

Transport & pollution



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Transport and Pollution

An industry challenge

JOHN MURLIS, Vice Chair, Transport Working Group, describes the main new policy developments that will affect the environmental industries in 2007 and some of the emerging solutions that will shape policy in the years to come.

Road transport is widely recognised as a major source of air pollution. Emission of fine particulates from road transport account for some 80 per cent of the measured total in urban areas, and vehicles on UK roads account for some 25 per cent of the national greenhouse-gas inventory. There is also a continuing and strong demand for road haulage and distribution services and for private motoring. It is not surprising therefore that the EIC Transport Working Group members continue to

report a high level of interest in the solutions they develop and market for reducing emissions from vehicles.

As in other parts of the UK environmental industry, it is developments in national and international policy that provide the forces that pull solutions into the market. In the UK, there is a strong tradition of evidence-based policy and the proven performance of environmental solutions gives policy makers benchmarks for the measures they can take.

New Policy Developments: Regulated Pollutants and Air Quality

In April last year, Defra and the environmental departments of the devolved administrations began a consultation on a revised Air Quality Strategy (AQS) for the UK. This major initiative is expected to set the AQ agenda for the next ten years or more. The consultation documents starts with an assessment of progress in protecting human health and the environment against

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the effects of air pollutants, with the Government's air quality objectives as a benchmark. It concludes that although there has been considerable progress since the AQS was first adopted in 1997 and that we are likely to achieve Government objectives for some pollutants, there is a long way to go on others and the problems of fine particulate (PM) and nitrogen dioxide (NO₂) are singled out for special mention. In both cases, road transport is the major source of concern. This may seem surprising as, over the years since 1997, considerable progress has been achieved in delivering lower emissions from individual vehicles, but it is the rise in the numbers of vehicles that has driven emission totals.

Against this background, it can be expected that the UK will be active in pressing for tighter EU vehicle emission standards. Later in 2006, agreement was reached on new standards for light duty vehicles for 2010 and 2014 (Euro 5 and 6). These will provide new more stringent standards for PM and NO_x. For the first time, a PM standard is to be provided for light vehicles. The Commission has been considering further stringency in the heavy vehicle standards and is expected to announce the new Euro 6 standards later this year. The new Euro 5 light vehicle standards amount to a reduction of some 80 per cent in the allowable emission of PM and will mean that diesel cars will require particulate filters. Euro 6 demands further reductions of NO_x emissions from diesel cars. The Commission claims that Euro 6 standards, relative to Euro 5, will give a 60 per cent to 90 per cent improvement in health benefits.

However, the Government recognises in its AQS consultation documents that progress in emission standards alone will not deliver its AQ objectives. It has therefore suggested a suite of further options for reducing emission from the road-transport sector, including accelerated implementation of the EU standards, incentives for retrofitting diesel particulate filters on HGVs and special action areas where high emission standards will be enforced. Analysis of the costs and benefits of the different options is under way with the full participation of EIC Transport Working Group members. The conclusions of the consultation exercise on the AQS are expected in the autumn.

London Low Emission Zone (LEZ)

In advance of the Government's revised AQS, the Greater London Authority has announced its plans for a LEZ. This aims to improve air quality in London by restricting circulation with the LEZ (most of the Greater London Area) of the more polluting commercial vehicles. This means that, as from February 2008, the largest HGVs (over 12 tonnes GVW) registered before 1 October 2001 (pre-Euro III) will either require modification to bring them up to the required Euro III standard or face a £200 daily charge. Lighter HGVs, buses and coaches enter the scheme in July 2008 followed by vans and minibuses in October 2010. In Jan 2012 the required standard rises to Euro IV. The LEZ is expected to make

a considerable impact on levels of PM in London and to produce significant health benefits for Londoners.

New Policy Developments: Tackling Climate Change

The consultation paper on the UK AQS contains some interesting hints about Government's thinking about future trends in AQ policy. In particular, it suggests that there is growing interest in policies that deliver combined benefits for air quality and for reducing the impacts of climate change. A recent EU Commission communication on greenhouse-gas emissions from transport claims that this sector is now the second largest single source in the EU.

The Commission's Communication (COM 2007 19 final) contains a mixture of disappointment and frustration with progress in improving the energy performance, (expressed as CO₂ emission) in particular, of cars and light-duty vehicles. It contrasts its aim of achieving 140 g CO₂/km by 2008/9 and 120 g CO₂/km by 2012 with the reality that cars sold in 2004 achieved only 163 g CO₂/km. The Commission concludes that this might be on track for the 140 level but it is unlikely to achieve the 120 level without further measures. The current approach, an agreement with car manufacturers, clearly needs strengthening, the Commission considers. The Commission goes on to suggest a package of further measures.

The further measures include a regulatory approach with mandatory reductions of CO₂ emissions. The target of 120 g CO₂/km would be part of a legislative framework, with the aim of reducing fleet average emission for cars to 130 g CO₂/km and of making up the extra 10 g CO₂/km by using biofuels. Similar standards for light commercial vehicles of 175g CO₂/km are suggested.

Fiscal measures are suggested with tax incentives for cleaner vehicles, including a proposed category of Light-duty Environmentally Enhanced Vehicles (LEEVs) combining performance on regulated emissions with good energy performance.

The Commission also sets out a range of ancillary measures to manage demand and to influence the behaviour of consumers. In the longer term, the Commission sets an aim of reaching the equivalent of 95 g CO₂/km for passenger cars and suggests provisions for relevant research.

New and Emerging Solutions

The scale of challenge for vehicle manufacturers from these policy initiatives is considerable. Much has been done to improve the emissions performance of petrol and diesel engines, which have become cleaner and more fuel-efficient as a result. However, since the implementation of stringent EU emissions limits for passenger cars in 1989, after-treatment technologies have been needed to deliver the required standards. More recently, manufacturers of diesel-engine vehicles have begun to use diesel particulate filters to deliver increasingly stringent standards.

For light vehicles, the new standards will require further development of tried and tested three-way catalytic exhaust treatment technology. The challenges are to ensure catalysts deliver emissions reductions from a cold start and durability of catalytic systems, five years use or 80,000km. In response to increasing pressure to improve fuel efficiency, vehicle manufacturers have begun to develop a range of 'lean burn' engine technologies, and radical solutions such as gasoline direct injection (GDI).

These engines place new demands on catalysts, and manufacturers have developed oxygen-tolerant substrates in response to deliver the required NO_x standards. An alternative approach, based on developments made originally for the heavy-duty fleet, is to use Selective Catalytic Reduction (SCR) technology, in which a reducing chemical, ammonia or urea is added to exhaust gases. Catalysts in the SCR enable the reaction between NO_x and the reducing agent to take place at the required rate in exhaust temperatures. The most recent developments, Euro 5 and 6 will pose new challenges as manufacturers consider strategies for delivering PM standards.

For the heavy-duty fleet, diesel is the fuel of choice. However, diesel engines produce fine particles (PM), which are highly injurious to health and are subject to stringent regulation as a result. Engine manufacturers have made considerable progress in managing PM, producing reduction of some 50 per cent as a result. However, the more recent standards make it increasingly difficult to deliver PM performance without after treatment. Diesel Particulate Filters (DPFs) can deliver more than 90 per cent reduction in PM. Advanced technologies have been developed to ensure that the filter elements are continually regenerated by burning off the trapped particles (CRT). Traps are now widely available both for new vehicles and as a retrofit option, enabling local action, for example on bus fleets.

For the future, SCR is available to deliver new NO_x standards. The combined trap and SCR, SCRT, technology promises a new line of emissions control for HDVs.

Manufacturers of heavy vehicles will also come under increasing pressure to deliver CO₂ performance. This will increasingly mean fine tuning engines to optimise fuel efficiency, using the DFF to remove the consequent higher emissions of PM from the engine.

For the further future, manufacturers are considering use of renewable fuels in conventional engines and such new engine technologies as fuel cells, to meet the combined challenge of climate change and urban air pollution.

Conclusion

The challenges of air pollution, especially in urban areas, and climate change have driven new policy initiatives, providing increased stringency in regulated emissions and new measures to limit CO₂ emissions.

The environmental industries have continued to rise to the challenge, developing a range of technologies for delivering high-emission performance for both light and heavy vehicles. ●