clauses, he says that the secret was “creative packaging on the chassis to get the containment to give us the range”.

Magic configurations

And he adds, coyly, that drawbars have also been converted “with a little pixie dust”. Not wanting to give away too many secrets, Lackey says the team looked at low-weight tanks mounted either side of the chassis rail and managed the conversion within 20kg of the gross vehicle weight. “We couldn’t afford to change the payload potential: we run at 44 tonnes and we’re bang on with, for example, JCB.”

Brit European’s first dual-fuel trucks went on the road in March this year, with funding from the TSB trials, and the firm is now up to 26 Mercedes-Benz Actros tractors, plus four drawbars. “At the moment, we’re running them on vehicle distribution, hauling vans, trucks and JCBs, with most on the JCB contract,” comments Lackey. “We’re certainly seeing the benefits to a degree, but, if the fuelling infrastructure was better, we could get more diesel substitution and reduce the capacity of our diesel tanks. But that will take government support.”

He also says that, to accelerate take-up and so reduce transport costs and meet its green

commitments, government needs to help with the cost of CNG/LNG conversions. “They must come down to £15,000–18,000, so we need an incentive like the Green Bus Fund.”

For now, though, Lackey is cautiously optimistic. “We’re expecting payback of under three years, and that’s on a mix of mileages and duties, from 82,000 up to 140,000 miles. If you exclude the capital investment, we’re seeing 18–19% saving on fuel and CO₂, and I’m confident we could reach 20% – but only if the gas infrastructure sees some serious investment.”

So does he think dual-fuel will spread? “I reckon probably 70% of our operation would work on dual-fuel, subject to the availability of refuelling facilities and product from the manufacturers. With Euro 6 now here and Euro 5 no longer available, we’re in a holding pattern, as far as more new trucks are concerned. In fact, we had to accelerate our replacement programme to get where we are – although my expectation is that Euro 6 dual-fuel will be ready by the back end of next year.”

Incidentally, under Brit European’s TSB project, the company is partnering with fuel specialist CNG Services and telematics firm Microlise. The former is setting up a gas grid refuelling station on the A50 corridor at Brit’s base near Crewe, while Microlise develops its system to provide real-time information on gas and diesel consumption rates. Lackey expects that eventually to help operators and developers alike with optimising gas substitution rates, according to vehicles, duties and operations.

There’s a collaborative team feeling about much of this. Operators, converters, manufacturers and service organisations are clearly helping one another to live the dream, reduce emissions, save money and improve the competitiveness of UK transport. And note one important signal: residuals on dual converted trucks are already on the way up.

Time to get on board with dual-fuel? The future’s bright; the future’s methane. **TE**



Next month: part two of this feature will examine the technologies, opportunities and implications for dual-fuel in the heavy truck sector

