

EMISSION POSSIBLE

TRUCK TECH: ALTERNATIVE FUELS

Emissions have dropped dramatically since the introduction of Euro-1 in 1992. But what does the future hold?

WORDS: MARTIN FLACH



Since the introduction of Euro-1 standards in 1992, there has been much talk within the road transport industry about emissions. Now, almost 30 years later, it seems an appropriate time to take an overview of the progress made so far and what the future might look like. Over a series of articles I will attempt to use my four decades of industry experience, gained with both IVECO and Ford, to bring some clarity to the subject.

Emissions is a general term for anything emitted by the vehicle. It can be split into two main categories: **Local air quality:** any emission that has an adverse effect on air quality in the area where the vehicle operates and particularly on the health of people living there.

The key emissions that fall into this category are oxides of nitrogen – NO and NOx – and particulates. Both have been linked to respiratory and cardiovascular problems, while particulates can also lead to an increased risk of cancer, albeit nowhere near the level of risk posed by smoking.

Particulates used to be predominantly produced by engine combustion and appeared as visible smoke.

With the improvements brought about by the Euro emissions regulations, however, such low levels of engine particulates have been achieved that attention is now moving to tyre, brake and clutch dusts. Sub-2.5 micron particles are a particular area of focus as smaller particles pose a greater risk to health.

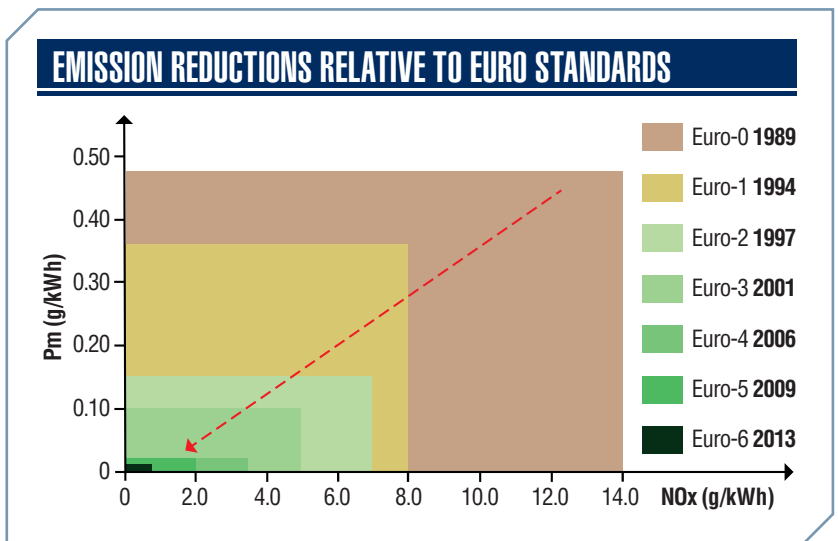
Global warming: any emission that contributes to greenhouse effects in the atmosphere.

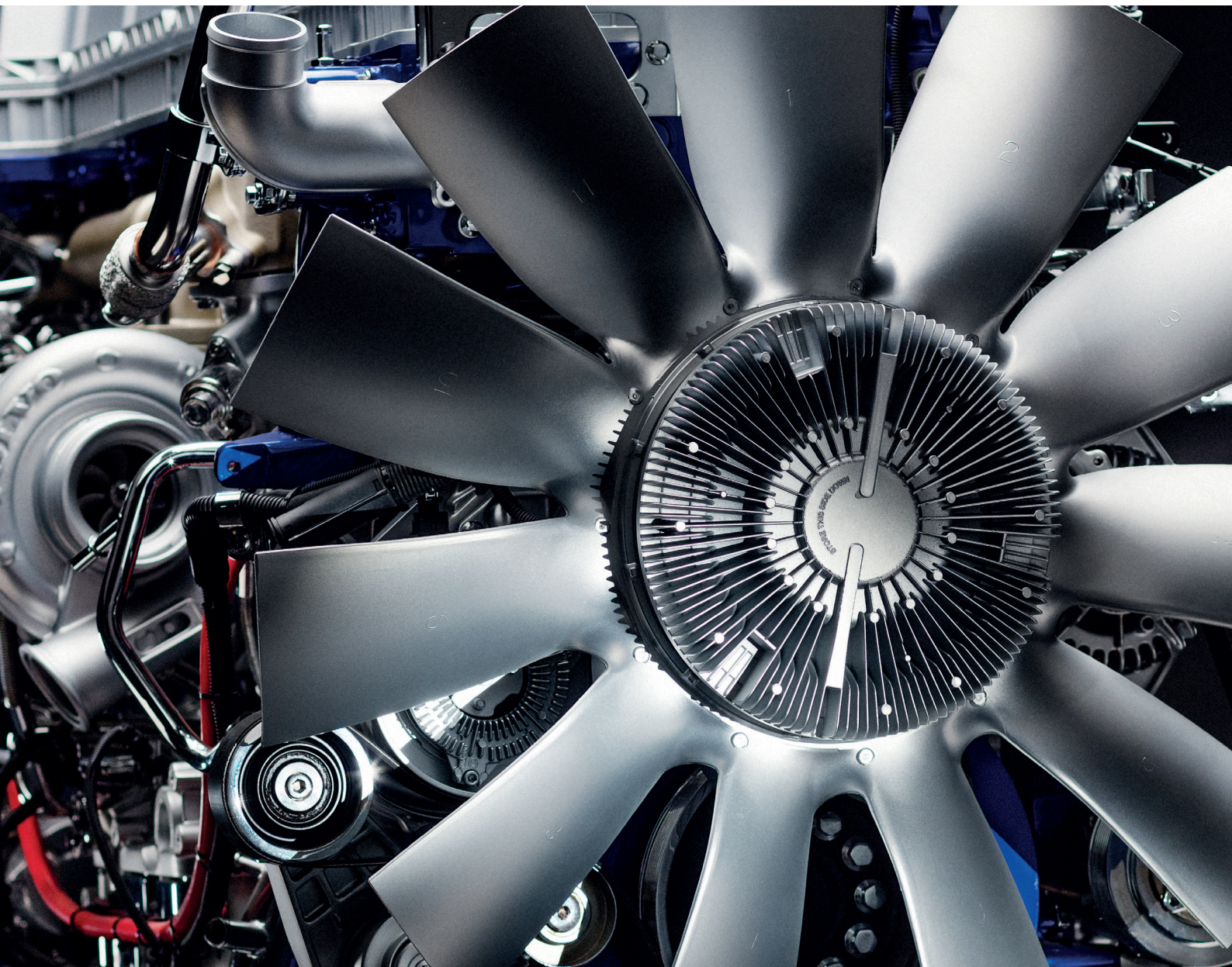
The key emissions in this category are methane, carbon dioxide (CO₂), nitrous oxide (N₂O) and refrigerant gases such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs).

Methane emissions from heavy commercial vehicles with natural gas engines have been regulated for many years, as their global warming potential (GWP) is over 30 times that of CO₂. OEMs are also keen to keep methane emissions low to ensure that fuel is not wasted. The retrofit dual-fuel conversions seen during the times of Euro-4 and Euro-5 regulation did generally suffer from high levels of methane slip, which led to CO₂-equivalent emissions often being higher than those of the base diesel vehicle.

Nitrous oxide, N₂O, better known as laughing gas, is not currently regulated as a vehicle emission. However, recent testing by the DfT and the Low Carbon Vehicle Partnership has shown that levels can be significant on vehicles with SCR exhaust after-treatment. With a GWP around 300 times greater than that of CO₂, regulation in the future seems likely.

CFCs, which have a GWP of more than 5,000, have already been successfully phased out of refrigerant systems, and HCFCs, with a GWP of around 1,500, are following suit.





LIGHT VERSUS HEAVY DUTY

When we talk about emissions regulations, some operators are unaware that the requirements for heavy-duty vehicles are different to those for light commercial vehicles.

Heavy duty: emissions are measured with an engine on a test bench and the unit of measurement is g/kWh or, in other words, grams per unit of energy. The emissions covered by the regulations are NOx, particulate matter (PMs), carbon monoxide (CO), total hydrocarbons (HC) and smoke. Important to note is that CO₂ is not regulated. For positive ignition engines like natural gas with spark ignition, methane is also covered. Ammonia was added to the list after the use of SCR became commonplace with Euro-4.

The evolution of heavy-duty emissions requirements over the past 30 years will be well known to most readers. From a starting point in the late 1980s until the introduction of Euro-6 in 2013, emissions progressively reduced as illustrated in the graph. PMs levels reduced from 0.48g/kWh to 0.01g/kWh, while NOx dropped from 14.0g/kWh to 0.4g/kWh.

At these low levels it becomes increasingly difficult to measure emissions accurately. Further reductions will be more reliant on improvements in measurement technology than the OEMs' ability to deliver the required levels.

Light duty: the vehicle is tested on a rolling road and emissions are measured in g/km. NOx, PMs, CO and non-methane hydrocarbons are regulated. The difference between the heavy- and light-duty regula-



tions is that light commercial vehicles are also tested for fuel consumption and CO₂.

Until 2018 the test used was the New European Drive Cycle (NEDC) but this has now been replaced by the Worldwide Light Duty Test Protocol (WLTP), which larger vans will adopt from September. This change has been brought about following many years of campaigning by those who point out that the published NEDC fuel consumption figures cannot be achieved in normal conditions.

Regulation will be further tightened with the addition of Real Driving Emissions (RDE), which will require manufacturers to demonstrate that the emissions produced on the road conform to those measured on the rolling road. An allowance is given for the lack of consistency between controlled testing in a laboratory and real-life road conditions.

LIGHT OR HEAVY?

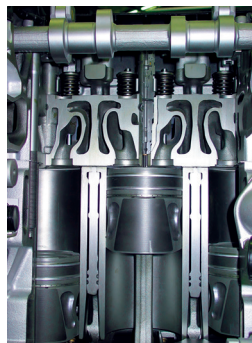
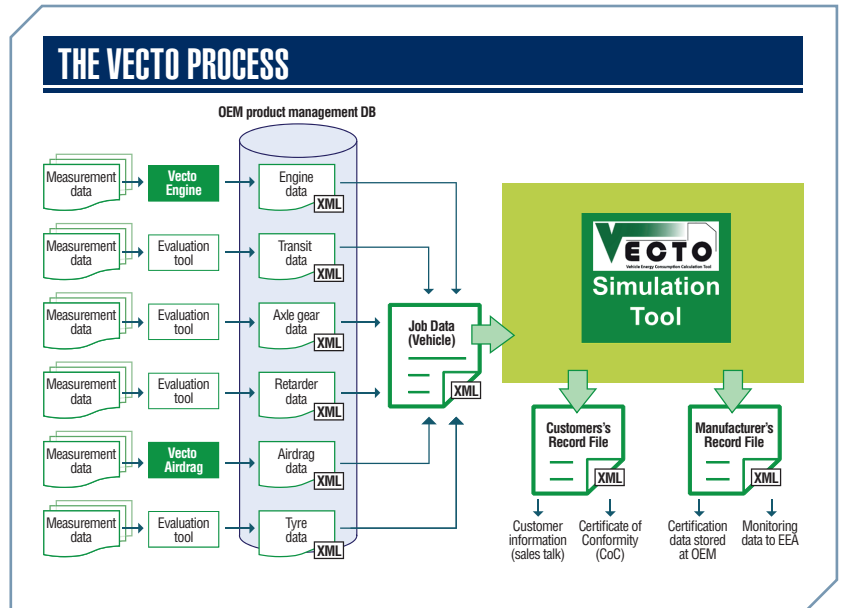
The split between light and heavy duty is determined by the reference mass of the vehicle which, broadly speaking, is the unladen weight. If this is above 2,840kg the vehicle must be certified to the heavy-duty requirements. Below 2,380kg, the vehicle qualifies as light duty. In between, the manufacturer can use either standard.

All vans at 3.5-tonne GVW and below will be light duty and all trucks at 7.5 tonnes and above will be heavy-duty. In between, a confusing mix of vehicles can be found, where the addition of a few options can force the requirement for heavy-duty emissions. With the introduction of WLTP and RDE the physical difference between light- and heavy-duty will be minimal, but for some time it has meant the difference between EGR or SCR exhaust aftertreatment.

TRUCK CO₂ EMISSIONS

Legislation has required CO₂ emissions and fuel consumption for vans to be published for many years. Manufacturers are checked on the average of all the vehicles they each produce; the 2020 target for vans is 147g/km. Factors are applied that take into account the weight of the vehicle and low-volume manufacturers, but the penalty for non-compliance is €95 (£81) per g/km over the target level. If a van manufacturer closes the year with an average of 152g/km and has produced 100,000 units, the fine will be: 5 (g over target) x 95 (€) x 100,000 (units) = €47.5m (£41m).

For some time the regulators have had heavy commercial vehicles in their sights, but have struggled with the complexity of trucks. Most manufacturers offer several thousand variants, all of which can have differing fuel consumption and hence CO₂ emissions.



“
I have yet to find an operator who will believe fuel consumption data
”

Clearly, testing every variant would be an impossible task. The answer has been found with the development of VECTO, a calculation tool that will be used by all, removing the need to test every variant and at the same time ensuring some consistency between makes. Each manufacturer must load the data for the entire driveline, the aerodynamics and rolling resistance of the truck.

VECTO will then use standardised bodies or trailers and operations to calculate fuel consumption and CO₂ emissions. The idea is that this will give the operator the ability to choose between trucks.

I have yet to find an operator who will believe any fuel consumption data supplied by the manufacturer. Most prefer to have demo units in their fleet to measure it for themselves.

Since 1 January 2019, VECTO data has been required for all 4x2 and 6x2 rigid and artics above 16 tonnes.

From 1 July 2019, these vehicles cannot be sold if the data is not available. Other vehicle categories will come in to scope progressively until July 2020.

The key aim of this regulation is to gather data to inform target setting. The EU has recently confirmed that manufacturers will have to reduce 2019 levels by 15% by 2025 and by 30% by 2030.

These targets will be argued by all over the next year or so, no doubt with the manufacturers trying to contain the environmentalists' ambition to something feasible and the politicians looking to see where the votes are. So what are the options for operators? □

● See next week's *Commercial Motor* for part two of our emissions specials.



THE POWER AND THE GLORY

TRUCK TECH: **ALTERNATIVE FUELS**

New battery technologies such as lithium-ion have made electric cars more commonplace but for commercial vehicles, significant financial and practical hurdles remain

WORDS: MARTIN FLACH

Commercial Motor The 'one size fits all' diesel engine, with its longevity, impressive fuel consumption and simple refuelling, has been the only real choice for commercial vehicle operators since the 1950s. A diesel vehicle can be used for a local job one day, a regional job the next and then a long-distance or even international run on the following day, without having to consider whether the vehicle is suitable for all these different operations. Choosing a vehicle powered by alternative fuel is much less straightforward.

ELECTRIC VEHICLES

Electric vehicles are not a new concept. Some of the earliest vehicles were electric, with the technology typically found in small, low-range vehicles such as milk floats, golf buggies and forklift trucks. Development has always been limited by the batteries; traditional lead acid batteries are heavy, have poor energy density and take a long time to recharge.

The game changer has been the introduction of new battery technologies such as lithium-ion, which have improved the energy density by a factor of five and can be recharged relatively quickly.

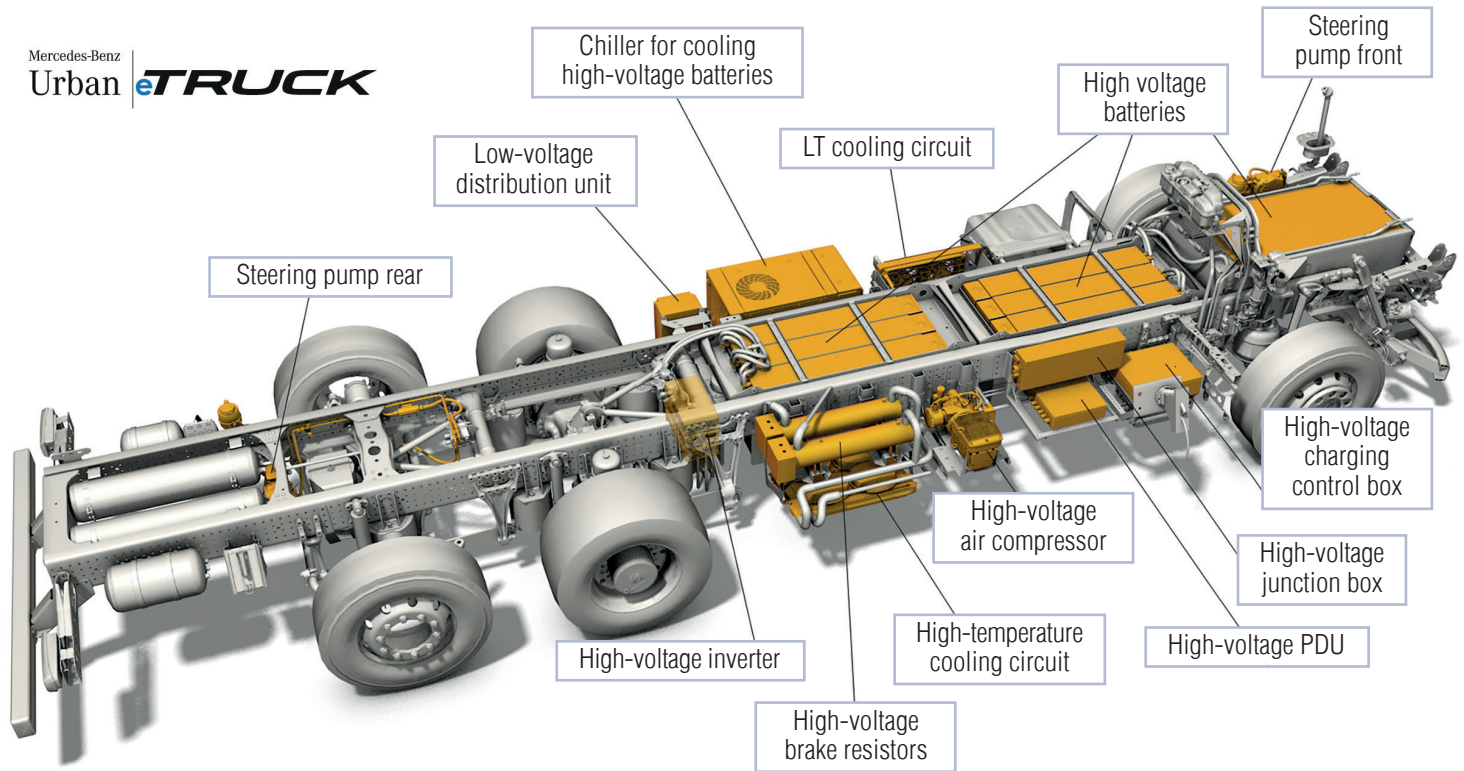


However, while battery-powered cars are becoming more commonplace it is still very early days for commercial vehicles. There are a few car-derived light van products on the market, while in the large van segment vehicles are already available from LDV, IVECO and Renault.

More are in the pipeline from Mercedes-Benz, Volkswagen/MAN and Ford, which is working with DHL Deutsche Post subsidiary Street Scooter. Conversions are available from companies such as BD Automotive, which modifies the Fiat Ducato.

Startups such as London Electric Vehicle Company ▶

Mercedes-Benz
Urban eTRUCK



and Arrival also have products coming to market soon, while the FUSO eCanter is anticipated in the 7.5-tonne sector. The limitation for all these products is still the batteries. To achieve a decent range, more batteries are needed which has an adverse effect on payload and, more importantly, cost. The limited range available will almost certainly mean that any of these vehicles will be restricted to operating in urban environments.

The payload issue for 3.5-tonne vehicles has been addressed by the derogation for B (car) licence holders to drive up to 4.25 tonnes if the vehicle is alternatively fuelled. O-licence exemption is also in place.

Although there is financial assistance available to encourage the take-up of electric vehicles, with the plug-in van grant offering up to £8,000 for vehicles up to 3.5 tonnes and up to £20,000 for vehicles above 3.5 tonnes, the purchase costs remain typically between three and five times that of the equivalent diesel vehicle. The only real way to get to a payback in five to seven years is to operate the vehicle within the London Congestion Charge zone. Outside London, payback periods can be longer than the life of the vehicle.

HEAVY VEHICLES

Moving up to the next weight category, the available range and payload rule out most artic work, so OEMs are focusing on the rigid market.

There are several companies such as EMOS, Electra, and E-Force retrofitting either used vehicles or new 'gliders' from the OEMs. This approach can

be useful in bringing models to market more quickly and extending the life of Euro-5 vehicles that would have to pay to enter London's ULEZ.

For artics, in particular the 6x2s so loved in the UK, the space required for batteries renders pure electrics suitable only for very low-range niche applications.

The alternative option of charging while on the move, which has been proposed by some, is feasible but involves huge infrastructure costs. Charging methods suggested so far include via an overhead wire as used on the railways, or in the road via a slot or inductive charging pads. In the UK, unlike in most of the EU, there is no maximum height regulation for trucks, so the height of any overhead wire would have to be chosen very carefully. In-road technology would





116g/km. This is better than a diesel vehicle, with a CO₂ emission of around 175g/km, but is hardly zero. If the electrical supply is produced by renewables the CO₂ emission will be lower, but as this resource is finite a large swing towards electric vehicles will mean burning more hydrocarbons to keep the grid alive.

PLUG-IN/RANGE-EXTENDED ELECTRIC HYBRIDS

The key difference with range-extended hybrids, also known as series hybrids, is that the internal combustion engine is not connected to the wheels by any mechanical means. Instead, it drives a generator to produce electrical energy for motors that provide the drive to the wheels.

The key benefit of this technology is its flexibility, offering a compromise between the various factors such as battery capacity, engine size, payload, cost, performance, pure electric range and overall range. If the vehicle is intended for an urban operation, the batteries, engine and fuel tank can be relatively small. For a vehicle more able to go anywhere, batteries can be larger, and engines more powerful.



Series hybrids are already used extensively in bus applications, but not yet in OEM commercial vehicles. Tevva has successfully converted several vehicles, mainly Euro-5 Mercedes Vario models, to range-extended electrics for UPS. □

● See next week's *Commercial Motor* for part three of our emissions specials.

have to be tough enough to withstand heavy traffic. Either technology seems unlikely in the short term.

Electric vehicles are certainly zero emission from the tailpipe and so ideal for addressing urban air quality issues. However, they are not zero-emission vehicles. The emissions produced in manufacturing the vehicle – from lithium mining, material shipping and manufacturing processes – need to be considered and can be significant. In operation, the emissions from the electrical generation need to be taken in to account for a true picture.

The average grid mix in the UK has a CO₂ emission of around 350g/kWh. A typical 3.5-tonne electric vehicle in an urban operation will use about 0.33kWh/km, so the CO₂ from the vehicle would be

Along the right lines:
electric road hybrid truck, Scania G 360 4x2 (hybrid truck with Siemens pantograph on the roof)

PARALLEL HYBRIDS

Parallel hybrids are those where either the internal combustion engine or the electric motor drives the axle directly. In the years of Euro-5, Mercedes, DAF, IVECO, Volvo and MAN all offered hybrid products, mainly on the medium-range vehicles at 7.5- 12 tonnes GVW. Reports from all showed good fuel consumption savings of about 25% in urban operations. Nevertheless, come Euro-6 most

had been dropped, with only the FUSO Canter Hybrid remaining on the market. The challenge was that, in urban operation, the vehicles were using about £10,000 of fuel each year, so the annual saving was only £2,500. At the time, the additional cost of the vehicle was up to £40,000, which resulted in a 16-year payback. The Canter technology is less expensive, hence the product remains available.

Hybrids will come into their own when we have zero-emission zones in several cities. Vehicles will be able to drive from one city to another using an internal combustion engine and then switch automatically to pure electric by GPS geomapping at the zone's entry point. The economics would be the additional cost of the vehicle against the cost of transhipping to a full electric vehicle somewhere outside the zero-emission zone.

HOW LOW CAN WE GO?

TECHNOLOGY: **ALTERNATIVE FUELS**

Following on in our series of articles on alternative fuels, we continue the review of the various low-carbon alternatives to diesel

WORDS: MARTIN FLACH

Commercial Motor On the face of it, hydrogen sounds like the ideal alternative fuel. It can be used in an internal combustion engine or a fuel cell and the emissions from the vehicle are water.

Some car OEMs have produced limited numbers of hydrogen vehicles. BMW had an internal combustion engine vehicle in production about 10 years ago, while Toyota, Honda and Hyundai now all have fuel-cell vehicles available. Current costs are high both for purchase and for operation, but will certainly come down as we move to a more hydrogen-based economy.

IVECO and FPT showed a hydrogen fuel-cell concept artic at IAA in 2018. The technology is feasible, but this concept demonstrated one of the limitations of hydrogen – the energy density is low, and so a lot of space is needed to store the fuel. On a 4x2 artic, with the space between the front and rear wheels on both sides of the chassis filled with tanks, range was only about 200km, compared with a diesel vehicle where this could be as much as 4,000km. Just imagine the challenge for a 6x2 artic.

Photo credit: Shutterstock / IVECO

There are currently a few buses running in the UK on hydrogen. These are short-distance, back-to-base operations using long-wheelbase, single-deck vehicles with plenty of space for fuel tanks on the roof. Range is not an issue in this operation. In the UK, ULEMco is producing some diesel conversions (pictured right) and Arcola is offering fuel cell conversions.

Hydrogen does not occur naturally in the environment. It can either be produced by removing the carbon from a hydrocarbon (such as steam-reforming methane) or by electrolysis of water to create hydrogen and oxygen. Either way, it only makes sense if the energy used to generate the hydrogen comes from a renewable source. Such a scenario could be useful for excess renewable wind or wave power at night.

Hydrogen has been seen as the fuel of the future for many years, but still seems a long way away from mass production. The most likely use of hydrogen could be as a zero-emission range extender for an electric vehicle if the cost and weight of the fuel cell and hydrogen tanks can be made competitive against an additional battery. This is the approach being taken by Arcola, which believes that at weights over 7.5 tonnes this already makes economic sense.





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COMPRESSED AND LIQUEFIED NATURAL GAS

Gas-fuelled spark ignition engines have been around since the birth of the internal combustion engine. Indeed, Nikolaus Otto used town gas as the fuel for his early developments.

In more recent years, ERF was noted for its supply of gas-powered vehicles to customers such as Safeway and Marks & Spencer. The real step forward came in the mid-2000s, when the engine technology was revised to meet the requirements of the Euro-4 regulations that for spark ignition required emissions meeting the EEV level. This was better than Euro-5. To achieve this, improvements had to be made to the combustion technology and most importantly the introduction of electronic control of the engine. IVECO and Mercedes-Benz were active in this period, with products from 3.5-tonne vans up to 26-tonne rigid.

Gas-powered artics from Volvo were available in the market with a Euro-5 methane/diesel dual-fuel engine. This was a compression ignition engine where a percentage of the diesel fuel injection was substituted with gas. This technology was also available as aftermarket conversions from Hardstaff and Clean Air Power, among others.

Although there were mixed reports about the reliability of this dual-fuel technology, the main downside was highlighted in work carried out for the DfT as part of the Low Carbon Truck Trials, where methane slip was shown to be significant. Methane is about 30 times worse than CO₂ in contributing towards global warming.

The Euro-6 requirements proved to be a step too far for the aftermarket converters, most of which are no longer trading. Euro-6 did, though, bring spark ignition offerings from Scania and IVECO, initially at 330-

340hp but more recently at 400-460hp.

Volvo has also recently returned to the market with an engine featuring high-pressure direct injection (HPDI) technology. This is still a compression ignition cycle but uses only a small amount of diesel as a liquid 'spark plug' to ignite the gas. While the spark ignition engines are available with either CNG or LNG tanks, the Volvo HPDI is only available for LNG.

The choice of LNG or CNG will depend on the vehicle operation. LNG has an energy density that is around 2.5 times that of CNG. This means that in a limited space available for tanks, the LNG vehicle will have a range 2.5 times better than the CNG vehicle. LNG is a cryogenic liquid and needs drivers to have the necessary training and personal protection equipment. Cooled down to -160C, it must be treated with respect. Filling a CNG vehicle is simpler, with no PPE required as the gas is compressed at around 250 bar at ambient temperatures.

CNG is often a few pence cheaper than LNG per kg and the vehicle will be cheaper. LNG tanks are unfortunately expensive but potentially could be given a second life on a replacement vehicle. For vehicles on operations where range is not an issue, CNG can be a good choice but for most artic operations, LNG is usually the choice.

GTL AND HVO (BIODIESELS)

In the days of mechanical in-line fuel pumps and low injection pressures, diesel engines would run with virtually any hydrocarbon. They may have been difficult to start and may have smoked a lot but they would run. Modern engines are not so flexible. The first-generation fatty acid methyl ester (FAME)-derived biodiesels worked OK in the days of Euro-4 and Euro-5, particularly with engines using unit injectors, but in Euro-6 and engines with common-rail fuel injection, with much higher injection pressures and temperatures, they struggle to be stable enough at anything except low blends.

Gas-to-liquid (GTL) and hydrogenated vegetable oil (HVO) are second-generation biodiesels. These are much closer to mineral diesel in the hydrocarbon chain and so are usable as direct replacement or drop-in fuels. This means that the engine will work well without any changes to maintenance regimes even at 100% biodiesel. Some OEMs have approved and certified engines to use these. GTL can be made from natural gas or biomethane. UK availability is limited, and higher costs are an issue, but fleets that have trialled them report good results.

The challenge that any biodiesel will have is not the



emissions from the tailpipe or well to wheel, but the public perception that this is still a diesel vehicle. With the current demonisation of diesel, this could prove to be an impossible task.

OTHER BIO AND SYNTHETIC FUELS

The benefits of liquid fuel's energy density for vehicle applications have long been recognised, with range being the main objective and easy refuelling also important. Many will recall the Volvo study of seven fuels on seven vehicles some years ago that explored alternatives to diesel. There is not much visible change yet, but extensive work is being carried out in research laboratories to investigate the potential for synthetic fuels.

With the premise of abundant solar or renewable energy available, the concept is to use this energy to split water into hydrogen and oxygen and then to combine the hydrogen with CO₂ to produce hydrocarbons. These can then be transformed into liquid form and used in internal combustion engines. This process of chemical engineering offers the prospect of designer fuels tailored for specific applications able to achieve low emissions for air quality and effectively zero emissions for global warming, with the CO₂ emitted only being that used to produce the fuel in the first place.

These fuels are still some way from production but could well be part of the future. □

● See next week's *Commercial Motor* for part four of our emissions specials.

MOTORWAY TRIALS

Recent testing by the DfT as part of the current Low Emissions Freight Trial has shown good results on CO₂ emissions on long-haul motorway operation. This was sufficient for the DfT to convince its Treasury colleagues to extend the guaranteed fuel duty differential between gas and diesel until 2032 in the 2018 Autumn Statement.

With 6x2s now available from Volvo and IVECO and the economics looking good for long distance, now seems to be the time for gas vehicles to take a slice of the market. We'll look at operator experience in a future article.

While most natural gas is still a fossil fuel, it can also be produced as biomethane from landfill or more typically now from anaerobic digestion (the big domes you often see in the countryside on farms). Biomethane is useful as it can reduce the CO₂ emissions from vehicles on a well-to-wheel basis by 80% or more.

NO_x and particulates are usually better than diesel vehicles, but since Euro-6 the improvements are smaller than they were with Euro-5.

Natural gas vehicles are a here-and-now technology that may well be replaced in the long term with other zero-emission alternatives, but for now is the only real game in town for long distance operations.



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TAKING A LEAP OF FAITH

TECHNOLOGY: **ALTERNATIVE FUELS**

In the fourth of our series of articles we look at the experiences of operators that are running very different types of alternative vehicles

WORDS: MARTIN FLACH

Commercial Motor

In previous articles in this series, we have looked at emissions and the alternative technologies that are available to help reduce them. So what are the experiences of operators that are already running alternative vehicles?

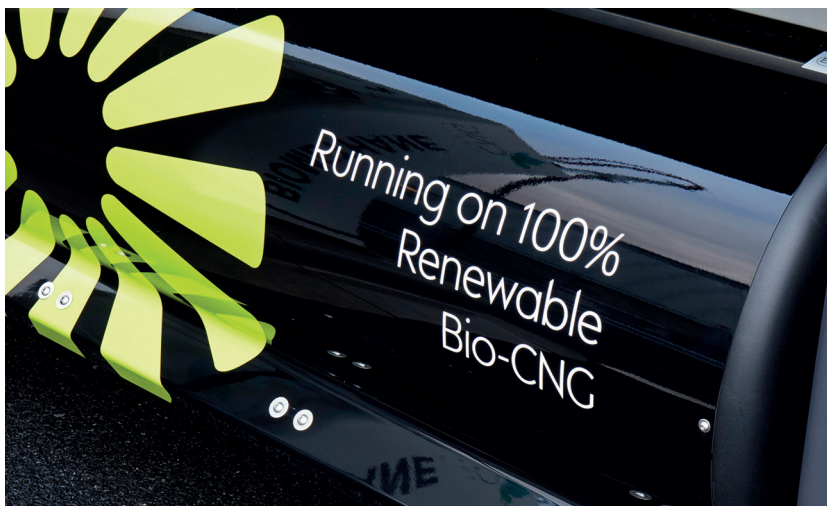
John Lewis Partnership (JLP) is the obvious operator to start with. As has been widely reported, it recently announced that it is committed to a diesel-free heavy fleet by 2028 and a zero-emission fleet by 2045, including vans and trucks.

Justin Laney, general manager, central transport, is the man tasked with achieving this. The JLP journey started in 2008, when vehicles in the fleet were converted to run on pure plant oil (PPO). They were set up to start and finish on mineral diesel and switch to PPO while running.

Although the technology worked at the time and the CO₂ benefits were good, the public debate in the late 2000s over the use of land and crops for food or fuel, together with the Treasury removing the fuel duty differential, killed off the benefits of this approach. Not deterred, JLP commissioned a study by Imperial College to look at possible alternative fuels and their sustainability and CO₂ reduction potential. The conclusions were that biomethane from waste streams and biodiesel from waste were the two best options. The JLP fleet is split into 37% trucks and 63% vans, but the CO₂ footprint is 70% from the heavy vehicles, so the focus was initially on the truck fleet.

EARLY ADOPTER

With no OEM gas artics available at the time, JLP ran dual-fuel diesel-gas vehicles for some while. On the whole these worked well, says Laney, but work conducted on behalf of the DfT showed unacceptably high levels of methane slip – the



release of unburnt methane to the atmosphere. JLP worked with Cambridge University to review methane slip catalysts, but concluded that there wasn't a technology available that would meet the requirements. Fortunately, this coincided with the introduction of Euro-6, where dual-fuel was always going to be difficult, and the availability of OEM dedicated gas engine artics from Scania and IVECO.

Laney is pragmatic about the dual-fuel era, in that although the results were not all that had been hoped for, the stepping stone that the technology provided gave operators the opportunity to experience an alternative to diesel and resulted in the creation of the refuelling infrastructure that is still in use today.

The game-changer for JLP was the building of the CNG Fuels gas station at Leyland, just 700m from the Waitrose RDC. Starting with Scania and then IVECO units, the depot is on course to have 100% gas vehicles. This is not without risks, says Laney, as he has to be sure that the station will be available all the time. Unlike with diesel trucks, you can't just nip down the road to find another filling station.





ELECTRIC VANS

Electric technology is an obvious choice, starting from small vehicles in the urban environment and progressively moving up the range. The longer-distance heavier vehicles will prove the most difficult to provide a solution for, and it may be that natural gas could be the answer for some of these applications.

The recently announced derogation for B licence holders to drive alternative fuel vehicles up to 4.25-tonne GVW will be a big help, says Laney, as it can improve the efficiency of the vehicle operation and reduce overall vehicle numbers, therefore making the economic business case viable. Care will be needed when specifying the vehicles to ensure that batteries, which are the costly and heavy part of the vehicle, are not over-specified in order to avoid any range anxiety. Charging and availability of power to sites will also need extensive preparatory work to ensure that vehicle availability is not limited by charging. All this is likely to lead to different battery set-ups for

different stores and even different routes from one store. Laney is clear: the days of one-size-fits-all are over and we all need to be smarter in our choice of vehicle and its utilisation.

GNEWT CARGO

At the other end of the scale is Gnewt Cargo, founded by Sam Clarke in 2008, and now part of Menzies Distribution. Gnewt was born following experience in China in the early 2000s where Clarke was impressed by the rapid transition to electric bicycles and scooters particularly, and on returning to the UK saw an opportunity to use electric bikes for last-mile delivery.

It was rapidly found that bikes suffered from a lack of capacity and that trikes and quadricycles gave more capacity but lost manoeuvrability in traffic. So, within a short time, the business moved to electric vans – initially with the Renault Kangoo, and more recently with the Nissan e-NV200 as well.

Subsequently there has been an explosion in numbers of bike couriers, both pedal and electric, but Clarke is concerned about the lack of regulation in the sector, which is notorious for overloaded bikes being ridden dangerously. The risks of accidents is high, and regulation could help to create stability in the sector, says Clarke.

The Gnewt fleet of more than 70 vehicles is now split equally between Renault and Nissan, with a few BD Auto 3.5-tonne GVW vehicles. Some of the Renaults are now approaching five years old and Clarke is pleased with how they have performed, with no major problems. The minor problems have tended to centre on areas of the vehicle designed for a car duty cycle, such as door locks, which, when used in high-intensity urban deliveries, show the limitations of the parts. Battery degradation has not been a problem so far, but a move of the depot increased the stem mileage and range is now more of a focus than it was. The winter months are

Working with CNG Fuels, the station has been provided with back-up systems that should ensure 100% uptime, but Laney believes that gas suppliers need to have back-up refuelling capability to ensure deliveries are not missed due to fuelling station issues.

The JLP commitment to gas vehicles will see stations being built to serve the RDCs in Bracknell, Milton Keynes and Aylesford by the end of 2020. All will use compressed biomethane natural gas, as Laney believes that the simplicity of refuelling with CNG compared with liquefied natural gas (LNG) at -160C is better for drivers and, as most vehicles operated are 4x2s running on out-and-back operations, the range is well within the limits of CNG.

The big challenge will be to find a way to introduce gas to the few 6x2 vehicles that JLP runs, as they tend to haul double-deck trailers on longer runs to areas such as Cornwall. Although LNG may be a solution, Laney would prefer to find a CNG solution even if it means needing to refuel en route. More infrastructure will be the key, he believes.

Reliability of the units has been good, but oil change intervals have been too short for his liking. New oils are set to improve the situation and he is confident that in the long term the higher costs of routine maintenance will balance out with some of the high costs he is starting to see on Euro-6 diesel vehicles, where fuel system and particulate filter repairs and replacements are starting to crop up on early units.

SECOND LIFE

JLP typically keeps its vehicles for seven years and Laney believes that by the time they come up for disposal, the resale value should be similar to a diesel vehicle of the same age. He is open, though, to other potential solutions, such as a second life for the gas tanks if that proves to be cost-effective.

While progress on the heavy fleet has been very good, the van fleet will be more challenging, says Laney. JLP runs 1,500 vans from 200 locations, making a single solution virtually impossible. □

particularly challenging, with the temperature effects on the battery charge capacity and the use of the heater by the driver reducing range significantly. These are both areas where Clarke feels that the OEMs could focus work to make simple improvements, like heating the vehicle while connected to the grid.

The 4.25-tonne driving licence derogation is a useful step for Clarke and he looks forward to new products arriving on the market from new companies such as Arrival, which will be free from the constraints often experienced by OEMs producing electric

versions of a diesel product.

When asked where the future lies for distribution, Clarke is clear that multi-model is the key. Using the right method for each step of the delivery process will lead to the best combination for the environment, while at the same time being economically sustainable. As part of this philosophy, Gnewt, in partnership with Ford, is trialling a return to portering, where a person with a trolley does the last part of the delivery. In dense traffic, walking is frequently faster than any form of

wheeled transport. The key is being able to have mobile warehouses that can supply the porter with their next load when they need it.

DO YOUR RESEARCH

Gnewt's ethos is to find practical solutions and not photo shoots for politicians and media. Having developed the business in London, the future will be to roll out with Menzies in other cities and other parts of the Menzies Distribution operations.

Clarke is clear in his advice to others thinking of making the change. You need to invest plenty of time in doing your research into available products, charging, infrastructure, telematics and even buildings to understand the implications, then seek advice and talk to others in the industry who are already on a similar journey.

The need for advice is a common theme that will be explored further in a future article.

