

Emission critical

The introduction of Euro 6 will demand fewer emissions of commercial vehicles. John Kendall investigates technologies that could help engine and vehicle manufacturers, as well as operators, to achieve targets

By the time the Euro 6 emissions limits have been fully implemented in 2014, the Europe-wide programme of exhaust emissions reductions that began in 1992 with Euro 1 will have ensured that pollution from heavy diesel engines in new trucks and buses has been slashed. In quantitative terms, compared with Euro 1, carbon monoxide (CO) emissions will have been reduced by 67%, hydrocarbons (HC) will have been cut by 88%, oxides of nitrogen (NOx) by 95% and particulates (PM) or soot by 98%.

By any standards, these are major reductions, even allowing for the greater number of vehicles on roads since the limits were first introduced, as well as vehicles in use complying with the less stringent Euro 2 to Euro 5.

After Euro 6, it seems unlikely that any further cut

in toxic pollutants will be required under European law and the emphasis will instead shift to carbon dioxide (CO₂) emissions. Indeed, the EU has already announced its plans for light CVs: by 2017, LCV makers must meet a fleet average target of 175g/km of CO₂ across their range of new vehicles sold in the EU. That target will be weight related, permitting heavier vehicles to exceed the average. The EU wants to reduce the figure further to 147g/km by 2020. The European Commission will also draw up a proposal by the end of the year to deal with emissions from vehicles built in multiple stages.

Moving targets

Add to this the EC white paper on transport, published in March, and we get a flavour of European thinking. The commission would like to see more freight travel by rail or water, instead of road. It's not for this feature to discuss these ideas, but the picture is one of downward pressure on emissions that is not likely to let up.

While we're discussing legislation, we need to consider Low Emissions Zones, such as those in London. Transport for London has focused on PM emissions and, until 3 January 2012, goods and passenger vehicles over 3.5 tonnes (five tonnes for passenger vehicles) need to conform to the Euro 3 emissions limits for PM. From that date, the vehicles will need to comply with Euro 4 for PM,



which represents an 80% reduction in particulates emissions from Euro 3. Vehicles first registered from 1 October 2006 will be deemed compliant.

From 3 January 2012, the LEZ rules will also apply to lighter vehicles. So goods vehicles from 1.205 tonnes unladen weight to 3.5 tonnes gross vehicle weight and minibuses of 5-tonnes gvw or less will also fall within scope of the regulations. Initially, the rules will only affect light vehicles registered before 1 January 2002, and vehicles complying with Euro 3 emissions limits will be deemed compliant.

As far as LEZ compliance for trucks and buses is concerned, several heavy vehicle manufacturers have made arrangements for retrofitting particulate trap systems to ensure compliance. The number of trucks likely to be affected is relatively small, given that their average working life is around seven years.

Volvo, which has several buses in service in the London area, has teamed up with Eminox to supply a continuously regenerating trap (CRT) type filter. Fitting can be arranged for all makes of vehicle at any of Volvo Truck and Bus Centre London's nine dealers. The conversion carries a reduced pollution certificate (RPC) or Low Emission Certificate (LEC) as evidence of compliance. Volvo will also provide a 24-month parts and labour warranty. The system will require cleaning and Volvo reckons this will be needed on average once a year.

Iveco has also arranged to supply an Eminox system through its parts operation, while Cummins is offering a separate CRT retrofit programme. Other filter suppliers include Dinex, Engine Control Systems and Pyroban.

Going retro

Meanwhile, Dinex has developed a range of replacement filters, displayed at the recent CV Show. Under the DiSIC label, the filters are designed to be a direct replacement for the existing silencer, involving no additional pipework. Dinex reckons that this can save between eight and 10 hours in fitting

time. The company also says the filters are approved for all European LEZs.

Retrofitting a particulate trap is not, however, low-cost, with prices in the £3,000–5,000 range, and while it may be preferred for buses and vehicles with specialist applications, the technology has limitations. For example, it is probably unrealistic to expect to bring Euro 4 and pre Euro 4 heavy engines up to Euro 5 compliance, given the more complex aftertreatment, fuel system, engine management system and engine redesign work deemed necessary by most manufacturers. So any future extension of the London Low Emissions Zone to exclude all but Euro 5 compliant vehicles would leave operators of older vehicles with little alternative but to replace them with later models.

Ultimately, road transport will need to move away from its dependence on oil products, but that is likely to be a long, slow process. In the meantime, we can expect to see more hybrid drivelines. Currently, these are well established in bus operations, where hybrids are suited to the stop/start nature of the operation, but many truck manufacturers are also running hybrid trials involving distribution and waste collection vehicles. As the pressure moves from toxic emissions to greenhouse gases, hybrid drivelines will become more attractive – although the weight of batteries remains an issue.

Otherwise, alternative fuels offer a potentially viable route to reducing emissions. Recent reports suggest that global reserves of natural gas stand at around 200 years, but renewable sources of methane – the main constituent of natural gas – could also prove to be abundant.

Gasrec produces liquid bio-methane from methane gas, mainly generated at the Albury landfill site, which could produce up to 5,000 tonnes of liquid biomethane a year – enough, according to the company, to power 100 heavy trucks a year. Gasrec development manager Doug Leaf says that research suggests the UK could produce up to 50% of current natural gas consumption with bio-methane, if other sources were tapped.

Those include sewage treatment plants, as well as landfill sites, and currently a number of water companies are either running pilot projects or investigating the potential of bio-methane. Beyond the suppliers, some truck manufacturers continue to ponder the use of dimethyl ether (DME), which offers a reduction in carbon dioxide emissions of up to 95% when the DME is sourced from biomass, considered on a well-to-wheel basis.

There are clearly many approaches to take, in order to cut emissions, and many more could arise before the next round of legislation takes hold. **TE**

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