

# COOL runnings

There's a quiet revolution in temperature-controlled transport, whispers Richard Simpson

**T**imes are changing in the refrigerated transport business, driven by the forthcoming abolition of duty-rebated (red) diesel in 2022-23 and concerns about air and noise pollution, particularly in urban deliveries.

Currently 'red' pays fuel duty of just 11.1p/litre compared to 58.7p/litre for DERV. The abolition of this discount strengthens the case for moving away from the incumbent technology of fridge units powered by dedicated diesel engines running on rebated fuel.

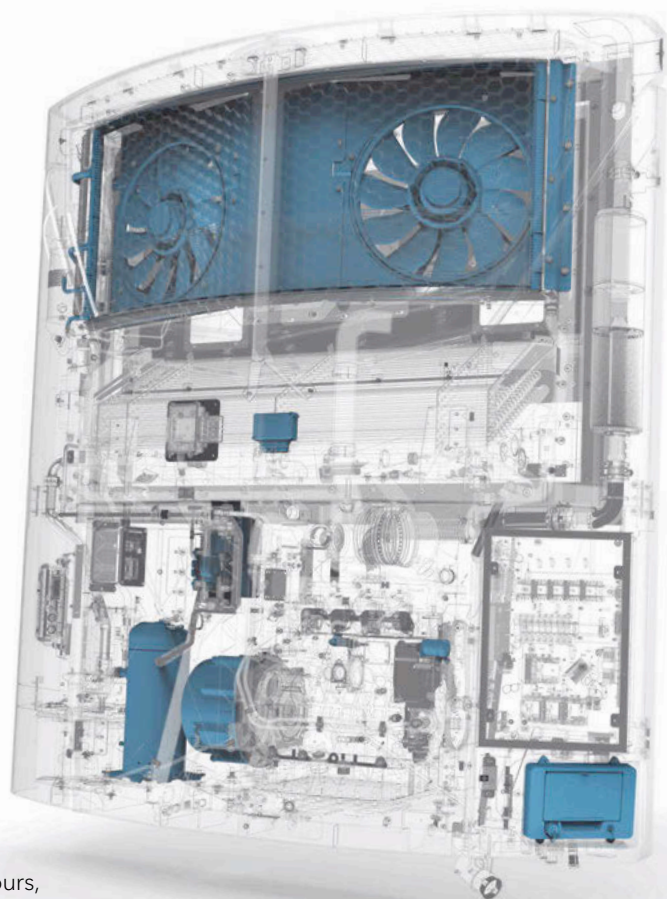
This change will accelerate existing trends towards the temperature-controlled sector seeking new technologies, whether on rigid trucks or trailers, for environmental acceptability.

Scott Dargan, managing director UK and Northern Europe at Carrier Transicold, whose Vector HE is shown above, maintains that while alternative power will play a larger role in transport refrigeration, diesel-powered units are still most commonly chosen for their operational and financial compatibility.

In terms of sustainability, Dargan believes there is progress being made in the industry overall. He says: "There has been a lot of misinformation giving the impression that fridge engines spend their lives running continuously in towns and cities pumping out pollutants. In fact, the average annual engine run

time across our entire managed fleet of rigid truck systems is 1,250 hours, meaning that for over 85% of time, the engine itself is not actually running. Moreover, when it is, it won't always be in an urban environment. Trailer units do tend to run for longer, but at the same time generally travel greater distances, with a lower duty cycle geared towards inner city work."

In an ideal world, the job of the refrigeration system is to maintain the product at the temperature it is loaded, rather than reduce it. Continues Dargan: "Of course, there are many times when the system will have to pull the temperature down, but once it reaches the required set point it will either enter a low engine speed regulation mode, or stop altogether via its start/stop functionality. Back at base, it can be plugged in to run on electric power. These two technologies, designed to



reduce fuel burn and engine run time, have been commonplace in reefers for decades."

## THE CHANGE

Due to low power output, the engines used in most refrigeration systems were exempted from previous emissions regulations (Stage IIIa Non-Road Mobile Machinery [NRMM]). However, from January 2019, new engines below 19kW were included in the EU Stage V NRMM standards. "If we look at the expansion of ultra-low emission zones and noise restrictions, and the impending removal of the red diesel rebate in the UK, the dynamics are starting to change," he concludes.

Thermo King UK area sales manager Steve Williams explains that the industry is in a transition stage moving slowly away from pure diesel, and that a variety of alternatives will be presented to the market.

"Conventional diesel fridges are going to be around for some time. Hybrid solutions will come ahead of any move to 100% electrical power. For a start, the infrastructure isn't there to support all-electric solutions yet. "To transition to full-electric products,



partnerships with other manufacturers need to be created to enable alternative power sources." (Thermo King recently announced a partnership with axle manufacturer BPW.)

Thermo King's acquisition of Frigoblock in 2015 allows it to provide a hybrid solution that can run the unit on diesel or electricity. Thermo King operators can switch to electric power when making inner city deliveries, and then back to diesel on the motorway. Similarly, Carrier Transcold's Eco-Drive modules, pictured above, allow operation of multi-brand rigid and trailer fridges on electric power using the truck engine as power source.

With hybrid options, states Williams, "Operators who have chosen the technology can use the appropriate power source for the setting."

Its hybrid solution, diagrammed below, uses an additional water-cooled Frigoblock alternator, belt-driven off the front of the truck engine, although a direct engine-driven PTO drive can sometimes be specified. "Power from the alternator is routed through an inverter, giving stable current irrespective of engine speed. To run the hybrid, the truck needs an extra bracket for the alternator and room on the chassis for the inverter.

A more radical alternative from Thermo-King draws on another cooling technique altogether. He says: "Cryogenic units are currently in use in Scandinavia and the Netherlands. The load is

cooled by the controlled release of liquid carbon dioxide sourced as a by-product of the fertilizer industry. The big advantage is that it is silent, and this is the reason for its popularity in the Netherlands where there is a need to comply with the PIEK noise limits when unloading at night. Thermo King has worked with the Dutch government to provide CO<sub>2</sub> refilling stations, but availability can sometimes be an issue."

### SCANDI IMPORT

Another European refrigeration technology is the hydraulic-electric fridge system from Hultsteins (pictured, p33, bottom). Although used since the 1960s in Scandinavia, it is relatively new to the UK. A PTO-driven hydraulic pump is used to harness power from the truck engine and provides power to the hydraulic motor to drive the fridge unit.

The company offers integrated units for rigid trucks, where the fridge unit can either be sandwiched between the cab and body, mounted under the chassis, or in the usual location above the cab.

Hultsteins also offers the British-developed Ecogen chassis-mounted clip-on generator, which can be fitted to most truck marques and power all

types of trailer fridge with an external electrical feed. Graham Usher, managing director of Eco Truck Fridge, Hultsteins' distributor for the eastern side of the UK, says Ecogen is a direct bolt-on for Scania, Volvo and Renault trucks, via an existing DIN port on the rear of the engine. Suitable PTOs could also be specified as a factory option on other makes of truck, although retrofit would require the intervention of an authorised workshop.

"I'd advise all fridge operators to specify a suitable PTO, even if they are not using Ecogen at present, to 'future-proof' new vehicles," he says. The unit, which has a 10-year operating life, can be switched to another vehicle too.

"Over its life, an independent fridge engine burns about four litres of diesel every hour of running time," Usher adds. "The Ecogen system enables that running time to be reduced or even eliminated, with little or no discernible increase in truck fuel consumption. This means a reduction in fuel cost, which will increase incrementally with the abolition of the rebate on red diesel, and lower maintenance costs for the fridge engine."

Meanwhile, Schmitz Cargobull UK has continued to innovate its trailers from 'boxes on wheels' to intelligent vehicles, according to managing director Alan Hunt. The introduction of telemetry and an ongoing programme of weight-reduction had come alongside a planned move to Hatz as supplier of the engines for its own-design refrigeration units. "The common-rail Hatz engine

is more efficient and environmentally-friendly," he says. SCB's next step will be to provide power to the cooling unit directly from the trailer axle, with surplus energy being stored onboard. **TE**

