

UCO units leading the way in Cenex low-carbon trials

By **David Wilcox**

TRACTOR UNITS running on fuel processed from used cooking oil (UCO) are emerging as the stars of the two-year Cenex low-carbon truck demonstration trials (*CM* 13 February).

Part way through the programme of 13 two-year-long trials, supported by £11m of government funding, the UCO trucks are comfortably outperforming the dual-fuel (diesel/gas) trucks in terms of their CO₂ savings.

Giving an update on the trial's progress at this month's Cenex LCV event at Millbrook Proving Ground in Bedfordshire, Cenex technical head Chris Walsh said data is coming back from 252 of the 363 trucks taking part in the trials. The majority of those – 348 – are dual-fuel vehicles; five are dedicated gas vehicles and 10 are Mercedes-Benz Axor tractor units running on UCO, operated by United Biscuits.

As of August, the dual-fuel vehicles were achieving an average gas substitution rate of 55%, up from just under 50% in January. They were generating well-to-wheel (WTW) CO₂ savings of 5%. The United Biscuits UCO trucks in the trial are achieving CO₂ savings of 85%.

Each of the United Biscuits Mercedes-Benz Axor 2543 (Euro-5) units has a dual-compartment fuel tank that holds 130 litres of diesel and 300 litres of fuel processed from UCO, called Ultra Biofuel. The two fuels are mixed by a blending system made by Bioltec of Germany and supplied by Bioltec's UK distributor, Convert2Green (C2G) of Middlewich, which also manufactures the fuel and is partnering United Biscuits in the low-carbon truck trials. The engine starts on pure diesel while a heat exchanger plumbed into the truck's coolant system warms the tank of UCO fuel to reduce its viscosity. As fuel temperature increases the Bioltec system begins to draw more UCO and less diesel.



Rob Wright, United Biscuits' head of distribution, said the overall average blend is 87% UCO and just 13% diesel. Because the plants grown to make the cooking oils have absorbed CO₂, this blend is reckoned to give WTW CO₂ savings of 85% compared with conventional diesel.

At the end of the shift, before the engine is turned off, the driver presses a button to switch to pure diesel, flushing out any UCO to prevent it thickening in the fuel system at low temperatures. The UCO bulk storage tank at United Biscuits' depot in Ashby-de-la-Zouch, Leicestershire, is also insulated and heated.

The Bioltec system costs £6,000, about a quarter of the price of a typical dual-fuel conversion, and was fitted by United Biscuits' own workshop. Unlike high concentrations of biodiesel, there is no need for special seals in the fuel system or more frequent filter changes.

"We are 19 months into the measurement

phase of the trial," said Wright. "The 10 trucks have covered two million kilometres and we've used 575,000 litres of UCO. We've had no repair and maintenance issues and fuel consumption is virtually the same because the calorific value per litre of UCO is within 2% of diesel's."

He added: "And we've had no cold-weather problems either." This is because Ultra Biofuel is not the same as Fame (Fatty Acid Methyl Esters) biodiesel. It conforms to a German DIN standard for vegetable oil fuels, DIN 51623.

Richard O'Keefe, MD at C2G, said: "We supply the whole package; the Bioltec system, the heated fuel storage tank and we make the Ultra Biofuel."

"We would normally structure the deal so that there is a capital payback within two years and then there is an ongoing saving on the fuel, which we peg at just below the diesel price. The savings don't depend on a fuel-duty advantage because the duty on our fuel is exactly the same as on diesel."

Analysis of tailpipe emissions by Leeds University, the third partner in the United Biscuits trial along with C2G, shows that particulate emissions are 40% lower than running on diesel alone.

The university has used an electron scanning microscope to study the condition of fuel injector nozzles removed from one of the Axors after 300,000km on UCO. It found slightly fewer deposits than on the nozzle of a conventional diesel Axor from the fleet.

"We are really encouraged by these results on Euro-5 engines," said Wright, explaining that United Biscuits has now converted two new Euro-6 Mercedes-Benz Actros 2545 units to run on UCO and will be monitoring their performance.

"UCO is the most sustainable alternative fuel because it is essentially a waste product," said Wright, adding that the UK generates 250 million litres of UCO each year.