



Setting their sights on a multi-fuel future

One effect of relentless rises in the price of diesel as concern over the environment increases is to stimulate competition in a growing UK market for dual-fuel truck conversions. Tim Blakemore and David Wilcox went to Warwickshire and North Yorkshire to find out what this means in practice for truck fleets.

Over the past twelve months or so a surprisingly-broad consensus has begun to emerge in the UK over the potential for gas as an alternative to diesel as a truck fuel (*Transport Engineer* April and July). Sceptical transport engineers of a certain age may be forgiven for thinking at this point that they've heard something like this countless times in the past, and that always ultimately the interest in gas has turned out to be hardly more than a flash in the pan. That old cliché about no fleet engineer ever having been sacked for buying diesel engines comes to mind. But this time around, mainly as a result of unprecedented concern over the environment and unprecedented economic woes, the mood really does seem to have changed. And, by the way, nobody is suggesting that fleet engineers are going to stop buying diesel engines. In April we reported how two rival UK suppliers of dual-fuel systems, Clean Air Power (CAP) and Hardstaff Group, are responding to this developing market. Here we focus on two more: G-volution and GSPK MultiFuel Technology.

Despite being a young company, formed as recently as last year, G-volution still can boast quite a heritage in the commercial vehicle alternative fuels business. Managing director Simon Pickess is a former managing director of The Leasing Group, the now-defunct company spawned by British Gas to focus on gas-fuelled trucks. And the technology employed by G-volution comes from Zeonardo, a Bath-based company where the engineers include Colin Gray, who gained practical experience aplenty of gas-fuelled trucks while working for Greenpower Technologies, the Bolton-based company

which *Transport Engineer* readers may remember from the dual-fuel MAN tractive unit entered in the 2004 BTAC (British Transport Advisory Consortium) trials at Mira (*Transport Engineer* July 2004). In the event, that Mira test failed to substantiate Greenpower's confident claim at the time that fuel costs would be cut by at least 15 per cent or the cost of the system would be refunded.

Fast forward two years and enter Chris Smith, a Somerset-based solicitor-turned-businessman who describes himself as "an accidental entrepreneur." Accidental or not, Mr Smith's track record in business is impressive. In 1988 he co-founded Inspec, a spectacle company which nine years later won a Queen's award for international trade. And in 2001 he was one of the founders of Maratex, which grew rapidly to become a leading retailer in eastern Europe. In 2006 Mr Smith set up Zeonardo and acquired the rights to the former Greenpower dual-fuel technology. Two years later Zeonardo was successful with an application to the South West of England Regional Development Agency (South West RDA) for a £130,000 research and development grant to help it take a dual-fuel system called Optimiser to market. "We knew we could raise two thirds of the money we needed to develop the Optimiser if we could get a grant for the rest," said Mr Smith at the time. "The grant from South West RDA made the difference between having a patent and turning that patent into a physical reality." G-volution is in effect the sales and marketing operation for Zeonardo technology, with ownership shared between Mr Pickess, Zeonardo

and Encore Assets Management, a Midlands-based company which does what it says on the tin.

Though the working principle of the G-volution Optimiser seems, on the face of it, to be broadly similar to that of the Hardstaff original HOXI system (*Transport Engineer* April), Mr Smith evidently is confident that his technology stands out from the rest. "Nobody else can properly control the mix of more than one fuel in the way we can," he said after winning the South West RDA grant. "Our product is uniquely better than those of our competitors. We have the leading technology and it is the development of a brilliant British idea."

Both Mr Smith and Mr Pickess emphasise that the system is designed to operate with a combination of fuels and is by no means confined to liquefied petroleum gas, which just happens to be the second fuel used with diesel on the dozen trucks converted so far by G-volution. "This is a business of the future," says Mr Smith.

Mr Pickess sees nothing to prevent this dual-fuel system turning into a tri-fuel system. Indeed he hints strongly at plans for a trial of just such an Optimiser variant to start within the next few months, though he is reluctant to go into further detail yet. What exactly makes the current G-volution dual-fuel system different from its rivals?

"The system is unique because it operates by translating the original fuel-control signals from the engine-management system to derive new control signals for both fuel types," says Mr Pickess. "When in dual-fuel mode the amount of primary fuelling is reduced to compensate for the addition of the secondary fuel. This occurs in real time and is synchronised with the operation

of the engine. The Optimiser provides an emulation facility so that the engine-management system is completely unaffected and continues to operate normally. Because the original engine-management system continues to control the engine in dual-fuel mode, the original power, torque and ignition-timing maps are maintained. The engine therefore continues to operate entirely within the manufacturer's original specification. These principles of operation of the Optimiser are protected by UK patents GB2372835 and GB2447046, with international patents pending.

"The Optimiser does not rely on the original engine-management system to compensate for the addition of the second fuel to achieve net fuel-cost savings. This method is proven to be inefficient as it only works when the engine is under 'speed-control' operation and therefore generally results in over-powering and increased exhaust emissions at all other times.

"The Optimiser continuously adjust the relative ratios of the two fuels when operating in dual-fuel mode, in real time, according to engine operating conditions. This ensures optimal operation at all times, rather than just under best-case conditions. The Optimiser is the only retrofit dual-fuel system that can do this, producing superior net fuel cost savings, which are virtually unaffected by changes in operational conditions, drive-cycle, load or driver behaviour."

So much for the theory. How does the G-volution system stand up in practice to the unflinching operating conditions and uncompromising economics of a truck fleet? To answer that question we went to the Henley-in-Arden, Warwickshire base of R Adams and Sons, a long-established family-owned haulier at present operating a fleet of 22 tractive units and three eight-



G-volution managing director Simon Pickess: emphasising the multi-fuel potential of the Optimiser system.



R Adams and Sons boss Mark Adams: "We reckon we are saving about £120 to £180 per week per truck in fuel costs."

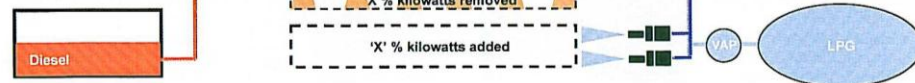


wheeled rigid. Mark Adams, who runs the company with his brother Andy, explains that it has gradually moved from coal-haulage, the basis of its business from the start 58 years ago, into agriculture. The 6x2 tractors pull mainly tipper semi-trailers, usually at 44 tonnes gross, which helps explain why average fuel economy is typically between 6 and 7mpg. Small wonder that finding ways of minimising fuel bills is a top priority for Mark and his brother.

With the exception of a 510hp Daf CF and a 420hp Scania R-series, all tractors in the R Adams fleet are MANs (or MAN ERFs). The company's local MAN dealer is Aquila Truck Centres, headed by MAN dealer association chairman Gary Mullaney (page 27). Mark Adams recalls how he challenged Mr Mullaney towards the end of 2007 as the cost of diesel started to soar again to come up with some ideas on how fuel cost savings could be made. Mr Mullaney's response was to suggest a G-volution dual-fuel version of a 430hp TGA 6x2 tractive unit with XXL cab. This duly went into service in January 2008. By the time of our visit last month it had clocked up around 170,000km. And has the truck delivered the promised savings? In answer to that question Mr Adams points to the FloGas LPG tank in the corner of his yard and to the fact that since then four more of his MAN tractors have undergone G-volution conversions. The Optimiser system was designed around the Bosch EDC-7 fuel injection equipment used on MAN D20 engines, explains Mr Pickess, so this is the only engine it fits at present. But adapted G-volution systems for other makes of truck are thought to be in the pipeline.

Mark Adams meanwhile has placed an order with Aquila for two new MAN TGA tractors, due for delivery on 1 September, both with G-volution conversions. "All

Evolution of G-volution: schematic showing the dual-fuel system's working principle.



Tactical substitution: LPG tank replaces diesel tank on MAN 6x2 run by R Adams and Sons, with no payload penalty.

the G-volution MANs we have so far have clocked up a total of around 500,000km," says Mr Adams. "We reckon we are saving about £120 to £180 per week per truck in fuel costs, taking the cost of LPG into account (around 39p per litre, excluding vat). So all in all we reckon we have saved about £56,000 on diesel so far and spent about £28,000 on lpg. At this rate the Optimiser equipment will pay for itself in 12 to 18 months."

Small change: G-volution Optimiser system in place on MAN D20 engine.

Mr Pickess puts the typical cost per vehicle of an Optimiser dual-fuel installation at around £10,000, though emphasising that variables such as axle configuration have an effect. About a dozen G-volution-converted trucks in total are now said to be in service.

Payload evidently is a crucial consideration with a tipper operation like R Adams and Sons. Something surely must have been lost here if only as a result of fitting each vehicle with an LPG tank. Mr Adams points out that in fact there is no kerb-weight penalty because the LPG tank simply replaces the additional diesel fuel tank on the nearside of the chassis which previously had been specified to extend range between fill-ups. And dual-fuel reliability? "We've had the odd teething trouble, but nothing serious," says Mr Adams. "I'm reassured anyway that if anything does go wrong with the Optimiser it simply reverts to normal diesel operation."



Going with the Flo: trucks run by R Adams and Sons use FloGas lpg, from this tank in its Warwickshire yard and from a nationwide network of FloGas filling stations.