



# Cooking

# on gas

**With increasing fuel costs and concerns over the environment, the IRTE Conference 2012 session on alternative fuel experience was very well attended. Brian Tinham reports**

In the current economic climate, it's no surprise to hear transport operators complaining about the soaring cost of diesel. It is a surprise, however, to find so few prepared to try something that promises to cut those costs at source – by substituting cheaper alternative fuels. The barriers, it appears, are knowledge, experience and cost.

So it was fascinating for delegates at the IRTE 2012 Conference to hear from three very different

operators that have grasped this nettle and converted their trucks, using three alternative approaches. Here were real numbers and real engineering insights.

First up was Catherine Crouch (left), group CRS director with Howard Tenens, who has been leading this haulage firm's charge into CNG-diesel dual-fuel conversions since 2009.

Why compressed natural gas? Crouch said that, comparing realistic alternative fuels, methane was a clear winner on both environmental and cost counts – despite the then lack of a refuelling infrastructure. "We committed to CNG," she said, "because biomethane is carbon neutral and we knew it would become the most sustainable fuel for the transport industry."

## **CNG and diesel**

Crouch worked with Mercedes-Benz and Hardstaff, whose OIGI (oil ignition, gas injection) system varies the proportion of CNG, depending on engine load and speed, up to 70% when cruising. Initially, because of evident issues with fitting gas tanks to already cluttered 6x2 tractor units, the engineering team went for 500-litre CNG tanks, mounted under trailers and 250 litre tanks on the tractor units. The combination gave a range of more than 700 miles – and, if the gas ran out, trucks could revert to diesel.

In 2011, with a preference for gas tanks on tractor units, Howard Tenens moved to version two, again with Hardstaff and Mercedes-Benz, converting

a 6x2 for a 500 mile range. "We repackaged the rear end of the tractor unit, moving the diesel and AdBlue tank, and installing an upright exhaust to make space for the CNG tanks," she stated.

The company has now been running 12 of its latest dual-fuel Axors for several months, as well as 10 of the earlier conversions, and Crouch reported significant environmental and economic success. "On the environmental side, CNG substitution results in a 15% carbon saving and biomethane takes that up to 50% – as well as the improvements, in terms of NOx and particulates," she said. "As for cost savings, CNG is 40% cheaper than diesel. So a realistic payback at today's conversion and fuel costs is three to five years, based on our mileage."

Impressive, but, to make this project feasible, Howard Tenens had to install a CNG (liquid to compressed vapour) station in Andover, Hants,

costing a quarter of a million pounds. It has since built two more at its Boston, Lincs, and Aveley, Essex, sites. All are now open to other operators and Crouch is confident that, in the foreseeable future, biomethane will be injected into the grid. So other operators are less likely to face that cost.

Talking of the future, she also said that dual-fuel technology is still evolving. "For example, we're now converting 4x2 tractor units, which are easier, because there's much more room on the chassis."

She also pointed to the £23 million demonstration programme, announced earlier this year by the Technology Strategy Board and DfT (Department for Transport). "As part of the low-carbon demonstrator trial, we will put a further 18 dual-fuel vehicles on the road during 2013," she stated.

Second to take the stage was Nick Elliott, national transport manager at Lafarge Aggregates and Concrete, and a member of the IRTE's Professional Sector Council. Describing himself as conservative by nature, Elliott advised fleet managers considering alternative fuels to review all the options. However, he added that his eventual decision in favour of LPG (liquefied petroleum gas) dual-fuel – which is a much cheaper conversion than CNG-diesel and an easier gas to find – is proving very successful.

And interestingly, that's on an application that most engineers would imagine must be marginal. Elliott's LPG-diesel experience is on fully-freighted tipping trailer combinations transporting high-weight, low-value, aggregate. What's more, his tractors only clock up around 100,000km, so this is hardly maximising the fuel cost saving.

### LPG and diesel

However, looking at the economics, he said: "We are seeing a 5.5ppm [pence per mile] reduction in fuel costs. Assuming 96,000km, that's £3,330 per annum saving on fuel, giving a 31–33 month payback, based on a capital cost of £9,000. We run our vehicles for six to seven years, so that's a lot of saving. Also, our equipment can be taken off and bolted onto the next truck at end of life, so there's another saving."

Elliott first had one of Lafarge's year-old MAN tractors converted to LPG-diesel by G-volution back in November 2010. The only technical issue he raised – beyond fitting the system that controls the LPG substitution – was resolving a payload penalty initially estimated at 160kg, due to the addition of LPG tanks. "G-volution worked on compact tank designs and we offset some of the weight by reducing diesel fill, so now there's a negligible net payload loss," he explained.

And he added that, even on MAN mid-lift tractors, equipped with all the wet kit for tipping trailer hydraulics, space was not a problem.

As for the driving experience, he told delegates

concerned about LPG's chequered past that the engine isn't souped up and runs just as sweetly as before. "I got into the truck and went for a drive fully freighted, with the guy from G-volution switching the system on and off. Even when we were doing 30mph up a steep hill and pulling hard, the driver and I couldn't tell the difference."

Finally, on the subject of refuelling, he explained that although LPG is not available everywhere, it's not difficult to find. For Lafarge, part of the solution was Flogas providing a skid-mounted station adjacent to its diesel pumps.

Indeed, so good has his experience been that not only did Lafarge have a second MAN tractor unit converted last autumn, but it is also now talking to G-volution and other vehicle manufacturers, particularly DAF, about LPG-diesel trials. "We need more marques to offer conversions. This is a good low-carbon solution and financially viable," he said.

### Gas engines

Both convincing projects – but what about running with straight, factory-ready gas trucks, instead of dual fuel? Darren O'Donnell, logistics asset manager at CCE (Coca-Cola Enterprises), provided some answers, with his presentation covering the firm's year-long trial of a CBM (compressed biomethane) powered 21-tonne Iveco Stralis 6x2 rigid, running head to head against an EEV (enhanced environmentally friendly vehicle) diesel equivalent.

That project was run with Cenex, the independent, government-funded Centre of Excellence for low-carbon and fuel-cell technologies. Looking at the findings, O'Donnell said the gas-powered Stralis recorded a 60.7% saving in well-to-wheel greenhouse gas emissions, with NOx and particulates down 85.6% and 97.1% respectively. Uptime was also comparable to the diesel version, at 99.2% against the diesel's 100% – "but that was just due to a bottom hose problem". Also, the vehicle was quieter and driver acceptance was good.

However, although fuel savings were around 13% – including write-down of the firm's CBM gas refuelling station at its Enfield depot over six years – O'Donnell stated: "Running 35,000km per year on local distribution, we just don't get an opportunity for payback." Why? Because financing costs are much higher and R&M slightly up, meaning that all-up running costs were around 15% more.

All that may change, though, he argued, if or when the gas refuelling infrastructure in the UK is rolled out. And he pointed to the fact that CCE's cost analysis was against Euro 5, not Euro 6 engined Stralis trucks – and diesel prices are continuing to rise. "There definitely will come a time when [gas trucks] are viable," asserted O'Donnell. And it's telling that CCE has now bought a fleet of 14 more gas-powered Stralis rigid.



Nick Elliott



Darren O'Donnell